# TABLE OF CONTENTS

## PART 1—PROCUREMENT REQUIREMENTS

<table>
<thead>
<tr>
<th>Pages</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-1</td>
<td>Notice Inviting Bids</td>
</tr>
<tr>
<td>1-10</td>
<td>Instructions to Bidders</td>
</tr>
<tr>
<td>1-8</td>
<td>Bid Form (Stipulated Price Basis)</td>
</tr>
<tr>
<td>1-2</td>
<td>Idaho Bid Bond</td>
</tr>
<tr>
<td>1-4</td>
<td>Contractor’s Qualification Form</td>
</tr>
<tr>
<td>1-1</td>
<td>Contractor’s Affidavit Concerning Alcohol and Drug-Free Workplace</td>
</tr>
<tr>
<td>1-1</td>
<td>Affidavit of Payment or Securement of All Taxes</td>
</tr>
</tbody>
</table>

## PART 2—CONTRACTING REQUIREMENTS

### CONTRACTING FORMS

<table>
<thead>
<tr>
<th>Pages</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-11</td>
<td>Agreement</td>
</tr>
</tbody>
</table>

### PROJECT FORMS

<table>
<thead>
<tr>
<th>Pages</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-4</td>
<td>Performance Bond Form</td>
</tr>
<tr>
<td>1-4</td>
<td>Payment Bond Form</td>
</tr>
</tbody>
</table>

### CONDITIONS OF THE CONTRACT

<table>
<thead>
<tr>
<th>Pages</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-52</td>
<td>General Conditions</td>
</tr>
<tr>
<td>1-18</td>
<td>Supplementary Conditions</td>
</tr>
</tbody>
</table>

## PART 3—SPECIFICATIONS

### DIVISION 01—GENERAL REQUIREMENTS

<table>
<thead>
<tr>
<th>Pages</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-5</td>
<td>Summary of Work</td>
</tr>
<tr>
<td>1-7</td>
<td>Contract Modification Procedures</td>
</tr>
<tr>
<td>1-7</td>
<td>Payment Procedures</td>
</tr>
<tr>
<td>1-6</td>
<td>Project Coordination</td>
</tr>
<tr>
<td>1-3</td>
<td>Project Meetings</td>
</tr>
<tr>
<td>1-7</td>
<td>Construction Progress Documentation</td>
</tr>
<tr>
<td>1-7</td>
<td>Submittal Procedures</td>
</tr>
<tr>
<td>1-1</td>
<td>Supplement: Transmittal of Contractor’s Submittal</td>
</tr>
<tr>
<td>1-4</td>
<td>Manufacturers’ Field Services</td>
</tr>
<tr>
<td>1-1</td>
<td>Supplement: Manufacturer’s Certificate of Proper Installation</td>
</tr>
<tr>
<td>1-9</td>
<td>Contractor Quality Control</td>
</tr>
</tbody>
</table>
**Table of Contents**

<table>
<thead>
<tr>
<th>Division</th>
<th>Description</th>
<th>Pages</th>
</tr>
</thead>
<tbody>
<tr>
<td>01 50 00</td>
<td>Temporary Facilities and Controls</td>
<td>1-13</td>
</tr>
<tr>
<td>01 57 13</td>
<td>Erosion and Sediment Control During Construction</td>
<td>1-6</td>
</tr>
<tr>
<td>01 77 00</td>
<td>Closeout Procedures</td>
<td>1-4</td>
</tr>
<tr>
<td>01 78 23</td>
<td>Operation and Maintenance Data</td>
<td>1-7</td>
</tr>
<tr>
<td>01 91 14</td>
<td>Equipment Testing and Facility Startup</td>
<td>1-5</td>
</tr>
<tr>
<td>Supplement:</td>
<td>Facility Performance Demonstration/Certification Form</td>
<td>1-1</td>
</tr>
<tr>
<td>02 41 00</td>
<td>Demolition</td>
<td>1-3</td>
</tr>
<tr>
<td>26 05 01</td>
<td>Electrical</td>
<td>1-33</td>
</tr>
<tr>
<td>26 05 02</td>
<td>Basic Electrical Requirements</td>
<td>1-5</td>
</tr>
<tr>
<td>31 10 00</td>
<td>Site Clearing</td>
<td>1-3</td>
</tr>
<tr>
<td>31 23 13</td>
<td>Subgrade Preparation</td>
<td>1-3</td>
</tr>
<tr>
<td>31 23 16</td>
<td>Excavation</td>
<td>1-5</td>
</tr>
<tr>
<td>31 23 23</td>
<td>Fill and Backfill</td>
<td>1-16</td>
</tr>
<tr>
<td>31 23 23.15</td>
<td>Trench Backfill</td>
<td>1-9</td>
</tr>
<tr>
<td>31 32 00</td>
<td>Permanent Soil Stabilization</td>
<td>1-8</td>
</tr>
<tr>
<td>31 32 19.16</td>
<td>Geotextile</td>
<td>1-8</td>
</tr>
<tr>
<td>31 32 20</td>
<td>Strip Drains</td>
<td>1-7</td>
</tr>
<tr>
<td>31 37 00</td>
<td>Riprap</td>
<td>1-3</td>
</tr>
<tr>
<td>32 11 23</td>
<td>Aggregate Base Courses</td>
<td>1-6</td>
</tr>
<tr>
<td>33 05 01.10</td>
<td>High Density Polyethylene (HDPE) Pressure Pipe and Fittings</td>
<td>1-8</td>
</tr>
<tr>
<td>33 21 00</td>
<td>Landfill Gas System</td>
<td>1-11</td>
</tr>
<tr>
<td>33 41 01</td>
<td>Culverts</td>
<td>1-6</td>
</tr>
</tbody>
</table>
33 47 13.01  Pond and Reservoir Liners – HDPE ........................................ 1- 19
  Supplement:
  Geomembrane Installer’s Certification of
  Subsurface Acceptability ..................................................... 1- 1
33 47 13.07  Pond and Reservoir Liners – Geosynthetic Clay Liner (GCL) 1- 10
  Supplement:
  GCL Installer’s Certification of Subsurface Acceptability...... 1- 1

DIVISION 34 THROUGH DIVISION 39 (NOT USED)

DIVISION 40—PROCESS INTERCONNECTIONS

40 27 02  Process Valves and Operators.................................................. 1- 7

DIVISION 41—MATERIAL PROCESSING AND HANDLING EQUIPMENT

41 14 36.01  Commercial Truck Scale.................................................... 1- 9
  Supplements:
  Unitec Low Profile Scale......................................................... 1- 1
  DD 2050 Self-Service Weighing Terminal................................. 1- 4
  Matko SBL-SG Signal Light Specifications................................. 1- 2
  Vishay Model 65058 Double-Ended Shear Beam Load Cell .. 1- 3
  Unitec Drawing B-1120, 80 x 10 Low Profile Truck Scales... 1- 1
  Unitec Drawing A-1019, Low Profile Truck Scales.............. 1- 1
  Unitec Drawing B-1130, 80' Low Profile Truck Scales ........ 1- 1

DIVISIONS 42 THROUGH DIVISION 49 (NOT USED)

PART 4—DRAWINGS (BOUND SEPARATELY)

END OF SECTION
PART 1

PROCUREMENT REQUIREMENTS
NOTICE INVITING BIDS
BID NO. 2019-06

Sealed Bids for construction of Central Corridor Project, addressed to the Kootenai County Board of Commissioners, 451 Government Way (third floor), P.O. Box 9000, Coeur d’Alene, Idaho, 83816, will be received at the Commissioner’s Office, Administration Building of the County of Kootenai, State of Idaho, (Owner), until 2:00 p.m., local time, on the 14th day of May 2019. Sealed bids shall be marked “Sealed Bid – Central Corridor Project.” Any Bids received after the specified time will not be considered. Bids will then be publicly opened and read.

The Project contemplated consists of the construction of the Central Corridor Lining System and a new Commercial Scale Access Road at the Kootenai County Farm Landfill (KCFL).

Bidding Documents may be obtained from the Kootenai County Commissioner’s Office, telephone: (208) 446-1600.

Each Bid must be submitted on the prescribed Bid Form and accompanied by Bid security as prescribed in the Instructions to Bidders. Successful Bidder will be required to furnish additional bond(s) and insurance prescribed in the Bidding Documents.

For information concerning the proposed Work, or for an appointment to visit the site, contact Cathy Mayer, Kootenai County Solid Waste Department, telephone: (208) 446-1430.

Attendance at the prebid conference (site tour) to be held on April 30, 2019, at 10:00 a.m. local time will be a mandatory requirement of submitting a Bid for this Project. Refer to Instructions to Bidders for additional information.

The Kootenai County Board of Commissioners reserves the right to reject any or all Bids, to waive formalities which do not affect the essential fairness of the bidding process, to make awards in the interest of the County, and to accept the bid deemed best overall for the County.

Dated this _____ day of ____________, 2019.

KOOTENAI COUNTY BOARD OF COMMISSIONERS

By __________________________
Chris Filios, Chairman

ATTEST

By __________________________
Jim Brannon, Deputy Clerk


END OF SECTION
INSTRUCTIONS TO BIDDERS
BID NO. 2019-06

1. DEFINED TERMS

1.1. Terms used in these Instructions to Bidders have the meanings indicated in the General Conditions and Supplementary Conditions. Additional terms used in these Instructions to Bidders have the meanings indicated below:

1.1.1. Issuing Office—The office from which the Bidding Documents are to be issued and where the bidding procedures are to be administered.

2. COPIES OF BIDDING DOCUMENTS

2.1. Complete sets of the Bidding Documents in the number and for the deposit sum, if any, stated in the Invitation for Bids may be obtained from the Issuing Office.

2.2. Complete sets of Bidding Documents shall be used in preparing Bids. Neither Owner nor Engineer assumes responsibility for errors or misinterpretations resulting from use of incomplete sets of Bidding Documents.

2.3. Drawings bound in the Bidding Documents are photographic reductions of original tracings. Amount of reduction is indicated by a note or scale bar on Drawing. Full-size Drawings are not available for bidding nor are the Engineer’s computer-aided engineering (CAE) design models.

2.4. Owner and Engineer, in making copies of Bidding Documents made available on the above terms, do so only for the purpose of obtaining Bids for the Work and do not authorize or confer a license or grant for any other use.

3. QUALIFICATIONS OF BIDDERS

3.1. In order to perform Work, Bidder and its Subcontractors, prior to submittal of Bid shall hold or obtain such licenses as required by State Statutes, and federal and local Laws and Regulations.

3.2. To demonstrate Bidder’s qualifications to perform the Work, within 5 days of Owner’s request, Bidder shall submit written evidence such as financial data, previous experience, present commitments, and such other data as may be requested by the Owner in addition to the Contractor’s Qualification Form information. Contractor’s Qualification Form is required to be filled out and submitted with the Bid.

3.3. Bidder is advised to carefully review those portions of the Bid Form requiring representations and certifications.
4. LICENSE REQUIREMENTS.

4.1. Contractor Class of License Requirement: As required by Idaho Statute 54-1904 to cover cost of work performed.

4.2. Before entering into an Agreement for Work, Bidders must be authorized to do business within the state as provided by Idaho Code 63-1502.

5. EXAMINATION OF BIDDING DOCUMENTS, OTHER RELATED DATA, AND SITE

5.1. Subsurface and Physical Conditions:

5.1.1. The Supplementary Conditions identify:

5.1.1.1. Those reports known to Owner of explorations and tests of subsurface conditions at or contiguous to the Site.

5.1.1.2. Those drawings known to Owner of physical conditions relating to existing surface and subsurface structures at the Site (except Underground Facilities).

5.1.2. Copies of reports and drawings referenced will be made available by Owner to any Bidder on request. Those reports and drawings are not part of the Contract Documents, but the “technical data” contained therein upon which Bidder is entitled to rely as provided in Paragraph 5.03 of the General Conditions has been identified and established in Paragraph 5.03 of the Supplementary Conditions. Bidder is responsible for any interpretation or conclusion Bidder draws from any “technical data” or any other data, interpretations, opinions, or information contained in such reports or shown or indicated in such drawings. Costs associated with making available copies of reports and drawings shall be borne by Bidder.

5.2. Underground Facilities: Information and data shown or indicated in the Bidding Documents with respect to existing Underground Facilities at or contiguous to the Site is based upon information and data furnished to Owner and Engineer by owners of such Underground Facilities, including Owner or others.

5.3. Hazardous Environmental Condition:

5.3.1. The Supplementary Conditions identify reports and drawings known to Owner relating to a Hazardous Environmental Condition identified at the Site, if applicable.

5.3.2. Copies of reports and drawings referenced will be made available by Owner to any Bidder on request. Those reports and drawings are not part of
the Contract Documents, but the “technical data” contained therein upon which Bidder is entitled to rely as provided in Paragraph 5.06 of the General Conditions has been identified and established in Paragraph 5.06 of the Supplementary Conditions. Bidder is responsible for any interpretation or conclusion Bidder draws from any “technical data” or any other data, interpretations, opinions, or information contained in such reports or shown or indicated in such drawings. Costs associated with making available copies of reports and drawings shall be borne by Bidder.

5.4. Provisions concerning responsibilities for the adequacy of data furnished to prospective Bidders with respect to subsurface conditions, other physical conditions, and Underground Facilities, and possible changes in the Bidding Documents due to differing or unanticipated subsurface or physical conditions appear in Paragraph 5.03 through Paragraph 5.05 of the General Conditions. Provisions concerning responsibilities for the adequacy of data furnished to prospective Bidders with respect to a Hazardous Environmental Condition at the Site, if any, and possible changes in the Contract Documents as a result of any Hazardous Environmental Condition uncovered or revealed at the Site which was not shown or indicated in the Drawings or Specifications or identified in the Contract Documents to be within the scope of the Work, appear in Paragraph 5.06 of the General Conditions.

5.5. On request, Owner will provide each Bidder access to the Site to conduct such examinations, investigations, explorations, tests, and studies as Bidder deems necessary for submission of a Bid. Bidder shall fill all holes and clean up and restore the Site to its former condition upon completion of such explorations, investigations, tests, and studies. Bidder shall comply with all applicable Laws and Regulations relative to excavation and utility locates.

5.6. Related Work at Site: Reference is made to the General Requirements for identification of the general nature of other work that is to be performed at the Site by Owner or others (such as utilities and other prime contractors) that relates to the Work contemplated by these Bidding Documents. On request Owner will provide to each Bidder for examination, access to or copies of contract documents (other than portions thereof related to price) for such other work.

5.7. Safety: Paragraph 7.12.C of the General Conditions indicates that if an Owner safety program exists, it will be noted in the Supplementary Conditions.

5.8. It is responsibility of each Bidder before submitting a Bid to:

5.8.1. Examine and carefully study the Bidding Documents, other related data identified in the Bidding Documents, and any Addenda.

5.8.2. Visit the Site to become familiar with and satisfy Bidder as to the general, local, and Site conditions that may affect cost, progress, and performance of the Work.
5.8.3. Become familiar with and satisfy Bidder as to all federal, state, and local Laws and Regulations that may affect cost, progress, and performance of the Work.

5.8.4. Carefully study all:

5.8.4.1. Reports of explorations and tests of subsurface conditions at or contiguous to the Site and all drawings of physical conditions relating to existing surface or subsurface structures at the Site (except Underground Facilities) that have been identified in Paragraph 5.03 of the Supplementary Conditions as containing reliable “technical data.”

5.8.4.2. Reports and drawings of Hazardous Environmental Conditions, if any, at the Site that have been identified in Paragraph 5.06 of the Supplementary Conditions as containing reliable “technical data.”

5.8.5. Consider the information known to Bidder; information commonly known to contractors doing business in the locality of the Site; information and observations obtained from visits to the Site; the Bidding Documents; and the Site-related reports and drawings identified in the Bidding Documents, with respect to the effect of such information, observations, and documents on:

5.8.5.1. Cost, progress, and performance of the Work.

5.8.5.2. Means, methods, techniques, sequences, and procedures of construction to be employed by Bidder, including applying any specific means, methods, techniques, sequences, and procedures of construction expressly required by the Bidding Documents.

5.8.5.3. Bidder’s safety precautions and programs.

5.8.6. Agree at the time of submitting its Bid that no further examinations, investigations, explorations, tests, studies, or data are necessary for the determination of its Bid for performance of the Work at the price(s) Bid and within the times required, and in accordance with the other terms and conditions of the Bidding Documents.

5.8.7. Become aware of the general nature of the work to be performed by Owner and others at the Site that relates to the Work as indicated in the Bidding Documents.

5.8.8. Promptly give Engineer written notice of all conflicts, errors, ambiguities, or discrepancies that Bidder discovers in Bidding Documents and confirm that written resolution thereof by Engineer is acceptable to Bidder.
5.8.9. Determine Bidding Documents are generally sufficient to indicate and convey understanding of all terms and conditions for performance of the Work.

5.9. Submission of a Bid will constitute an incontrovertible representation by Bidder that Bidder has complied with every requirement of this article; that without exception the Bid is premised upon performing and furnishing the Work required by Bidding Documents and applying specific means, methods, techniques, sequences, and procedures of construction that may be shown or indicated or expressly required by Bidding Documents; that Bidder has given Engineer written notice of all conflicts, errors, ambiguities, and discrepancies that Bidder has discovered in Bidding Documents and the written resolutions thereof by Engineer are acceptable to Bidder; and that Bidding Documents are generally sufficient to indicate and convey understanding of terms and conditions for performing and furnishing the Work.

6. PREBID CONFERENCE (MANDATORY ATTENDANCE)

6.1. A prebid conference will be held at 10:00 a.m. local time on April 30, 2019, at the Kootenai County Farm Landfill located at 22089 South Highway 85, Coeur d’Alene, Idaho, 83814. Representatives of Owner and Engineer will be present to discuss the Project. Bidders are required to attend and participate in the conference. Bids will not be accepted from Bidders that do not have a representative at the prebid conference. Owner will transmit to prospective Bidders of record such Addenda as Owner considers necessary in response to questions arising at the conference. Oral statements may not be relied upon and will not be binding or legally effective.

7. SITE AND OTHER AREAS

7.1. The Site is identified in the Bidding Documents. Easements for permanent structures or permanent changes in existing facilities are to be obtained and paid for by Owner, unless otherwise provided in the Bidding Documents. All additional lands and access thereto required for temporary construction facilities, construction equipment, or storage of materials and equipment to be incorporated in the Work are to be obtained and paid for by Contractor.

8. INTERPRETATIONS AND ADDENDA

8.1. All questions about the meaning or intent of the Bidding Documents are to be submitted to Engineer in writing. Interpretations or clarifications considered necessary by Engineer in response to such questions will be issued by Addenda mailed or delivered to all parties recorded by the office issuing documents as having received the Bidding Documents. Questions received less than 10 days prior to the date for opening of Bids may not be answered. Only questions answered by Addenda will be binding. Oral and other interpretations or clarifications will be without legal effect.

8.2. Addenda may also be issued to clarify, correct, or change the Bidding Documents as deemed advisable by Owner or Engineer.
9. **BID SECURITY**

9.1. Bid shall be accompanied by Bid security made payable to Owner in an amount of 5 percent of Bidder’s maximum Bid price and in the form of: (A) Cash; (B) A cashier’s check made payable to the political subdivision; (C) A certified check made payable to the political subdivision; or (D) A bidder’s bond executed by a qualified surety company meeting the requirements of Paragraph 6.01 of the General Conditions, made payable to the political subdivision.

9.2. The Bid security of the Successful Bidder will be retained until such Bidder has executed the Contract Documents, furnished the required contract security and met the other conditions of the Notice of Award, whereupon the Bid security will be returned. If the Successful Bidder fails to execute and deliver the Contract Documents and furnish the required contract security within the time period specified in Article Signing of Agreement, Owner may consider Bidder to be in default, annul the Notice of Award, and the Bid security of that Bidder will be forfeited. Such forfeiture shall be Owner’s exclusive remedy if Bidder defaults. Bid security of other Bidders whom Owner believes to have a reasonable chance of receiving the award may be retained by Owner until the earlier of the 7th day after the Effective Date of the Agreement or the number of days specified for all Bids to remain subject to acceptance in Article Bids to Remain Subject to Acceptance, whereupon Bid security furnished by such Bidders will be returned.

9.3. Bid security of other Bidders whom Owner believes do not have a reasonable chance of receiving the award will be returned within 7 days after Bid opening.

10. **CONTRACT TIMES**

10.1. The number of days within which, or the dates by which, the Work is to be substantially completed and ready for final payment are set forth in the Agreement.

11. **LIQUIDATED DAMAGES**

11.1. Provisions for liquidated damages, if any, are set forth in the Agreement.

12. **SUBSTITUTE AND “OR-EQUAL” ITEMS**

12.1. The Contract, if awarded, will be on the basis of materials and equipment specified or described in the Bidding Documents without consideration of possible substitute or “or-equal” items. Whenever it is specified or described in the Bidding Documents that a substitute or “or-equal” item of material or equipment may be furnished or used by Contractor if acceptable to Engineer, application for such acceptance will not be considered by Engineer until after the Effective Date of the Agreement.
13. SUBCONTRACTORS, SUPPLIERS, AND OTHERS

13.1. Pursuant to Idaho Code 67-2310, when Owner is the State of Idaho, a County, Town, Village, or School District, and when the Work involves plumbing, heating and air conditioning, or electrical Work, Bidder shall include in its Bid the name and address of each Subcontractor who, in the event the Bidder is awarded the Contract, will perform the Work. Subcontractors named in accordance with the provisions of this section must possess appropriate license or Certificate of Competency issued by the State of Idaho covering the applicable classification of Work proposed. Failure of any Bidder to comply with this provision of the Idaho Code shall render Bid submitted by the Bidder unresponsive and void.

13.2. Contractor shall not be required to employ any Subcontractor, Supplier, individual, or entity against whom Contractor has reasonable objection.

14. PREPARATION OF BID

14.1. With each copy of the Bidding Documents, Bidder will be furnished one separate unbound copy of the Bid Form, and, if applicable, the Bid Bond Form. No substitution of the Bid Form will be allowed.

14.2. All blanks on the Bid Form shall be completed by typing or printing with ink and the Bid Form signed in ink. Erasures or alterations shall be initialed in ink by the person signing the Bid Form. A Bid price shall be indicated for each Bid item listed therein or the words “No Bid,” “No Change,” or “Not Applicable” entered.

14.3. A Bid by a corporation shall be executed in the corporate name by the president or a vice president or other corporate officer accompanied by evidence of authority to sign. The corporate seal shall be affixed and attested by the secretary or an assistant secretary. The corporate address and state of incorporation shall be shown.

14.4. A Bid by a partnership shall be executed in the partnership name and signed by a partner (whose title must appear under the signature), accompanied by evidence of authority to sign. The official address of the partnership shall be shown.

14.5. A Bid by a limited liability company shall be executed in the name of the firm by a member and accompanied by evidence of authority to sign. The state of formation of the firm and the official address of the firm shall be shown.

14.6. A Bid by an individual shall show the Bidder’s name and official address.

14.7. A Bid by a joint venture shall be executed by each joint venturer in the manner indicated on the Bid Form. The official address of the joint venture shall be shown.

14.8. All names shall be typed or printed in ink below the signatures.
14.9. The Bid shall contain an acknowledgement of receipt of all Addenda; the numbers of which shall be filled in on the Bid Form.

14.10. Postal and e-mail addresses and telephone number for communications regarding the Bid shall be shown.

14.11. The Bid shall contain evidence of Bidder’s authority and qualification to do business in the state where the Project is located, or Bidder shall covenant in writing to obtain such authority and qualification prior to award of the Contract and attach such covenant to the Bid. Bidder’s state contractor license number and class, if applicable, shall also be shown on the Bid Form.

15. BASIS OF BID; COMPARISON OF BIDS

15.1. Lump Sum:

   15.1.1. Bidders shall submit a Bid on a lump sum basis as set forth in the Bid Form.

15.2. Unit Price:

   15.2.1. Bidders shall submit a Bid on a unit price basis for each item of Work listed in the Bid schedule.

   15.2.2. The total of all estimated prices will be the sum of the products of the estimated quantity of each item and the corresponding unit price. The final quantities and Contract Price will be determined in accordance with Paragraph 13.03 of the General Conditions.

   15.2.3. Discrepancies between the multiplication of units of Work and unit prices will be resolved in favor of the unit prices. Discrepancies between the indicated sum of any column of figures and the correct sum thereof will be resolved in favor of the correct sum.

16. SUBMISSION OF BID

16.1. The unbound copy of the Bid Form is to be completed and submitted with the Bid security and the following data:

   16.1.1. Contractor’s Qualification Form.

   16.1.2. Contractor’s Affidavit Concerning Alcohol and Drug Free Workplace.

   16.1.3. Contractor’s License No.: ____________.

   16.1.4. Affidavit of Payment or Securement of all Taxes.
16.2. A Bid shall be submitted no later than the date and time prescribed, and at the place indicated in the Invitation for Bids. Enclose Bid in a plainly marked package with the Project title (and, if applicable, the designated portion of the Project for which the Bid is submitted), name and address of Bidder, and accompanied by the Bid security and other required documents. If a Bid is sent by mail or other delivery system, the sealed envelope containing the Bid shall be enclosed in a separate package plainly marked on the outside with the notation “BID ENCLOSED.”

17. MODIFICATION AND WITHDRAWAL OF BID

17.1. A Bid may be modified or withdrawn by an appropriate document duly executed in the same manner that a Bid must be executed and delivered to the place where Bids are to be submitted prior to the date and time for the opening of Bids.

17.2. If within 24 hours after Bids are opened any Bidder files a duly signed written notice with Owner and promptly thereafter demonstrates to the reasonable satisfaction of Owner that there was a material and substantial mistake in the preparation of its Bid, that Bidder may withdraw its Bid, and the Bid security will be returned. Thereafter, if the Work is rebid, that Bidder will be disqualified from further bidding on the Work.

18. OPENING OF BIDS

18.1. Bids will be opened at the time and place indicated in the Invitation for Bids and unless obviously nonresponsive, read aloud publicly.

19. BIDS TO REMAIN SUBJECT TO ACCEPTANCE

19.1. All Bids will remain subject to acceptance for the period of time stated in the Bid Form, but Owner may, in its sole discretion, release any Bid and return the Bid security prior to the end of this period.

20. EVALUATION OF BIDS AND AWARD OF CONTRACT

20.1. Pursuant to Idaho Code 67-2348, a resident Bidder shall be allowed a preference over a nonresident Bidder from a state which gives or requires a preference to Bidders from that state. The preference shall be equal to the preference given or required by the state of the nonresident Bidder.

20.2. Owner reserves the right to reject any or all Bids, including without limitation, nonconforming, nonresponsive, unbalanced or conditional Bids. Owner further reserves the right to reject the Bid of any Bidder whom it finds, after reasonable inquiry and evaluation, to not be responsible. Owner may also reject the Bid of any Bidder if Owner believes that it would not be in the best interest of the Project to make an award to that Bidder. Owner also reserves the right to waive all informalities not involving price, time, or changes in the Work and to negotiate contract terms with the Successful Bidder.
20.3. More than one Bid for the same Work from an individual or entity under the same or different names will not be considered. Reasonable grounds for believing that any Bidder has an interest in more than one Bid for the Work may be cause for disqualification of that Bidder and the rejection of all Bids in which that Bidder has an interest.

20.4. In evaluating Bids, Owner will consider whether or not the Bids comply with the prescribed requirements, and such alternates, unit prices, and other data, as may be requested in the Bid Form or prior to the Notice of Award.

20.5. In evaluating Bidders, Owner may consider the qualifications of Bidders and may consider the qualifications and experience of Subcontractors, Suppliers, and other individuals or entities proposed for those portions of the Work for which the identity of Subcontractors, Suppliers, and other individuals or entities must be submitted either with the Bid, or otherwise prior to issuance of the Notice of Award.

20.6. Owner may conduct such investigations as Owner deems necessary to establish responsibility, qualifications, and financial ability of Bidders, proposed Subcontractors, Suppliers, individuals, or entities proposed for those portions of the Work in accordance with the Contract Documents.

20.7. If the Contract is to be awarded, Owner will award the Contract to Bidder whose Bid is in the best interests of the Project.

21. CONTRACT SECURITY AND INSURANCE

21.1. Article 6 of the General Conditions, as may be modified by the Supplementary Conditions, sets forth Owner’s requirements as to bonds and insurance. When Successful Bidder delivers executed Agreement to Owner, it shall be accompanied by such bonds.

22. SIGNING OF AGREEMENT

22.1. When Owner issues a Notice of Award to Successful Bidder, it shall be accompanied by the required number of unsigned counterparts of the Agreement along with the other Contract Documents that are identified in the Agreement as attached thereto. Within 15 days thereafter, Successful Bidder shall sign and deliver the required number of counterparts of the Agreement and attached documents to Owner. Within 10 days thereafter, Owner shall deliver one fully signed counterpart to Successful Bidder with a complete set of Drawings with appropriate identification.

23. RETAINAGE

23.1. Provisions concerning retainage and Contractor’s rights to deposit securities in lieu of retainage, if applicable, are set forth in the Agreement.

END OF SECTION
NOTE TO BIDDER: Use typewriter or ink for completing this Bid Form.

BID FORM
(STIPULATED PRICE BASIS)

1. BID RECIPIENT

1.1. This Bid is submitted to:

Owner: Kootenai County, Idaho; Kootenai County Commissioners
Address: 451 Government Way, P.O. Box 9000, Coeur d’Alene, Idaho, 83816
Project Identification: Central Corridor Project
Contract No.: 2019-06

1.2. The undersigned Bidder proposes and agrees, if this Bid is accepted, to enter into an Agreement with Owner in the form included in the Bidding Documents to perform all Work as specified or indicated in the Bidding Documents for the prices and within the times indicated in this Bid and in accordance with the other terms and conditions of the Bidding Documents.

2. BIDDER’S ACKNOWLEDGEMENTS

2.1. Bidder accepts all of the terms and conditions of the Instructions to Bidders, including without limitation those dealing with the disposition of Bid security. This Bid will remain subject to acceptance for 60 days after the Bid opening, or for such longer period of time that Bidder may agree to in writing upon request of Owner.

3. BIDDER’S REPRESENTATIONS

3.1. In submitting this Bid, Bidder represents that:

3.1.1. Bidder has examined and carefully studied the Bidding Documents, the other related data identified in the Bidding Documents, and the following Addenda, receipt of which is hereby acknowledged.

<table>
<thead>
<tr>
<th>Addendum No.</th>
<th>Addendum Date</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

(Bidder shall insert number of each Addendum received.)
3.1.2. Bidder has visited the Site and become familiar with and is satisfied as to the general, local, and Site conditions that may affect cost, progress, and performance of the Work.

3.1.3. Bidder is familiar with and is satisfied as to all Laws and Regulations that may affect cost, progress, and performance of the Work.

3.1.4. Bidder has carefully studied: i) reports of explorations and tests of subsurface conditions at or contiguous to the Site and drawings of physical conditions relating to existing surface or subsurface structures at the Site (except Underground Facilities) which have been identified in Paragraph 5.03 of the Supplementary Conditions as containing reliable “technical data,”; and ii) reports and drawings of Hazardous Environmental Conditions, if any, at the Site that have been identified in Paragraph 5.06 of the Supplementary Conditions as containing reliable “technical data.”

3.1.5. Bidder has considered the information known to Bidder; information commonly known to contractors doing business in the locality of the Site; information and observations obtained from visits to the Site; the Bidding Documents; and the Site-related reports and drawings identified in the Bidding Documents, with respect to the effect of such information, observations, and documents on (1) the cost, progress, and performance of the Work; (2) the means, methods, techniques, sequences, and procedures of construction to be employed by Bidder, including applying the specific means, methods, techniques, sequences, and procedures of construction expressly required by the Bidding Documents; and (3) Bidder’s safety precautions and programs.

3.1.6. Based on information and observations referred to in paragraph above, Bidder does not consider that further examinations, investigations, explorations, tests, studies, or data are necessary for the determination of this Bid for performance of the Work at the price(s) Bid and within the times required, and in accordance with the other terms and conditions of the Bidding Documents.

3.1.7. Bidder is aware of the general nature of work to be performed by Owner and others at the Site that relates to the Work as indicated in the Bidding Documents.

3.1.8. Bidder has given Engineer written notice of conflicts, errors, ambiguities, or discrepancies that Bidder has discovered in the Bidding Documents, and the written resolution thereof by Engineer is acceptable to Bidder.
3.1.9. The Bidding Documents are generally sufficient to indicate and convey understanding of terms and conditions for the performance of the Work for which this Bid is submitted.

4. **BIDDER’S CERTIFICATION**

4.1. Bidder certifies:

4.1.1. This Bid is genuine and not made in the interest of or on behalf of any undisclosed individual or entity and is not submitted in conformity with any collusive agreement or rules of any group, association, organization or corporation;

4.1.2. Bidder has not directly or indirectly induced or solicited any other Bidder to submit a false or sham Bid;

4.1.3. Bidder has not solicited or induced any individual or entity to refrain from bidding; and

4.1.4. Bidder has not engaged in corrupt, fraudulent, collusive, or coercive practices in competing for the Contract. For the purposes of this paragraph:

4.1.4.1. “corrupt practice” means the offering, giving, receiving, or soliciting of anything of value likely to influence the action of a public official in the bidding process;

4.1.4.2. “fraudulent practice” means an intentional misrepresentation of facts made (a) to influence the bidding process to the detriment of Owner, (b) to establish Bid prices at artificial noncompetitive levels, or (c) to deprive Owner of the benefits of free and open competition;

4.1.4.3. “collusive practice” means a scheme or arrangement between two or more Bidders, with or without the knowledge of Owner, a purpose of which is to establish Bid prices at artificial, noncompetitive levels; and

4.1.4.4. “coercive practice” means harming or threatening to harm, directly or indirectly, persons or their property to influence their participation in the bidding process or affect the execution of the Contract.

4.1.5. Required sales and use taxes are included in the stated Bid prices for the Work.
5. **BASIS OF BIDS***SEE SUMMARY OF WORK FOR ADJUSTMENTS TO THESE BID ITEMS.***

5.1. Bidder shall complete the Work in accordance with the Contract Documents for the following price(s):

5.2. **Lump Sum Bid Schedule:**

<table>
<thead>
<tr>
<th>Item No.</th>
<th>Description</th>
<th>Estimated Quantity</th>
<th>Unit</th>
<th>Bid Unit Price</th>
<th>Extended Bid Unit Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>LS-1</td>
<td>Bonds, Insurance, Mobilization, Demobilization, and Contract Closeout</td>
<td>1</td>
<td>LS</td>
<td>$</td>
<td></td>
</tr>
<tr>
<td>LS-2</td>
<td>Survey and Quality Control</td>
<td>1</td>
<td>LS</td>
<td>$</td>
<td></td>
</tr>
<tr>
<td>LS-3</td>
<td>Site Clearing and Preparation</td>
<td>1</td>
<td>LS</td>
<td>$</td>
<td></td>
</tr>
<tr>
<td>LS-4</td>
<td>Temporary Facilities and Controls, and Erosion &amp; Sediment Control Measures During Construction</td>
<td>1</td>
<td>LS</td>
<td>$</td>
<td></td>
</tr>
</tbody>
</table>

Total of Lump Sum Prices $ 

5.3. **Unit Price Bid Schedule:**

5.3.1. Unit prices have been computed in accordance with Paragraph 13.03.C of the General Conditions.

5.3.2. Bidder acknowledges that estimated quantities are not guaranteed, and are solely for the purpose of comparison of Bids, and final payment for all unit price Bid items will be based on actual quantities, determined as provided in the Contract Documents.

<table>
<thead>
<tr>
<th>Item No.</th>
<th>Description</th>
<th>Estimated Quantity</th>
<th>Unit</th>
<th>Bid Unit Price</th>
<th>Extended Bid Unit Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>UP-1</td>
<td>Topsoil Removal and Stockpiling</td>
<td>6,800</td>
<td>CY</td>
<td>$</td>
<td></td>
</tr>
<tr>
<td>UP-2</td>
<td>Demolition</td>
<td>1</td>
<td>US</td>
<td>$</td>
<td></td>
</tr>
<tr>
<td>UP-3</td>
<td>General Excavation</td>
<td>10,000</td>
<td>CY</td>
<td>$</td>
<td></td>
</tr>
<tr>
<td>UP-4</td>
<td>Embankment Fill</td>
<td>13,500</td>
<td>CY</td>
<td>$</td>
<td></td>
</tr>
<tr>
<td>Item No.</td>
<td>Description</td>
<td>Estimated Quantity</td>
<td>Unit</td>
<td>Bid Unit Price</td>
<td>Extended Bid Unit Price</td>
</tr>
<tr>
<td>---------</td>
<td>--------------------------------------------------</td>
<td>--------------------</td>
<td>------</td>
<td>----------------</td>
<td>-------------------------</td>
</tr>
<tr>
<td>UP-5</td>
<td>Subgrade Preparation</td>
<td>17,000 SY</td>
<td>SY</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td>UP-6</td>
<td>Unsuitable Subgrade Areas</td>
<td>1,500 SY</td>
<td>SY</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td>UP-7</td>
<td>Bottom Liner System</td>
<td>12,000 SY</td>
<td>SY</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td>UP-8</td>
<td>Strip Drains</td>
<td>3,900 LF</td>
<td>LF</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td>UP-9</td>
<td>Drain Sand</td>
<td>6,000 CY</td>
<td>CY</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td>UP-10</td>
<td>Anchor Trench Earthwork</td>
<td>300 LF</td>
<td>LF</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td>UP-11</td>
<td>Leachate Collector</td>
<td>1,500 LF</td>
<td>LF</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td>UP-12</td>
<td>Leachate Collection Sump and Bottom Liner Penetration</td>
<td>900 SY</td>
<td>SY</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td>UP-13</td>
<td>Leachate/Clean Water Gravity Discharge Pipe System</td>
<td>1 US</td>
<td>US</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td>UP-14</td>
<td>Riprap Ditches</td>
<td>620 LF</td>
<td>LF</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td>UP-15</td>
<td>Lined Stormwater Berm</td>
<td>950 LF</td>
<td>LF</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td>UP-16</td>
<td>Perimeter Access Roads and Landfill Access Road</td>
<td>2,000 SY</td>
<td>SY</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td>UP-17</td>
<td>Commercial Scale Access Roads</td>
<td>6,600 SY</td>
<td>SY</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td>UP-18</td>
<td>Commercial Scale</td>
<td>1 EA</td>
<td>EA</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td>UP-19</td>
<td>Culverts</td>
<td>170 LF</td>
<td>LF</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td>UP-20</td>
<td>Permanent Soil Stabilization (Hydroseed and Mat)</td>
<td>5 AC</td>
<td>AC</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td>UP-21</td>
<td>12-Inch Buried Solid Wall HDPE LFG Pipe</td>
<td>260 LF</td>
<td>LF</td>
<td>$</td>
<td>$</td>
</tr>
</tbody>
</table>

**Total of Extended Bid Unit Prices $**
5.4. Base Bid Summary:

5.4.1. Lump Sum Bid Price: $_________

5.4.2. Total Extended Unit Bid Prices: $_________

5.4.3. Base Bid (Total of Above): $_________

6. TIME OF COMPLETION

6.1. Bidder agrees the Work and any Milestones specified in Section 01 31 13, Project Coordination, will be substantially complete and will be completed and ready for final payment in accordance with Paragraph 15.06 of the General Conditions on or before the dates, or within the number of calendar days, indicated in the Agreement.

6.2. Bidder accepts the provisions of the Agreement as to liquidated damages in the event of failure to complete the Work, and any specified Milestones, within the Contract Times.

7. ATTACHMENTS TO THIS BID

7.1. The following documents are submitted with and made a condition of this Bid:

7.1.1. Required Bid security in the form of Idaho Bid Bond.

7.1.2. Contractor’s Qualification Form.

7.1.3. Contractor’s Affidavit Concerning Alcohol and Drug Free Workplace.

7.1.4. Contractor’s License No.: ____________.

7.1.5. Affidavit of Payment or Securement of All Taxes.

8. DEFINED TERMS

8.1. The terms used in this Bid with initial capital letters have the meanings stated in the Instructions to Bidders, the General Conditions, and the Supplementary Conditions.
9. LIST OF SUBCONTRACTORS

9.1. Electrical Subcontractor:

Name: ________________________________

Address: ________________________________

____________________________________

Public Works License No.: ________________________________

Is the subcontractor within the Bidding authority in compliance with Idaho Code 54-1904? (circle one) Yes No

Documentation will be required to verify compliance with these provisions from the apparent successful Bidder.

10. BID SUBMITTAL

10.1. This Bid submitted by: ________________________________

Bidder’s Business Address: ________________________________

____________________________________

Phone No.:______________ FAX No.: ________________

E-mail: ________________________________

SUBMITTED on _____________, 20_______

Idaho Contractor’s License No.: ________________________________

Contractor’s License Class (where applicable): ________________

If Bidder is:

An Individual

Name (typed or printed): ________________________________

By (signature): ________________________________

Doing business as: ________________________________
A Partnership

Partnership Name: ________________________________ (SEAL)

By: ____________________________________________
(Signature of general partner – attach evidence of authority to sign)

Name (typed or printed): __________________________

A Corporation

Corporation Name: ________________________________ (SEAL)

State of Incorporation: _____________________________

Type (General Business, Professional, Service, Limited Liability): ___

By: ____________________________________________
(Signature – attach evidence of authority to sign)

Name (typed or printed): __________________________

Title: ________________________________ (CORPORATE SEAL)

Attest: _________________________________________
(Signature of Corporate Secretary)

Date of Qualification to do business in Idaho is: ________________.

A Joint Venture

Joint Venturer Name: ________________________________ (SEAL)

By: ____________________________________________
(Signature of joint venture partner – attach evidence of authority to sign)

Name (typed or printed): __________________________

Title: __________________________________________

(Each joint venturer must sign. The manner of signing for each individual, partnership, and corporation that is a party to the joint venture should be in the manner indicated above.)

END OF SECTION
IDAHO BID BOND

Any singular reference to Bidder, Surety, Owner, or other party shall be considered plural where applicable.

BIDDER (Name and Address):

SURETY (Name and Address of Principal Place of Business):

OWNER (Name and Address):

BID

Bid Due Date:
Project (Brief Description Including Location):

BOND

Bond Number:
Date (Not later than Bid due date):
Penal sum ________________________________
(Words) ________________________________
(Figures)

Surety and Bidder, intending to be legally bound hereby, subject to the terms printed on the reverse side hereof, do each cause this Bid Bond to be duly executed on its behalf by its authorized officer, agent, or representative.

BIDDER

Bidder’s Name and Corporate Seal
By: ________________________________
Signature and Title
Attest: ________________________________
Signature and Title

SURETY

Surety’s Name and Corporate Seal
By: ________________________________
Signature and Title
(Attach Power of Attorney)
Attest: ________________________________
Signature and Title

Note: Above addresses are to be used for giving required notice.
1. Bidder and Surety, jointly and severally, bind themselves, their heirs, executors, administrators, successors, and assigns to pay to Owner upon default of Bidder the penal sum set forth on the face of this Bond. Payment of the penal sum is the extent of Surety’s liability.

2. Default of Bidder shall occur upon the failure of Bidder to deliver within the time required by the Bidding Documents (or any extension thereof agreed to in writing by Owner) the executed Agreement required by the Bidding Documents and any performance and payment bonds required by the Bidding Documents.

3. This obligation shall be null and void if:
   3.1. Owner accepts Bidder’s Bid and Bidder delivers within the time required by the Bidding Documents (or any extension thereof agreed to in writing by Owner) the executed Agreement required by the Bidding Documents and any performance and payment bonds required by the Bidding Documents, or
   3.2. All Bids are rejected by Owner, or
   3.3. Owner fails to issue a Notice of Award to Bidder within the time specified in the Bidding Documents (or any extension thereof agreed to in writing by Bidder and, if applicable, consented to by Surety when required by Paragraph 5 hereof).

4. Payment under this Bond will be due and payable upon default of Bidder and within 30 calendar days after receipt by Bidder and Surety of written notice of default from Owner, which notice will be given with reasonable promptness, identifying this Bond and the Project and including a statement of the amount due.

5. Surety waives notice of any and all defenses based on or arising out of any time extension to issue Notice of Award agreed to in writing by Owner and Bidder, provided that the total time for issuing Notice of Award including extensions shall not in the aggregate exceed 120 days from Bid due date without Surety’s written consent.

6. No suit or action shall be commenced under this Bond prior to 30 calendar days after the notice of default required in Paragraph 4 above is received by Bidder and Surety and in no case later than one year after Bid due date.

7. Any suit or action under this Bond shall be commenced only in a court of competent jurisdiction located in the state in which the Project is located.

8. Notices required hereunder shall be in writing and sent to Bidder and Surety at their respective addresses shown on the face of this Bond. Such notices may be sent by personal delivery, commercial courier, or by United States Registered or Certified Mail, return receipt requested, postage pre-paid, and shall be deemed to be effective upon receipt by the party concerned.

9. Surety shall cause to be attached to this Bond a current and effective Power of Attorney evidencing the authority of the officer, agent, or representative who executed this Bond on behalf of Surety to execute, seal, and deliver such Bond and bind the Surety thereby.

10. This Bond is intended to conform to all applicable statutory requirements. Any applicable requirement of any applicable statute that has been omitted from this Bond shall be deemed to be included herein as if set forth at length. If any provision of this Bond conflicts with any applicable statute, then the provision of said statute shall govern and the remainder of this Bond that is not in conflict therewith shall continue in full force and effect.

11. The term “Bid” as used herein includes a Bid, offer, or proposal as applicable.

END OF SECTION
The Owner requires a statement as to financial ability, equipment, and experience to be completed and submitted by prospective contractors bidding on this. No Contractor is eligible to Bid until the following form has been completely filled out and submitted in accordance with the Advertisement for Bids and Instructions to Bidders.

**CONTRACTOR’S QUALIFICATION FORM**

Submitted to: Kootenai County, Idaho; Kootenai County Commissioners (Owner)

Address: 451 Government Way, P.O. Box 9000, Coeur d’Alene, Idaho, 83816

Attention: Kootenai Farm Landfill Central Corridor Project

By: ________________________________________________________________________ A Corporation

(Contractor) ____________________________________________________________________ A Partnership

An Individual

Type of Work: ___________________________________________________________________

Principal Office: __________________________________________________________________

Contractor’s Surety: __________________________________________________________________

Contractor's Bank and Local Contact: __________________________________________________________________

**EXPERIENCE QUESTIONNAIRE**

1. How many years has your organization been in business as a contractor under your present business name? __________________________

2. How many years’ experience in the proposed type and size of construction work has your organization had: (a) As a general contractor: __________________________

3. List the most recent projects your organization has had in construction work similar in type and size to the work proposed herein:

<table>
<thead>
<tr>
<th>Contract Amount</th>
<th>Class of Work</th>
<th>When Completed</th>
<th>Name &amp; Address of Owner</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
4. What other important projects has your organization completed?

<table>
<thead>
<tr>
<th>Contract Amount</th>
<th>Class of Work</th>
<th>When Completed</th>
<th>Name &amp; Address of Owner</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

5. Have you ever failed to complete any work awarded to you? _______. If so, where and why? ________________________________

6. Name the Surety Company, and the name and address of the local agent you expect to use in the event this contract is awarded to you:

__________________________________________________________________________

__________________________________________________________________________

__________________________________________________________________________
7. What is the construction experience of the individuals that will be involved in this project:

<table>
<thead>
<tr>
<th>Individual’s Name</th>
<th>Present Position or Office</th>
<th>Years of Construction Experience</th>
<th>Magnitude and Type of Work</th>
<th>In What Capacity</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

8. List the major items of equipment which you own or which will be available for use on the proposed work:

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

9. List below the contracts which you, or your company, or corporation were party, during the previous 10 years which contracts were involved in litigation of any type:

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________
10. Will you, upon request, fill out a detailed financial statement and furnish any other information that may be required by Owner?       __Yes   __No

The undersigned hereby declares that the foregoing statements are true.

By__________________________

Title________________________

Date________________________

END OF SECTION
STATE OF ___________________________
COUNTY OF ___________________________

Pursuant to the Idaho Code, Section 72-1717, I, the undersigned, being duly sworn, depose and certify that ___________________________ is in compliance with the provisions of Idaho Code, Section 72-1717; that ___________________________ provides a drug-free workplace program that complies with the provisions of Idaho Code, Title 72, Chapter 17 and will maintain such program throughout the life of a state construction contract and that ___________________________ shall subcontract work only to subcontractors meeting the requirements of Idaho Code, Section 72-1717(1)(a).

______________________________________________
Name of Contractor

______________________________________________
Address

______________________________________________
City and State

By: __________________________________
   (Signature)

Subscribed and sworn to before me this _______ day of _______________, ____.

Commission Expires:

______________________________________________
NOTARY PUBLIC, residing at

______________________________________________

END OF SECTION
AFFIDAVIT OF PAYMENT OR SECUREMENT OF ALL TAXES

STATE OF IDAHO } 
COUNTY OF _____________ } 

______________________________, being first duly sworn, on oath 
deposes and says that they are in conformance with Idaho Code 63-1502; that they have paid 
or secured to the satisfaction of the respective taxing units all taxes for which they or their 
property is liable, now due or delinquent, including assessments, excises and license fees 
levied by the State of Idaho or any taxing unit within the State of Idaho.

Signed: _____________________________ 

Titled: _______________________________ 

Subscribed and sworn to before me this _____ day of ______________ , 20 _____ 

My commission expires: _______________________________ 

_______________________________________ Notary Public 

(SEAL)

END OF SECTION
AGREEMENT

THIS AGREEMENT is by and between Kootenai County (Owner) and ________________ (Contractor).

Owner and Contractor, in consideration of the mutual covenants set forth herein, agree as follows:

1. WORK

1.1. Contractor shall complete the Work as specified or indicated in the Contract Documents. The Work is generally described as follows:

1.1.1. Construction of the Central Corridor Project at the Kootenai County Farm Landfill.

2. ENGINEER

2.1. The Project has been designed by CH2M HILL (Engineer), who is to act as Owner’s representative, assume duties and responsibilities, and have the rights and authority assigned to Engineer in the Contract Documents in connection with the completion of the Work in accordance with the Contract Documents.

3. CONTRACT TIMES

3.1. Time of the Essence: Time limits for Milestones, if any, Substantial Completion, and completion and readiness for final payment as stated in the Contract Documents are of the essence of the Contract.

3.2. Dates for Substantial Completion and Final Payment:

3.2.1. The Work shall be substantially completed on or before October 1, 2019, and completed and ready for final payment in accordance with Paragraph 15.06 of the General Conditions on or before October 30, 2019.

3.2.2. Notice to Proceed will be issued in accordance with Paragraph 4.01 of the General Conditions and is anticipated to be issued on or before June 10, 2019.

3.3. Liquidated Damages:

3.3.1. Contractor and Owner recognize that time is of the essence of this Agreement and that Owner will suffer financial loss if the Work is not completed within the times specified in Paragraph Contract Times above, plus any extensions thereof allowed in accordance with Article 11 of the General
Conditions. The parties also recognize the delays, expense, and difficulties involved in proving in a legal or arbitration proceeding the actual loss suffered by Owner if the Work is not completed on time. Accordingly, instead of requiring any such proof, Owner and Contractor agree that as liquidated damages for delay (but not as a penalty) Contractor shall pay Owner $2,500 for each day that expires after the time specified herein for Substantial Completion until the Work is substantially complete.

3.4. Force Majeure:

3.4.1. Except for the obligation to pay for services rendered, neither party hereto shall be liable for its failure to perform hereunder, in whole or in part, due to contingencies beyond its reasonable control, including, but not limited to: riots, war, fire, acts of nature, injunction, compliance with any law, regulation, guideline, or order of any governmental body or any instrumentality thereof, whether now existing or hereafter created.

4. CONTRACT PRICE

4.1. Owner will pay Contractor for completion of the Work in accordance with the Contract Documents an amount in current funds equal to the sum of the amounts determined pursuant to the following:

4.1.1. Lump Sum: For Work other than Unit Price Work.

<table>
<thead>
<tr>
<th>Item No.</th>
<th>Description</th>
<th>Estimated Quantity</th>
<th>Unit</th>
<th>Unit Price</th>
<th>Estimated Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>LS-1</td>
<td>Bonds, Insurance, Mobilization, Demobilization, and Contract Closeout</td>
<td>1</td>
<td>LS</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td>LS-2</td>
<td>Survey and Quality Control</td>
<td>1</td>
<td>LS</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td>LS-3</td>
<td>Site Clearing and Preparation</td>
<td>1</td>
<td>LS</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td>LS-4</td>
<td>Temporary Facilities and Controls, and Erosion &amp; Sediment Control Measures During Construction</td>
<td>1</td>
<td>LS</td>
<td>$</td>
<td>$</td>
</tr>
</tbody>
</table>

**TOTAL OF ESTIMATED LUMP SUM PRICES:** $__________

plus:

4.1.2. Unit Prices:

4.1.2.1. As provided in Paragraph 13.03 of the General Conditions, estimated quantities are not guaranteed, and determinations of actual
4.1.2.2. For Unit Price Work, an amount equal to the sum of established unit price for each separately identified item of Unit Price Work times the estimated quantity of that item as indicated in this paragraph:

<table>
<thead>
<tr>
<th>Item No.</th>
<th>Description</th>
<th>Estimated Quantity</th>
<th>Unit</th>
<th>Bid Unit Price</th>
<th>Extended Bid Unit Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>UP-1</td>
<td>Topsoil Removal and Stockpiling</td>
<td>6,800 CY</td>
<td>CY</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td>UP-2</td>
<td>Demolition</td>
<td>1 US</td>
<td>US</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td>UP-3</td>
<td>General Excavation</td>
<td>10,000 CY</td>
<td>CY</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td>UP-4</td>
<td>Embankment Fill</td>
<td>13,500 CY</td>
<td>CY</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td>UP-5</td>
<td>Subgrade Preparation</td>
<td>17,000 SY</td>
<td>SY</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td>UP-6</td>
<td>Unsuitable Subgrade Areas</td>
<td>1,500 SY</td>
<td>SY</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td>UP-7</td>
<td>Bottom Liner System</td>
<td>12,000 SY</td>
<td>SY</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td>UP-8</td>
<td>Strip Drains</td>
<td>3,900 LF</td>
<td>LF</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td>UP-9</td>
<td>Drain Sand</td>
<td>6,000 CY</td>
<td>CY</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td>UP-10</td>
<td>Anchor Trench Earthwork</td>
<td>300 LF</td>
<td>LF</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td>UP-11</td>
<td>Leachate Collector</td>
<td>1,500 LF</td>
<td>LF</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td>UP-12</td>
<td>Leachate Collection Sump and Bottom Liner Penetration</td>
<td>900 SY</td>
<td>SY</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td>UP-13</td>
<td>Leachate/Clean Water Gravity Discharge Pipe System</td>
<td>1 US</td>
<td>US</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td>UP-14</td>
<td>Riprap Ditches</td>
<td>620 LF</td>
<td>LF</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td>UP-15</td>
<td>Lined Stormwater Berm</td>
<td>950 LF</td>
<td>LF</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td>UP-16</td>
<td>Perimeter Access Roads and Landfill Access Road</td>
<td>2,000 SY</td>
<td>SY</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td>UP-17</td>
<td>Commercial Scale Access Roads</td>
<td>6,600 SY</td>
<td>SY</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td>UP-18</td>
<td>Commercial Scale</td>
<td>1 EA</td>
<td>EA</td>
<td>$</td>
<td>$</td>
</tr>
</tbody>
</table>
## Unit Price Bid Schedule

<table>
<thead>
<tr>
<th>Item No.</th>
<th>Description</th>
<th>Estimated Quantity</th>
<th>Unit</th>
<th>Bid Unit Price</th>
<th>Extended Bid Unit Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>UP-19</td>
<td>Culverts</td>
<td>170</td>
<td>LF</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td>UP-20</td>
<td>Permanent Soil Stabilization (Hydroseed and Mat)</td>
<td>5</td>
<td>AC</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td>UP-21</td>
<td>12-Inch Buried Solid Wall HDPE LFG Pipe</td>
<td>260</td>
<td>LF</td>
<td>$</td>
<td>$</td>
</tr>
</tbody>
</table>

**Total of Extended Bid Unit Prices** $

TOTAL OF ESTIMATED UNIT PRICES: $________

4.1.3. TOTAL ESTIMATED PRICE (including taxes):

<table>
<thead>
<tr>
<th>Dollars</th>
<th>(Words)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>Cents</td>
<td>(Words)</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>$</td>
<td>(Figures)</td>
</tr>
</tbody>
</table>

5. PAYMENT PROCEDURES

5.1. Submittal and Processing of Payments: Contractor shall submit Applications for Payment in accordance with Article 15 of the General Conditions. Applications for Payment will be processed by Engineer as provided in the General Conditions.

5.2. Progress Payments and Retainage: Owner will make progress payments on account of the Contract Price on the basis of Contractor’s Application for Payment by the 30th day of each month during performance of the Work as provided herein. All such payments will be measured by the Schedule of Values established as provided in Paragraph 2.05 of the General Conditions (and in the case of Unit Price Work based on the number of units completed) or, in the event there is no Schedule of Values, as provided in the General Requirements.

5.2.1. Prior to Substantial Completion, progress payments will be made in an amount equal to the percentage indicated below but, in each case, less the aggregate of payments previously made and less such amounts as Engineer may determine or Owner may withhold, including but not limited to liquidated damages, in accordance with Paragraph 15.01 of the General Conditions.
5.2.1.1. Ninety-five percent of Work completed (with the balance being retainage). If the Work has been 50 percent completed as determined by Engineer, and if the character and progress of the Work have been satisfactory to Owner and Engineer, Owner, on recommendation of Engineer, may determine that as long as the character and progress of the Work remain satisfactory to them, there will be no additional retainage; and

5.2.1.2. Ninety-five percent of cost of materials and equipment not incorporated in the Work (with the balance being retainage).

5.2.2. Owner will release to Contractor retainage for those separate portions of the Work determined substantially complete by Engineer and accepted by Owner for use as intended.

5.2.3. Upon Substantial Completion, Owner will pay an amount sufficient to increase total payments to Contractor to 100 percent of the Work completed, less such amounts as Engineer will determine in accordance with Paragraph 15.01.C.6 of the General Conditions and less 100 percent of Engineer’s estimate of the value of Work to be completed or corrected as shown on the tentative list of items to be completed or corrected attached to the certificate of Substantial Completion.

5.3. Final Payment: Upon final completion and acceptance of the Work in accordance with Paragraph 15.06 of the General Conditions, Owner will pay the remainder of the Contract Price as recommended by Engineer as provided in Paragraph 15.06.

6. CONTRACTOR’S REPRESENTATIONS

6.1. In order to induce Owner to enter into this Agreement, Contractor makes the following representations:

6.1.1. Contractor has examined and carefully studied the Contract Documents and the other related data identified in the Bidding Documents.

6.1.2. Contractor has visited the Site and become familiar with and is satisfied as to the general, local, and Site conditions that may affect cost, progress, and performance of the Work.

6.1.3. Contractor is familiar with and is satisfied as to all federal, state, and local Laws and Regulations that may affect cost, progress, and performance of the Work.

6.1.4. Contractor has carefully studied: (1) reports of explorations and tests of subsurface conditions at or contiguous to the Site and drawings of physical
conditions relating to existing surface or subsurface structures at the Site (except Underground Facilities) if any, which have been identified in Paragraph 5.03 of the Supplementary Conditions as containing reliable “technical data”, and (2) reports and drawings of Hazardous Environmental Conditions, if any, at the Site which have been identified in Paragraph 5.06 of the Supplementary Conditions as containing reliable “technical data.”

6.1.5. Contractor has considered the information known to Contractor; information commonly known to contractors doing business in the locality of the Site; information and observations obtained from visits to the Site; the Contract Documents; and Site-related reports and drawings identified in the Contract Documents, with respect to the effect of such information, observations, and documents on 1) the cost, progress, and performance of the Work; 2) the means, methods, techniques, sequences, and procedures of construction to be employed by Contractor, including any specific means, methods, techniques, sequences, and procedures of construction expressly required by the Contract Documents; and 3) Contractor’s safety precautions and programs.

6.1.6. Based on the information and observations referred to above, Contractor does not consider that any further examinations, investigations, explorations, tests, studies, or data are necessary for the performance of the Work at the Contract Price, within the Contract Times, and in accordance with the other terms and conditions of the Contract Documents.

6.1.7. Contractor is aware of the general nature of work to be performed by Owner and others at the Site that relates to the Work as indicated in the Contract Documents.

6.1.8. Contractor has given Engineer written notice of conflicts, errors, ambiguities, or discrepancies that Contractor has discovered in the Contract Documents, and the written resolution thereof by Engineer is acceptable to Contractor.

6.1.9. The Contract Documents are generally sufficient to indicate and convey understanding of terms and conditions for performance and furnishing of the Work.

7. CONTRACT DOCUMENTS

7.1. Contents:

7.1.1. The Contract Documents that are attached to this Agreement (except as expressly noted otherwise) consist of the following:

7.1.1.1. This Agreement (pages 1 to ____, inclusive).
7.1.1.2. Performance bond (pages ____ to ____ , inclusive).
7.1.1.3. Payment bond (pages ____ to ____ , inclusive).
7.1.1.4. General Conditions (pages ____ to ____ , inclusive).
7.1.1.5. Supplementary Conditions (pages ____ to ____ , inclusive).
7.1.1.7. Drawings consisting of 29 sheets with each sheet bearing the following general title: “Central Corridor Project.”
7.1.1.8. Addenda (numbers ____ to _____ , inclusive).

7.1.2. Exhibits to this Agreement (enumerated as follows):
7.1.2.1. Contractor’s Bid (pages ____ to ____ , inclusive).
7.1.2.2. Documentation submitted by Contractor prior to Notice of Award (pages ____ to ____ , inclusive).

7.1.3. The following which may be delivered or issued on or after the Effective Date of the Agreement and are not attached hereto:
7.1.3.1. Notice to Proceed.
7.1.3.2. Work Change Directives.
7.1.3.3. Change Order(s).

7.2. This is the entire Agreement of the parties. There are no Contract Documents other than those listed above in this Article.

7.3. The Contract Documents may only be amended, modified, or supplemented as provided in Paragraph 11.01 of the General Conditions.

8. MISCELLANEOUS

8.1. Terms used in this Agreement will have the meanings stated in the General Conditions and the Supplementary Conditions. In the event of a conflict, the terms of this Agreement shall govern.

8.2. Successors and Assigns: Owner and Contractor each binds itself, its partners, successors, assigns, and legal representatives to the other party hereto, its partners,
successors, assigns, and legal representatives in respect to all covenants, agreements, and obligations contained in the Contract Documents.

8.3. Severability: Any provision or part of the Contract Documents held to be void or unenforceable under any Law or Regulation shall be deemed stricken, and remaining provisions shall continue to be valid and binding upon Owner and Contractor, who agree the Contract Documents shall be reformed to replace such stricken provision or part thereof with a valid and enforceable provision that comes as close as possible to expressing the intention of the stricken provision.

8.4. Assignment of Contract:

8.4.1. No assignment by a party hereto of any rights under or interests in the Contract shall be binding on another party hereto without the written consent of the party sought to be bound; and, specifically but without limitation, monies that may become due and monies that are due may not be assigned without such consent (except to the extent that the effect of this restriction may be limited by law), and unless specifically stated to the contrary in any written consent to an assignment, no assignment shall release or discharge the assignor from any duty or responsibility under the Contract Documents.

8.4.2. Owner will provide Contractor with a conformed copy of the assigned contract after the assignment is completed.

8.5. Contractor’s Certifications:

8.5.1. Contractor certifies that it has not engaged in corrupt, fraudulent, collusive, or coercive practices in competing for or in executing the Contract. For the purposes of this paragraph:

8.5.1.1. “corrupt practice” means the offering, giving, receiving, or soliciting of anything of value likely to influence the action of a public official in the bidding process or in Contract execution;

8.5.1.2. “fraudulent practice” means an intentional misrepresentation of facts made (a) to influence the bidding process or the execution of the Contract to the detriment of Owner, (b) to establish Bid or Contract Price at artificial noncompetitive levels, or (c) to deprive Owner of the benefits of free and open competition;

8.5.1.3. “collusive practice” means a scheme or arrangement between two or more Bidders, with or without the knowledge of Owner, a purpose of which is to establish Bid prices at artificial, noncompetitive levels; and
8.5.1.4. “coercive practice” means harming or threatening to harm, directly or indirectly, persons or their property to influence their participation in the bidding process or affect execution of the Contract.

8.6. County-Specific Requirements:

8.6.1. Work Status: Contractor shall be responsible for providing verification of lawful work status for all of its employees, and for all employees of all subcontractors.

8.6.2. Prohibition on Discrimination: Contractor and Contractor’s subcontractors shall not discriminate against any employee or applicant for employment because of race, religion, color, sex, age, or national origin. Contractor shall take affirmative action to ensure applicants are employed and employees are treated during employment without regard to their race, religion, color, sex, age, or national origin. Such action shall include the following: employment, upgrading, demotion or transfer; recruitment or recruitment advertising; layoff or termination; rates of pay or other forms of compensation; and selection for training, including apprenticeship. Contractor agrees to post in conspicuous places, available to employees and applicants for employment, notices setting forth the policies for non-discrimination.

8.6.3. Drug-Free Workplace: Contractor shall submit an Affidavit with the Bid certifying compliance with Title 72, Chapter 17, Idaho Code, requiring the Contractor and its subcontractors to provide a drug-free workplace program and to maintain such program throughout the duration of the Agreement.

8.6.4. Independent Contractor: The parties agree that Contractor is an independent contractor of County and in no way an employee or agent of County, and is not entitled to workers’ compensation or any benefit of employment with County. County shall have no control over the performance of this Agreement by Contractor or its employees, except to specify the place of performance, and the results to be achieved.

8.6.5. Owner shall have no responsibility for security or protection of Contractor’s supplies or equipment. Contractor agrees to pay and be responsible for all taxes from the compensation received under this Agreement.

8.6.6. Warranty: Contractor warrants that all services will be performed in a good workmanlike manner and that all materials and goods supplied under this Agreement shall be of merchantable quality. Contractor acknowledges that it shall be liable for any breach of this warranty.
8.6.7. Indemnification: Contractor agrees to indemnify, defend, and hold harmless County, and its officers, agents and employees, and Engineer, as identified under Article 17.18 of the General Conditions, from and against any and all claims, losses, actions, or judgments for damages or injury to persons or property arising out of or in connection with the acts and/or performance of activities of Contractor, Contractor’s agents, employees, or representatives under this Agreement.

8.6.8. Compliance with Laws: Contractor agrees to comply with all federal, state, city, and local laws, rules, ordinances, and regulations.

8.6.9. Waiver: No waiver of any breach by either party of the terms of this Agreement shall be deemed a waiver of any subsequent breach of the Agreement.

8.6.10. Venue: This Agreement shall be governed by and interpreted under the laws of the State of Idaho. Venue for any dispute arising under this Agreement shall be in Kootenai County, Idaho.

8.6.11. Attorney Fees: Reasonable attorney fees and costs shall be awarded to the prevailing party in any suit, action, arbitration, or other proceeding of any nature whatsoever instituted in connection with any controversy arising out of this Agreement or to interpret or enforce any rights under this Agreement.

Notices: For the purposes of this Agreement, including, without any limitation, all notices required or authorized herein shall be as follows:

FOR THE COUNTY:

Kootenai County Board of Commissioners
451 Government Way
P.O. Box 9000
Coeur d’Alene, ID 83816

AND

Kootenai County Solid Waste Department
3330 North Ramsey Road
Coeur d’Alene, ID 83815

FOR THE CONTRACTOR:

__________________________________
(Name)

__________________________________
(Address)
IN WITNESS WHEREOF, Owner and Contractor have signed this Agreement in triplicate. One counterpart each has been delivered to Owner, Contractor, and Engineer. All portions of the Contract Documents have been signed or identified by Owner and Contractor or on their behalf.

This Agreement will be effective on ________________, 2018 (which is the Effective Date of the Agreement).

OWNER: ___________________________  CONTRACTOR: ___________________________

By: _______________________________  By: _______________________________

Title: _______________________________  Title: _______________________________

[CORPORATE SEAL]  [CORPORATE SEAL]

Attest: _______________________________  Attest: _______________________________

Title: _______________________________  Title: _______________________________

Address for giving notices:

____________________________________

(If Owner is a corporation, attach evidence of authority to sign. If Owner is a public body, attach evidence of authority to sign and resolution or other documents authorizing execution of this Agreement.)

Address for giving notices:

____________________________________

License No. ____________________________ (Where applicable)

Agent for service or process: ____________

____________________________________

(If Contractor is a corporation, a partnership, or a joint venture, attach evidence of authority to sign.)

END OF SECTION
PERFORMANCE BOND FORM

Any singular reference to Contractor, Surety, Owner, or other party shall be considered plural where applicable.

CONTRACTOR
(Name and Address):

SURETY
(Name and Address of Principal Place of Business):

OWNER (Name and Address):

CONTRACT
Date:
Amount:
Description (Name and Location):

BOND
Bond Number:
Date (Not earlier than Contract Date):
Amount:
Modifications to this Bond Form:

Surety and Contractor, intending to be legally bound hereby, subject to the terms printed on the reverse side hereof, do each cause this Performance Bond to be duly executed on its behalf by its authorized officer, agent, or representative.

CONTRACTOR AS PRINCIPAL
Company:
Signature: __________________________(Seal)
Name and Title

SURETY
Surety’s Name and Corporate Seal
By: ________________________________
Signature and Title
(Attach Power of Attorney)

(Space is provided below for signatures of additional parties, if required.)

Attest: ______________________________
Signature and Title
CENTRAL CORRIDOR PROJECT
KOOTENAI COUNTY SOLID WASTE

CONTRACTOR AS PRINCIPAL

Company: 
Signature: ___________________________ (Seal)
Name and Title

SURETY

________________________ (Seal)
Surety’s Name and Corporate Seal

By: _______________________________
Signature and Title
(Attach Power of Attorney)

Attest: ________________________________
Signature and Title
1. Contractor and Surety, jointly and severally, bind themselves, their heirs, executors, administrators, successors, and assigns to Owner for the performance of the Contract, which is incorporated herein by reference.

2. If Contractor performs the Contract, Surety and Contractor have no obligation under this Bond, except to participate in conferences as provided in Paragraph 3.1.

3. If there is no Owner Default, Surety’s obligation under this Bond shall arise after:

   3.1. Owner has notified Contractor and Surety, at the addresses described in Paragraph 10 below, that Owner is considering declaring a Contractor Default and has requested and attempted to arrange a conference with Contractor and Surety to be held not later than 15 days after receipt of such notice to discuss methods of performing the Contract. If Owner, Contractor and Surety agree, Contractor shall be allowed a reasonable time to perform the Contract, but such an agreement shall not waive Owner’s right, if any, subsequently to declare a Contractor Default; and

   3.2. Owner has declared a Contractor Default and formally terminated Contractor’s right to complete the Contract. Such Contractor Default shall not be declared earlier than 20 days after Contractor and Surety have received notice as provided in Paragraph 3.1; and

   3.3. Owner has agreed to pay the Balance of the Contract Price to:

       1. Surety in accordance with the terms of the Contract;

       2. Another contractor selected pursuant to Paragraph 4.3 to perform the Contract.

4. When Owner has satisfied the conditions of Paragraph 3, Surety shall promptly and at Surety’s expense take one of the following actions:

   4.1. Arrange for Contractor, with consent of Owner, to perform and complete the Contract; or

   4.2. Undertake to perform and complete the Contract itself, through its agents or through independent contractors; or

4.3. Obtain bids or negotiated proposals from qualified contractors acceptable to Owner for a contract for performance and completion of the Contract, arrange for a contract to be prepared for execution by Owner and Contractor selected with Owner’s concurrence, to be secured with performance and payment bonds executed by a qualified surety equivalent to the bonds issued on the Contract, and pay to Owner the amount of damages as described in Paragraph 6 in excess of the Balance of the Contract Price incurred by Owner resulting from Contractor Default; or

4.4. Waive its right to perform and complete, arrange for completion, or obtain a new contractor and with reasonable promptness under the circumstances:

       1. After investigation, determine the amount for which it may be liable to Owner and, as soon as practicable after the amount is determined, tender payment therefor to Owner; or

       2. Deny liability in whole or in part and notify Owner citing reasons therefor.

5. If Surety does not proceed as provided in Paragraph 4 with reasonable promptness, Surety shall be deemed to be in default on this Bond 15 days after receipt of an additional written notice from Owner to Surety demanding that Surety perform its obligations under this Bond, and Owner shall be entitled to enforce any remedy available to Owner. If Surety proceeds as provided in Paragraph 4.4, and Owner refuses the payment tendered or Surety has denied liability, in whole or in part, without further notice Owner shall be entitled to enforce any remedy available to Owner.

6. After Owner has terminated Contractor’s right to complete the Contract, and if Surety elects to act under Paragraph 4.1, 4.2, or 4.3 above, then the responsibilities of Surety to Owner shall not be greater than those of Contractor under the Contract, and the responsibilities of Owner to Surety shall not be greater than those of Owner under the Contract. To a limit of the amount of this Bond, but subject to commitment by Owner of the Balance of the Contract Price to mitigation of costs and damages on the Contract, Surety is obligated without duplication for:
6.1. The responsibilities of Contractor for correction of defective Work and completion of the Contract;

6.2. Additional legal, design professional, and delay costs resulting from Contractor’s Default, and resulting from the actions or failure to act of Surety under Paragraph 4; and

6.3. Liquidated damages, or if no liquidated damages are specified in the Contract, actual damages caused by delayed performance or non-performance of Contractor.

7. Surety shall not be liable to Owner or others for obligations of Contractor that are unrelated to the Contract, and the Balance of the Contract Price shall not be reduced or set off on account of any such unrelated obligations. No right of action shall accrue on this Bond to any person or entity other than Owner or its heirs, executors, administrators, or successors.

8. Surety hereby waives notice of any change, including changes of time, to Contract or to related subcontracts, purchase orders, and other obligations.

9. Any proceeding, legal or equitable, under this Bond may be instituted in any court of competent jurisdiction in the location in which the Work or part of the Work is located and shall be instituted within two years after Contractor Default or within two years after Contractor ceased working or within two years after Surety refuses or fails to perform its obligations under this Bond, whichever occurs first. If the provisions of this paragraph are void or prohibited by law, the minimum period of limitation available to sureties as a defense in the jurisdiction of the suit shall be applicable.

10. Notice to Surety, Owner, or Contractor shall be mailed or delivered to the address shown on the signature page.

11. When this Bond has been furnished to comply with a statutory requirement in the location where the Contract was to be performed, any provision in this Bond conflicting with said statutory requirement shall be deemed deleted herefrom and provisions conforming to such statutory requirement shall be deemed incorporated herein. The intent is that this Bond shall be construed as a statutory bond and not as a common law bond.

12. Definitions.

12.1. Balance of the Contract Price: The total amount payable by Owner to Contractor under the Contract after all proper adjustments have been made, including allowance to Contractor of any amounts received or to be received by Owner in settlement of insurance or other Claims for damages to which Contractor is entitled, reduced by all valid and proper payments made to or on behalf of Contractor under the Contract.

12.2. Contract: The agreement between Owner and Contractor identified on the signature page, including all Contract Documents and changes thereto.

12.3. Contractor Default: Failure of Contractor, which has neither been remedied nor waived, to perform or otherwise to comply with the terms of the Contract.

12.4. Owner Default: Failure of Owner, which has neither been remedied nor waived, to pay Contractor as required by the Contract or to perform and complete or comply with the other terms thereof.

END OF SECTION
PAYMENT BOND FORM

Any singular reference to Contractor, Surety, Owner, or other party shall be considered plural where applicable.

CONTRACTOR  SURETY
(Name and Address):  (Name and Address of Principal Place of Business):

OWNER (Name and Address):

CONTRACT

Date:
Amount:
Description (Name and Location):

BOND

Bond Number:
Date (Not earlier than Contract Date):
Amount:
Modifications to this Bond Form:

Surety and Contractor, intending to be legally bound hereby, subject to the terms printed on the reverse side hereof, do each cause this Payment Bond to be duly executed on its behalf by its authorized officer, agent, or representative.

CONTRACTOR AS PRINCIPAL  SURETY

Company:  Surety’s Name and Corporate Seal

Signature:  (Seal)  ____________________________
Name and Title

By:  ____________________________
Signature and Title
(Attach Power of Attorney)

(Space is provided below for signatures of additional parties, if required.)

Attest:  ____________________________
Signature and Title
1. Contractor and Surety, jointly and severally, bind themselves, their heirs, executors, administrators, successors, and assigns to Owner to pay for labor, materials, and equipment furnished by Claimants for use in the performance of the Contract, which is incorporated herein by reference.

2. With respect to Owner, this obligation shall be null and void if Contractor:

   2.1. Promptly makes payment, directly or indirectly, for all sums due Claimants, and

   2.2. Defends, indemnifies, and holds harmless Owner from all claims, demands, liens, or suits alleging non-payment by Contractor by any person or entity who furnished labor, materials, or equipment for use in the performance of the Contract, provided Owner has promptly notified Contractor and Surety (at the addresses described in Paragraph 12) of any claims, demands, liens, or suits and tendered defense of such claims, demands, liens, or suits to Contractor and Surety, and provided there is no Owner Default.

3. With respect to Claimants, this obligation shall be null and void if Contractor promptly makes payment, directly or indirectly, for all sums due.

4. Surety shall have no obligation to Claimants under this Bond until:

   4.1. Claimants who are employed by or have a direct contract with Contractor have given notice to Surety (at the addresses described in Paragraph 12) and sent a copy, or notice thereof, to Owner, stating that a claim is being made under this Bond and, with substantial accuracy, the amount of the claim.

   4.2. Claimants who do not have a direct contract with Contractor:

      1. Have furnished written notice to Contractor and sent a copy, or notice thereof, to Owner, within 90 days after having last performed labor or last furnished materials or equipment included in the claim stating, with substantial accuracy, the amount of the claim and the name of the party to whom the materials or equipment were furnished or supplied, or for whom the labor was done or performed; and

   5. If a notice by a Claimant required by Paragraph 4 is provided by Owner to Contractor or to Surety, that is sufficient compliance.

6. Reserved.

7. Surety’s total obligation shall not exceed the amount of this Bond, and the amount of this Bond shall be credited for any payments made in good faith by Surety.

8. Amounts owed by Owner to Contractor under the Contract shall be used for the performance of the Contract and to satisfy claims, if any, under any performance bond. By Contractor furnishing and Owner accepting this Bond, they agree that all funds earned by Contractor in the performance of the Contract are dedicated to satisfy obligations of Contractor and Surety under this Bond, subject to Owner’s priority to use the funds for the completion of the Work.

9. Surety shall not be liable to Owner, Claimants, or others for obligations of Contractor that are unrelated to the Contract. Owner shall not be liable for payment of any costs or expenses of any Claimant under this Bond, and shall have under this Bond no obligations to make payments to, give notices on behalf of, or otherwise have obligations to Claimants under this Bond.

10. Surety hereby waives notice of any change, including changes of time, to the Contract or to related Subcontracts, purchase orders and other obligations.
11. No suit or action shall be commenced by a Claimant under this Bond other than in a court of competent jurisdiction in the location in which the Work or part of the Work is located or after the expiration of one year from the date (1) on which the Claimant gave the notice required by Paragraph 4.1 or Paragraph 4.2.3, or (2) on which the last labor or service was performed by anyone or the last materials or equipment were furnished by anyone under the Construction Contract, whichever of (1) or (2) first occurs. If the provisions of this paragraph are void or prohibited by law, the minimum period of limitation available to sureties as a defense in the jurisdiction of the suit shall be applicable.

12. Notice to Surety, Owner, or Contractor shall be mailed or delivered to the addresses shown on the signature page. Actual receipt of notice by Surety, Owner, or Contractor, however accomplished, shall be sufficient compliance as of the date received at the address shown on the signature page.

13. When this Bond has been furnished to comply with a statutory requirement in the location where the Contract was to be performed, any provision in this Bond conflicting with said statutory requirement shall be deemed deleted herefrom and provisions conforming to such statutory requirement shall be deemed incorporated herein. The intent is that this Bond shall be construed as a statutory Bond and not as a common law bond.

14. Upon request of any person or entity appearing to be a potential beneficiary of this Bond, Contractor shall promptly furnish a copy of this Bond or shall permit a copy to be made.

15. Definitions:

15.1. Claimant: An individual or entity having a direct contract with Contractor, or with a first-tier subcontractor of Contractor, to furnish labor, materials, or equipment for use in the performance of the Contract. The intent of this Bond shall be to include without limitation in the terms “labor, materials or equipment” that part of water, gas, power, light, heat, oil, gasoline, telephone service, or rental equipment used in the Contract, architectural and engineering services required for performance of the Work of Contractor and Contractor’s Subcontractors, and all other items for which a mechanic’s lien may be asserted in the jurisdiction where the labor, materials, or equipment were furnished.

15.2. Contract: The agreement between Owner and Contractor identified on the signature page, including all Contract Documents and changes thereto.

15.3. Owner Default: Failure of Owner, which has neither been remedied nor waived, to pay Contractor as required by the Contract or to perform and complete or comply with the other terms thereof.

END OF SECTION
STANDARD GENERAL CONDITIONS
OF THE CONSTRUCTION CONTRACT

Prepared by

EJCDC
ENGINEERS JOINT CONTRACT
DOCUMENTS COMMITTEE

Issued and Published Jointly by

ACEC
AMERICAN COUNCIL OF ENGINEERING COMPANIES

ASCE
AMERICAN SOCIETY OF CIVIL ENGINEERS

National Society of Professional Engineers®

These General Conditions have been prepared for use with the Agreement Between Owner and Contractor for Construction Contract (EJCDC® C-520, Stipulated Sum, or C-525, Cost-Plus, 2013 Editions). Their provisions are interrelated and a change in one may necessitate a change in the other.
# TABLE OF CONTENTS

<table>
<thead>
<tr>
<th>Article</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>ARTICLE 1 – DEFINITIONS AND TERMINOLOGY</strong></td>
<td>1</td>
</tr>
<tr>
<td>1.01 Defined Terms</td>
<td>1</td>
</tr>
<tr>
<td>1.02 Terminology</td>
<td>4</td>
</tr>
<tr>
<td><strong>ARTICLE 2 – PRELIMINARY MATTERS</strong></td>
<td>5</td>
</tr>
<tr>
<td>2.01 Delivery of Bonds and Evidence of Insurance</td>
<td>5</td>
</tr>
<tr>
<td>2.02 Copies of Documents</td>
<td>5</td>
</tr>
<tr>
<td>2.03 Before Starting Construction</td>
<td>5</td>
</tr>
<tr>
<td>2.04 Preconstruction Conference; Designation of Authorized Representatives</td>
<td>5</td>
</tr>
<tr>
<td>2.05 Initial Acceptance of Schedules</td>
<td>6</td>
</tr>
<tr>
<td>2.06 Electronic Transmittals</td>
<td>6</td>
</tr>
<tr>
<td><strong>ARTICLE 3 – DOCUMENTS: INTENT, REQUIREMENTS, REUSE</strong></td>
<td>7</td>
</tr>
<tr>
<td>3.01 Intent</td>
<td>7</td>
</tr>
<tr>
<td>3.02 Reference Standards</td>
<td>7</td>
</tr>
<tr>
<td>3.03 Reporting and Resolving Discrepancies</td>
<td>8</td>
</tr>
<tr>
<td>3.04 Requirements of the Contract Documents</td>
<td>8</td>
</tr>
<tr>
<td>3.05 Reuse of Documents</td>
<td>8</td>
</tr>
<tr>
<td><strong>ARTICLE 4 – COMMENCEMENT AND PROGRESS OF THE WORK</strong></td>
<td>9</td>
</tr>
<tr>
<td>4.01 Commencement of Contract Times; Notice to Proceed</td>
<td>9</td>
</tr>
<tr>
<td>4.02 Starting the Work</td>
<td>9</td>
</tr>
<tr>
<td>4.03 Reference Points</td>
<td>9</td>
</tr>
<tr>
<td>4.04 Progress Schedule</td>
<td>9</td>
</tr>
<tr>
<td>4.05 Delays in Contractor’s Progress</td>
<td>10</td>
</tr>
<tr>
<td><strong>ARTICLE 5 – AVAILABILITY OF LANDS; SUBSURFACE AND PHYSICAL CONDITIONS; HAZARDOUS ENVIRONMENTAL CONDITIONS</strong></td>
<td>10</td>
</tr>
<tr>
<td>5.01 Availability of Lands</td>
<td>10</td>
</tr>
<tr>
<td>5.02 Use of Site and Other Areas</td>
<td>10</td>
</tr>
<tr>
<td>5.03 Subsurface and Physical Conditions</td>
<td>10</td>
</tr>
<tr>
<td>5.04 Differing Subsurface or Physical Conditions</td>
<td>10</td>
</tr>
<tr>
<td>5.05 Underground Facilities</td>
<td>11</td>
</tr>
<tr>
<td>5.06 Hazardous Environmental Conditions at Site</td>
<td>11</td>
</tr>
<tr>
<td><strong>ARTICLE 6 – BONDS AND INSURANCE</strong></td>
<td>12</td>
</tr>
<tr>
<td>6.01 Performance, Payment, and Other Bonds</td>
<td>12</td>
</tr>
<tr>
<td>6.02 Insurance—General Provisions</td>
<td>13</td>
</tr>
<tr>
<td>6.03 Contractor’s Insurance</td>
<td>13</td>
</tr>
<tr>
<td>6.04 Owner’s Liability Insurance</td>
<td>13</td>
</tr>
<tr>
<td>6.05 Property Insurance</td>
<td>13</td>
</tr>
<tr>
<td>6.06 Waiver of Rights</td>
<td>14</td>
</tr>
<tr>
<td>6.07 Receipt and Application of Property Insurance Proceeds</td>
<td>14</td>
</tr>
<tr>
<td><strong>ARTICLE 7 – CONTRACTOR’S RESPONSIBILITIES</strong></td>
<td>15</td>
</tr>
<tr>
<td>7.01 Supervision and Superintendence</td>
<td>15</td>
</tr>
<tr>
<td>7.02 Labor; Working Hours</td>
<td>15</td>
</tr>
<tr>
<td>7.03 Services, Materials, and Equipment</td>
<td>15</td>
</tr>
<tr>
<td>7.04 “Or Equals”</td>
<td>16</td>
</tr>
<tr>
<td>7.05 Substitutes</td>
<td>16</td>
</tr>
<tr>
<td>7.06 Concerning Subcontractors, Suppliers, and Others</td>
<td>16</td>
</tr>
<tr>
<td>7.07 Patent Fees and Royalties</td>
<td>16</td>
</tr>
<tr>
<td>7.08 Permits</td>
<td>16</td>
</tr>
<tr>
<td>Section</td>
<td>Page</td>
</tr>
<tr>
<td>------------------------------------------------------------------------</td>
<td>-------</td>
</tr>
<tr>
<td>ARTICLE 13 – COST OF THE WORK; ALLOWANCES; UNIT PRICE WORK</td>
<td>38</td>
</tr>
<tr>
<td>13.01 Cost of the Work</td>
<td>38</td>
</tr>
<tr>
<td>13.02 Allowances</td>
<td>40</td>
</tr>
<tr>
<td>13.03 Unit Price Work</td>
<td>40</td>
</tr>
<tr>
<td>ARTICLE 12 – CLAIMS</td>
<td>37</td>
</tr>
<tr>
<td>12.01 Claims</td>
<td>37</td>
</tr>
<tr>
<td>ARTICLE 11 – AMENDING THE CONTRACT DOCUMENTS; CHANGES IN THE WORK</td>
<td>34</td>
</tr>
<tr>
<td>11.01 Amending and Supplemening Contract Documents</td>
<td>34</td>
</tr>
<tr>
<td>11.02 Owner-Approved Changes in the Work</td>
<td>35</td>
</tr>
<tr>
<td>11.03 Unauthorized Changes in the Work</td>
<td>35</td>
</tr>
<tr>
<td>11.04 Change of Contract Price</td>
<td>35</td>
</tr>
<tr>
<td>11.05 Change of Contract Times</td>
<td>36</td>
</tr>
<tr>
<td>11.06 Change Proposals</td>
<td>36</td>
</tr>
<tr>
<td>11.07 Execution of Change Orders</td>
<td>37</td>
</tr>
<tr>
<td>11.08 Notification to Surety</td>
<td>37</td>
</tr>
<tr>
<td>ARTICLE 10 – ENGINEER’S STATUS DURING CONSTRUCTION</td>
<td>32</td>
</tr>
<tr>
<td>10.01 Owner’s Representative</td>
<td>32</td>
</tr>
<tr>
<td>10.02 Visits to Site</td>
<td>32</td>
</tr>
<tr>
<td>10.03 Project Representative</td>
<td>33</td>
</tr>
<tr>
<td>10.04 Rejecting Defective Work</td>
<td>33</td>
</tr>
<tr>
<td>10.05 Shop Drawings, Change Orders and Payments</td>
<td>33</td>
</tr>
<tr>
<td>10.06 Determinations for Unit Price Work</td>
<td>33</td>
</tr>
<tr>
<td>10.07 Decisions on Requirements of Contract Documents and Acceptability of Work</td>
<td>33</td>
</tr>
<tr>
<td>10.08 Limitations on Engineer’s Authority and Responsibilities</td>
<td>33</td>
</tr>
<tr>
<td>10.09 Compliance with Safety Program</td>
<td>34</td>
</tr>
<tr>
<td>ARTICLE 9 – OWNER’S RESPONSIBILITIES</td>
<td>32</td>
</tr>
<tr>
<td>9.01 Communications to Contractor</td>
<td>32</td>
</tr>
<tr>
<td>9.02 Replacement of Engineer</td>
<td>32</td>
</tr>
<tr>
<td>9.03 Furnish Data</td>
<td>32</td>
</tr>
<tr>
<td>9.04 Pay When Due</td>
<td>32</td>
</tr>
<tr>
<td>9.05 Lands and Easements; Reports, Tests, and Drawings</td>
<td>32</td>
</tr>
<tr>
<td>9.06 Insurance</td>
<td>32</td>
</tr>
<tr>
<td>9.07 Change Orders</td>
<td>32</td>
</tr>
<tr>
<td>9.08 Inspections, Tests, and Approvals</td>
<td>32</td>
</tr>
<tr>
<td>9.09 Limitations of Owner’s Responsibilities</td>
<td>32</td>
</tr>
<tr>
<td>9.10 Undisclosed Hazardous Environmental Condition</td>
<td>32</td>
</tr>
<tr>
<td>9.11 Evidence of Financial Arrangements</td>
<td>32</td>
</tr>
<tr>
<td>9.12 Safety Programs</td>
<td>32</td>
</tr>
<tr>
<td>ARTICLE 8 – OTHER WORK AT THE SITE</td>
<td>30</td>
</tr>
<tr>
<td>8.01 Other Work</td>
<td>30</td>
</tr>
<tr>
<td>8.02 Coordination</td>
<td>31</td>
</tr>
<tr>
<td>8.03 Legal Relationships</td>
<td>31</td>
</tr>
<tr>
<td>ARTICLE 7 – LAWS AND REGULATIONS; REPORTS, TESTS, AND DRAWINGS</td>
<td>25</td>
</tr>
<tr>
<td>7.09 Taxes</td>
<td>25</td>
</tr>
<tr>
<td>7.10 Laws and Regulations</td>
<td>25</td>
</tr>
<tr>
<td>7.11 Record Documents</td>
<td>26</td>
</tr>
<tr>
<td>7.12 Safety and Protection</td>
<td>26</td>
</tr>
<tr>
<td>7.13 Safety Representative</td>
<td>26</td>
</tr>
<tr>
<td>7.14 Hazard Communication Programs</td>
<td>27</td>
</tr>
<tr>
<td>7.15 Emergencies</td>
<td>27</td>
</tr>
<tr>
<td>7.16 Shop Drawings, Samples, and Other Submittals</td>
<td>27</td>
</tr>
<tr>
<td>7.17 Contractor’s General Warranty and Guarantee</td>
<td>29</td>
</tr>
<tr>
<td>7.18 Indemnification</td>
<td>29</td>
</tr>
<tr>
<td>7.19 Delegation of Professional Design Services</td>
<td>30</td>
</tr>
</tbody>
</table>
ARTICLE 18 – MISCELLANEOUS ...................................................................................................................................... 51

ARTICLE 17 – FINAL RESOLUTION OF DISPUTES ........................................................................................................ 51

ARTICLE 16 – SUSPENSION OF WORK AND TERMINATION .............................................................................................. 49

ARTICLE 15 – PAYMENTS TO CONTRACTOR; SET-OFFS; COMPLETION; CORRECTION PERIOD .......................... 43

ARTICLE 14 – TESTS AND INSPECTIONS; CORRECTION, REMOVAL OR ACCEPTANCE OF DEFECTIVE WORK ......... 41
ARTICLE 1 – DEFINITIONS AND TERMINOLOGY

1.01 Defined Terms

A. Wherever used in the Bidding Requirements or Contract Documents, a term printed with initial capital letters, including the term’s singular and plural forms, will have the meaning indicated in the definitions below. In addition to terms specifically defined, terms with initial capital letters in the Contract Documents include references to identified articles and paragraphs, and the titles of other documents or forms.

1. Addenda—Written or graphic instruments issued prior to the opening of Bids which clarify, correct, or change the Bidding Requirements or the proposed Contract Documents.

2. Agreement—The written instrument, executed by Owner and Contractor, that sets forth the Contract Price and Contract Times, identifies the parties and the Engineer, and designates the specific items that are Contract Documents.

3. Application for Payment—The form acceptable to Engineer which is to be used by Contractor during the course of the Work in requesting progress or final payments and which is to be accompanied by such supporting documentation as is required by the Contract Documents.

4. Bid—The offer of a Bidder submitted on the prescribed form setting forth the prices for the Work to be performed.

5. Bidder—An individual or entity that submits a Bid to Owner.

6. Bidding Documents—The Bidding Requirements, the proposed Contract Documents, and all Addenda.

7. Bidding Requirements—The advertisement or invitation to bid, Instructions to Bidders, Bid Bond or other Bid security, if any, the Bid Form, and the Bid with any attachments.

8. Change Order—A document which is signed by Contractor and Owner and authorizes an addition, deletion, or revision in the Work or an adjustment in the Contract Price or the Contract Times, or other revision to the Contract, issued on or after the Effective Date of the Contract.

9. Change Proposal—A written request by Contractor, duly submitted in compliance with the procedural requirements set forth herein, seeking an adjustment in Contract Price or Contract Times, or both; contesting an initial decision by Engineer concerning the requirements of the Contract Documents or the acceptability of Work under the Contract Documents; challenging a set-off against payments due; or seeking other relief with respect to the terms of the Contract.

10. Claim—(a) A demand or assertion by Owner directly to Contractor, duly submitted in compliance with the procedural requirements set forth herein: seeking an adjustment of Contract Price or Contract Times, or both; contesting an initial decision by Engineer concerning the requirements of the Contract Documents or the acceptability of Work under the Contract Documents; contesting Engineer’s decision regarding a Change Proposal; seeking resolution of a contractual issue that Engineer has declined to address; or seeking other relief with respect to the terms of the Contract; or (b) a demand or assertion by Contractor directly to Owner, duly submitted in compliance with the procedural requirements set forth herein, contesting Engineer’s decision regarding a Change Proposal; or seeking resolution of a contractual issue that Engineer has declined to address. A demand for money or services by a third party is not a Claim.

11. Constituent of Concern—Asbestos, petroleum, radioactive materials, polychlorinated biphenyls (PCBs), hazardous waste, and any substance, product, waste, or other material of any nature whatsoever that is or becomes listed, regulated, or addressed pursuant to (a) the Comprehensive Environmental Response, Compensation and Liability Act, 42 U.S.C. §§9601 et seq. (“CERCLA”); (b) the Hazardous Materials Transportation Act, 49 U.S.C. §§5501 et seq.; (c) the Resource Conservation and Recovery Act, 42 U.S.C. §§6901 et seq. (“RCRA”); (d) the Toxic Substances Control Act, 15 U.S.C.
§§2601 et seq.; (e) the Clean Water Act, 33 U.S.C. §§1251 et seq.; (f) the Clean Air Act, 42 U.S.C. §§7401 et seq.; or (g) any other federal, state, or local statute, law, rule, regulation, ordinance, resolution, code, order, or decree regulating, relating to, or imposing liability or standards of conduct concerning, any hazardous, toxic, or dangerous waste, substance, or material.

12. **Contract**—The entire and integrated written contract between the Owner and Contractor concerning the Work.

13. **Contract Documents**—Those items so designated in the Agreement, and which together comprise the Contract.

14. **Contract Price**—The money that Owner has agreed to pay Contractor for completion of the Work in accordance with the Contract Documents.

15. **Contract Times**—The number of days or the dates by which Contractor shall: (a) achieve Milestones, if any; (b) achieve Substantial Completion; and (c) complete the Work.

16. **Contractor**—The individual or entity with which Owner has contracted for performance of the Work.

17. **Cost of the Work**—See Paragraph 13.01 for definition.

18. **Drawings**—The part of the Contract that graphically shows the scope, extent, and character of the Work to be performed by Contractor.

19. **Effective Date of the Contract**—The date, indicated in the Agreement, on which the Contract becomes effective.

20. **Engineer**—The individual or entity named as such in the Agreement.

21. **Field Order**—A written order issued by Engineer which requires minor changes in the Work but does not change the Contract Price or the Contract Times.

22. **Hazardous Environmental Condition**—The presence at the Site of Constituents of Concern in such quantities or circumstances that may present a danger to persons or property exposed thereto. The presence at the Site of materials that are necessary for the execution of the Work, or that are to be incorporated in the Work, and that are controlled and contained pursuant to industry practices, Laws and Regulations, and the requirements of the Contract, does not establish a Hazardous Environmental Condition.

23. **Laws and Regulations; Laws or Regulations**—Any and all applicable laws, statutes, rules, regulations, ordinances, codes, and orders of any and all governmental bodies, agencies, authorities, and courts having jurisdiction.

24. **Liens**—Charges, security interests, or encumbrances upon Contract-related funds, real property, or personal property.

25. **Milestone**—A principal event in the performance of the Work that the Contract requires Contractor to achieve by an intermediate completion date or by a time prior to Substantial Completion of all the Work.

26. **Notice of Award**—The written notice by Owner to a Bidder of Owner’s acceptance of the Bid.

27. **Notice to Proceed**—A written notice by Owner to Contractor fixing the date on which the Contract Times will commence to run and on which Contractor shall start to perform the Work.

28. **Owner**—The individual or entity with which Contractor has contracted regarding the Work, and which has agreed to pay Contractor for the performance of the Work, pursuant to the terms of the Contract.

29. **Progress Schedule**—A schedule, prepared and maintained by Contractor, describing the sequence and duration of the activities comprising the Contractor’s plan to accomplish the Work within the Contract Times.

30. **Project**—The total undertaking to be accomplished for Owner by engineers, contractors, and others, including planning, study, design, construction, testing, commissioning, and start-up, and of which the Work to be performed under the Contract Documents is a part.

31. **Project Manual**—The written documents prepared for, or made available for, procuring and constructing...
the Work, including but not limited to the Bidding Documents or other construction procurement documents, geotechnical and existing conditions information, the Agreement, bond forms, General Conditions, Supplementary Conditions, and Specifications. The contents of the Project Manual may be bound in one or more volumes.

32. Resident Project Representative—The authorized representative of Engineer assigned to assist Engineer at the Site. As used herein, the term Resident Project Representative or “RPR” includes any assistants or field staff of Resident Project Representative.

33. Samples—Physical examples of materials, equipment, or workmanship that are representative of some portion of the Work and that establish the standards by which such portion of the Work will be judged.

34. Schedule of Submittals—A schedule, prepared and maintained by Contractor, of required submittals and the time requirements for Engineer’s review of the submittals and the performance of related construction activities.

35. Schedule of Values—A schedule, prepared and maintained by Contractor, allocating portions of the Contract Price to various portions of the Work and used as the basis for reviewing Contractor’s Applications for Payment.

36. Shop Drawings—All drawings, diagrams, illustrations, schedules, and other data or information that are specifically prepared or assembled by or for Contractor and submitted by Contractor to illustrate some portion of the Work. Shop Drawings, whether approved or not, are not Drawings and are not Contract Documents.

37. Site—Lands or areas indicated in the Contract Documents as being furnished by Owner upon which the Work is to be performed, including rights-of-way and easements, and such other lands furnished by Owner which are designated for the use of Contractor.

38. Specifications—The part of the Contract that consists of written requirements for materials, equipment, systems, standards, and workmanship as applied to the Work, and certain administrative requirements and procedural matters applicable to the Work.

39. Subcontractor—An individual or entity having a direct contract with Contractor or with any other Subcontractor for the performance of a part of the Work.

40. Substantial Completion—The time at which the Work (or a specified part thereof) has progressed to the point where, in the opinion of Engineer, the Work (or a specified part thereof) is sufficiently complete, in accordance with the Contract Documents, so that the Work (or a specified part thereof) can be utilized for the purposes for which it is intended. The terms “substantially complete” and “substantially completed” as applied to all or part of the Work refer to Substantial Completion thereof.

41. Successful Bidder—The Bidder whose Bid the Owner accepts, and to which the Owner makes an award of contract, subject to stated conditions.

42. Supplementary Conditions—The part of the Contract that amends or supplements these General Conditions.

43. Supplier—A manufacturer, fabricator, supplier, distributor, materialman, or vendor having a direct contract with Contractor or with any Subcontractor to furnish materials or equipment to be incorporated in the Work by Contractor or a Subcontractor.

44. Technical Data—Those items expressly identified as Technical Data in the Supplementary Conditions, with respect to either (a) subsurface conditions at the Site, or physical conditions relating to existing surface or subsurface structures at the Site (except Underground Facilities) or (b) Hazardous Environmental Conditions at the Site. If no such express identifications of Technical Data have been made with respect to conditions at the Site, then the data contained in boring logs, recorded measurements of subsurface water levels, laboratory test results, and other factual, objective information regarding conditions at the Site that are set forth in any geotechnical or environmental report prepared for the Project and made
available to Contractor are hereby defined as Technical Data with respect to conditions at the Site under Paragraphs 5.03, 5.04, and 5.06.

45. **Underground Facilities**—All underground pipelines, conduits, ducts, cables, wires, manholes, vaults, tanks, tunnels, or other such facilities or attachments, and any encasements containing such facilities, including but not limited to those that convey electricity, gases, steam, liquid petroleum products, telephone or other communications, fiber optic transmissions, cable television, water, wastewater, storm water, other liquids or chemicals, or traffic or other control systems.

46. **Unit Price Work**—Work to be paid for on the basis of unit prices.

47. **Work**—The entire construction or the various separately identifiable parts thereof required to be provided under the Contract Documents. Work includes and is the result of performing or providing all labor, services, and documentation necessary to produce such construction; furnishing, installing, and incorporating all materials and equipment into such construction; and may include related services such as testing, start-up, and commissioning, all as required by the Contract Documents.

48. **Work Change Directive**—A written directive to Contractor issued on or after the Effective Date of the Contract, signed by Owner and recommended by Engineer, ordering an addition, deletion, or revision in the Work.

1.02 **Terminology**

A. The words and terms discussed in the following paragraphs are not defined but, when used in the Bidding Requirements or Contract Documents, have the indicated meaning.

B. **Intent of Certain Terms or Adjectives:**

1. The Contract Documents include the terms “as allowed,” “as approved,” “as ordered,” “as directed” or terms of like effect or import to authorize an exercise of professional judgment by Engineer. In addition, the adjectives “reasonable,” “suitable,” “acceptable,” “proper,” “satisfactory,” or adjectives of like effect or import are used to describe an action or determination of Engineer as to the Work. It is intended that such exercise of professional judgment, action, or determination will be solely to evaluate, in general, the Work for compliance with the information in the Contract Documents and with the design concept of the Project as a functioning whole as shown or indicated in the Contract Documents (unless there is a specific statement indicating otherwise). The use of any such term or adjective is not intended to and shall not be effective to assign to Engineer any duty or authority to supervise or direct the performance of the Work, or any duty or authority to undertake responsibility contrary to the provisions of Article 10 or any other provision of the Contract Documents.

C. **Day:**

1. The word “day” means a calendar day of 24 hours measured from midnight to the next midnight.

D. **Defective:**

1. The word “defective,” when modifying the word “Work,” refers to Work that is unsatisfactory, faulty, or deficient in that it:

   a. does not conform to the Contract Documents; or

   b. does not meet the requirements of any applicable inspection, reference standard, test, or approval referred to in the Contract Documents; or

   c. has been damaged prior to Engineer’s recommendation of final payment (unless responsibility for the protection thereof has been assumed by Owner at Substantial Completion in accordance with Paragraph 15.03 or 15.04).

E. **Furnish, Install, Perform, Provide:**

1. The word “furnish,” when used in connection with services, materials, or equipment, shall mean to supply and deliver said services, materials, or equipment to the Site (or some other specified location) ready for use or installation and in usable or operable condition.
2. The word “install,” when used in connection with services, materials, or equipment, shall mean to put into use or place in final position said services, materials, or equipment complete and ready for intended use.

3. The words “perform” or “provide,” when used in connection with services, materials, or equipment, shall mean to furnish and install said services, materials, or equipment complete and ready for intended use.

4. If the Contract Documents establish an obligation of Contractor with respect to specific services, materials, or equipment, but do not expressly use any of the four words “furnish,” “install,” “perform,” or “provide,” then Contractor shall furnish and install said services, materials, or equipment complete and ready for intended use.

F. Unless stated otherwise in the Contract Documents, words or phrases that have a well-known technical or construction industry or trade meaning are used in the Contract Documents in accordance with such recognized meaning.

ARTICLE 2 – PRELIMINARY MATTERS

2.01 Delivery of Bonds and Evidence of Insurance

A. Bonds: When Contractor delivers the executed counterparts of the Agreement to Owner, Contractor shall also deliver to Owner such bonds as Contractor may be required to furnish.

B. Evidence of Contractor’s Insurance: When Contractor delivers the executed counterparts of the Agreement to Owner, Contractor shall also deliver to Owner, with copies to each named insured and additional insured (as identified in the Supplementary Conditions or elsewhere in the Contract), the certificates and other evidence of insurance required to be provided by Contractor in accordance with Article 6.

C. Evidence of Owner’s Insurance: After receipt of the executed counterparts of the Agreement and all required bonds and insurance documentation, Owner shall promptly deliver to Contractor, with copies to each named insured and additional insured (as identified in the Supplementary Conditions or otherwise), the certificates and other evidence of insurance required to be provided by Owner under Article 6.

2.02 Copies of Documents

A. Owner shall furnish to Contractor four printed copies of the Contract (including one fully executed counterpart of the Agreement), and one copy in electronic portable document format (PDF). Additional printed copies will be furnished upon request at the cost of reproduction.

B. Owner shall maintain and safeguard at least one original printed record version of the Contract, including Drawings and Specifications signed and sealed by Engineer and other design professionals. Owner shall make such original printed record version of the Contract available to Contractor for review. Owner may delegate the responsibilities under this provision to Engineer.

2.03 Before Starting Construction

A. Preliminary Schedules: Within 10 days after the Effective Date of the Contract (or as otherwise specifically required by the Contract Documents), Contractor shall submit to Engineer for timely review:

1. a preliminary Progress Schedule indicating the times (numbers of days or dates) for starting and completing the various stages of the Work, including any Milestones specified in the Contract;

2. a preliminary Schedule of Submittals; and

3. a preliminary Schedule of Values for all of the Work which includes quantities and prices of items which when added together equal the Contract Price and subdivides the Work into component parts in sufficient detail to serve as the basis for progress payments during performance of the Work. Such prices will include an appropriate amount of overhead and profit applicable to each item of Work.

2.04 Preconstruction Conference; Designation of Authorized Representatives

A. Before any Work at the Site is started, a conference attended by Owner, Contractor, Engineer, and others as appropriate will be held to establish a working understanding among the parties as to the Work and to discuss the schedules referred to in Paragraph
2.03.A. procedures for handling Shop Drawings, Samples, and other submittals, processing Applications for Payment, electronic or digital transmittals, and maintaining required records.

B. At this conference Owner and Contractor each shall designate, in writing, a specific individual to act as its authorized representative with respect to the services and responsibilities under the Contract. Such individuals shall have the authority to transmit and receive information, render decisions relative to the Contract, and otherwise act on behalf of each respective party.

2.05 Initial Acceptance of Schedules

A. At least 10 days before submission of the first Application for Payment a conference, attended by Contractor, Engineer, and others as appropriate, will be held to review for acceptability to Engineer as provided below the schedules submitted in accordance with Paragraph 2.03.A. Contractor shall have an additional 10 days to make corrections and adjustments and to complete and resubmit the schedules. No progress payment shall be made to Contractor until acceptable schedules are submitted to Engineer.

1. The Progress Schedule will be acceptable to Engineer if it provides an orderly progression of the Work to completion within the Contract Times. Such acceptance will not impose on Engineer responsibility for the Progress Schedule, for sequencing, scheduling, or progress of the Work, nor interfere with or relieve Contractor from Contractor’s full responsibility therefor.

2. Contractor’s Schedule of Submittals will be acceptable to Engineer if it provides a workable arrangement for reviewing and processing the required submittals.

3. Contractor’s Schedule of Values will be acceptable to Engineer as to form and substance if it provides a reasonable allocation of the Contract Price to the component parts of the Work.

2.06 Electronic Transmittals

A. Except as otherwise stated elsewhere in the Contract, the Owner, Engineer, and Contractor may transmit, and shall accept, Project-related correspondence, text, data, documents, drawings, information, and graphics, including but not limited to Shop Drawings and other submittals, in electronic media or digital format, either directly, or through access to a secure Project website.

B. If the Contract does not establish protocols for electronic or digital transmittals, then Owner, Engineer, and Contractor shall jointly develop such protocols.

C. When transmitting items in electronic media or digital format, the transmitting party makes no representations as to long term compatibility, usability, or readability of the items resulting from the recipient’s use of software application packages, operating systems, or computer hardware differing from those used in the drafting or transmittal of the items, or from those established in applicable transmittal protocols.

ARTICLE 3 – DOCUMENTS: INTENT, REQUIREMENTS, REUSE

3.01 Intent

A. The Contract Documents are complementary; what is required by one is as binding as if required by all.

B. It is the intent of the Contract Documents to describe a functionally complete project (or part thereof) to be constructed in accordance with the Contract Documents.

C. Unless otherwise stated in the Contract Documents, if there is a discrepancy between the electronic or digital versions of the Contract Documents (including any printed copies derived from such electronic or digital versions) and the printed record version, the printed record version shall govern.

D. The Contract supersedes prior negotiations, representations, and agreements, whether written or oral.

E. Engineer will issue clarifications and interpretations of the Contract Documents as provided herein.

3.02 Reference Standards

A. Standards Specifications, Codes, Laws and Regulations

1. Reference in the Contract Documents to standard specifications, manuals, reference standards, or codes of any technical society, organization, or association, or to Laws or Regulations, whether such reference be specific or by implication, shall mean the standard specification, manual, reference
standard, code, or Laws or Regulations in effect at the time of opening of Bids (or on the Effective Date of the Contract if there were no Bids), except as may be otherwise specifically stated in the Contract Documents.

2. No provision of any such standard specification, manual, reference standard, or code, or any instruction of a Supplier, shall be effective to change the duties or responsibilities of Owner, Contractor, or Engineer, or any of their subcontractors, consultants, agents, or employees, from those set forth in the part of the Contract Documents prepared by or for Engineer. No such provision or instruction shall be effective to assign to Owner, Engineer, or any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors, any duty or authority to supervise or direct the performance of the Work or any duty or authority to undertake responsibility inconsistent with the provisions of the part of the Contract Documents prepared by or for Engineer.

3.03 Reporting and Resolving Discrepancies

A. Reporting Discrepancies:

1. Contractor's Verification of Figures and Field Measurements: Before undertaking each part of the Work, Contractor shall carefully study the Contract Documents, and check and verify pertinent figures and dimensions therein, particularly with respect to applicable field measurements. Contractor shall promptly report in writing to Engineer any conflict, error, ambiguity, or discrepancy that Contractor discovers, or has actual knowledge of, and shall not proceed with any Work affected thereby until the conflict, error, ambiguity, or discrepancy is resolved, by a clarification or interpretation by Engineer, or by an amendment or supplement to the Contract Documents issued pursuant to Paragraph 11.01.

2. Contractor's Review of Contract Documents: If, before or during the performance of the Work, Contractor discovers any conflict, error, ambiguity, or discrepancy within the Contract Documents, or between the Contract Documents and (a) any applicable Law or Regulation, (b) actual field conditions, (c) any standard specification, manual, reference standard, or code, or (d) any instruction of any Supplier, then Contractor shall promptly report it to Engineer in writing. Contractor shall not proceed with the Work affected thereby (except in an emergency as required by Paragraph 7.15) until the conflict, error, ambiguity, or discrepancy is resolved, by a clarification or interpretation by Engineer, or by an amendment or supplement to the Contract Documents issued pursuant to Paragraph 11.01.

B. Resolving Discrepancies:

1. Except as may be otherwise specifically stated in the Contract Documents, the provisions of the part of the Contract Documents prepared by or for Engineer shall take precedence in resolving any conflict, error, ambiguity, or discrepancy between such provisions of the Contract Documents and:

   a. the provisions of any standard specification, manual, reference standard, or code, or the instruction of any Supplier (whether or not specifically incorporated by reference as a Contract Document); or

   b. the provisions of any Laws or Regulations applicable to the performance of the Work (unless such an interpretation of the provisions of the Contract Documents would result in violation of such Law or Regulation).

3.04 Requirements of the Contract Documents

A. During the performance of the Work and until final payment, Contractor and Owner shall submit to the Engineer all matters in question concerning the requirements of the Contract Documents (sometimes referred to as requests for information or interpretation—RFIs), or relating to the acceptability of the Work under
the Contract Documents, as soon as possible after such matters arise. Engineer will be the initial interpreter of the requirements of the Contract Documents, and judge of the acceptability of the Work thereunder.

B. Engineer will, with reasonable promptness, render a written clarification, interpretation, or decision on the issue submitted, or initiate an amendment or supplement to the Contract Documents. Engineer’s written clarification, interpretation, or decision will be final and binding on Contractor, unless it appeals by submitting a Change Proposal, and on Owner, unless it appeals by filing a Claim.

C. If a submitted matter in question concerns terms and conditions of the Contract Documents that do not involve (1) the performance or acceptability of the Work under the Contract Documents, (2) the design (as set forth in the Drawings, Specifications, or otherwise), or (3) other engineering or technical matters, then Engineer will promptly give written notice to Owner and Contractor that Engineer is unable to provide a decision or interpretation. If Owner and Contractor are unable to agree on resolution of such a matter in question, either party may pursue resolution as provided in Article 12.

3.05 Reuse of Documents

A. Contractor and its Subcontractors and Suppliers shall not:

1. have or acquire any title to or ownership rights in any of the Drawings, Specifications, or other documents (or copies of any thereof) prepared by or bearing the seal of Engineer or its consultants, including electronic media editions, or reuse any such Drawings, Specifications, other documents, or copies thereof on extensions of the Project or any other project without written consent of Owner and Engineer and specific written verification or adaptation by Engineer; or

2. have or acquire any title or ownership rights in any other Contract Documents, reuse any such Contract Documents for any purpose without Owner’s express written consent, or violate any copyrights pertaining to such Contract Documents.

B. The prohibitions of this Paragraph 3.05 will survive final payment, or termination of the Contract. Nothing herein shall preclude Contractor from retaining copies of the Contract Documents for record purposes.

ARTICLE 4 – COMMENCEMENT AND PROGRESS OF THE WORK

4.01 Commencement of Contract Times; Notice to Proceed

A. The Contract Times will commence to run on the thirtieth day after the Effective Date of the Contract or, if a Notice to Proceed is given, on the day indicated in the Notice to Proceed. A Notice to Proceed may be given at any time within 30 days after the Effective Date of the Contract. In no event will the Contract Times commence to run later than the sixtieth day after the day of Bid opening or the thirtieth day after the Effective Date of the Contract, whichever date is earlier.

4.02 Starting the Work

A. Contractor shall start to perform the Work on the date when the Contract Times commence to run. No Work shall be done at the Site prior to such date.

4.03 Reference Points

A. Owner shall provide engineering surveys to establish reference points for construction which in Engineer’s judgment are necessary to enable Contractor to proceed with the Work. Contractor shall be responsible for laying out the Work, shall protect and preserve the established reference points and property monuments, and shall make no changes or relocations without the prior written approval of Owner. Contractor shall report to Engineer whenever any reference point or property monument is lost or destroyed or requires relocation because of necessary changes in grades or locations, and shall be responsible for the accurate replacement or relocation of such reference points or property monuments by professionally qualified personnel.

4.04 Progress Schedule

A. Contractor shall adhere to the Progress Schedule established in accordance with Paragraph 2.05 as it may be adjusted from time to time as provided below.

1. Contractor shall submit to Engineer for acceptance (to the extent indicated in Paragraph 2.05) proposed adjustments in the Progress Schedule that will not result in changing the Contract Times.
2. Proposed adjustments in the Progress Schedule that will change the Contract Times shall be submitted in accordance with the requirements of Article 11.

B. Contractor shall carry on the Work and adhere to the Progress Schedule during all disputes or disagreements with Owner. No Work shall be delayed or postponed pending resolution of any disputes or disagreements, or during any appeal process, except as permitted by Paragraph 16.04, or as Owner and Contractor may otherwise agree in writing.

4.05 Delays in Contractor’s Progress

A. If Owner, Engineer, or anyone for whom Owner is responsible, delays, disrupts, or interferes with the performance or progress of the Work, then Contractor shall be entitled to an equitable adjustment in the Contract Times and Contract Price. Contractor’s entitlement to an adjustment of the Contract Times is conditioned on such adjustment being essential to Contractor’s ability to complete the Work within the Contract Times.

B. Contractor shall not be entitled to an adjustment in Contract Price or Contract Times for delay, disruption, or interference caused by or within the control of Contractor. Delay, disruption, and interference attributable to and within the control of a Subcontractor or Supplier shall be deemed to be within the control of Contractor.

C. If Contractor’s performance or progress is delayed, disrupted, or interfered with by unanticipated causes not the fault of and beyond the control of Owner, Contractor, and those for which they are responsible, then Contractor shall be entitled to an equitable adjustment in Contract Times. Contractor’s entitlement to an adjustment of the Contract Times is conditioned on such adjustment being essential to Contractor’s ability to complete the Work within the Contract Times. Such an adjustment shall be Contractor’s sole and exclusive remedy for the delays, disruption, and interference described in this paragraph. Causes of delay, disruption, or interference that may give rise to an adjustment in Contract Times under this paragraph include but are not limited to the following:

1. severe and unavoidable natural catastrophes such as fires, floods, epidemics, and earthquakes;
2. abnormal weather conditions;
3. acts or failures to act of utility owners (other than those performing other work at or adjacent to the Site by arrangement with the Owner, as contemplated in Article 8); and
4. acts of war or terrorism.

D. Delays, disruption, and interference to the performance or progress of the Work resulting from the existence of a differing subsurface or physical condition, an Underground Facility that was not shown or indicated by the Contract Documents, or not shown or indicated with reasonable accuracy, and those resulting from Hazardous Environmental Conditions, are governed by Article 5.

E. Paragraph 8.03 governs delays, disruption, and interference to the performance or progress of the Work resulting from the performance of certain other work at or adjacent to the Site.

F. Contractor shall not be entitled to an adjustment in Contract Price or Contract Times for any delay, disruption, or interference if such delay is concurrent with a delay, disruption, or interference caused by or within the control of Contractor.

G. Contractor must submit any Change Proposal seeking an adjustment in Contract Price or Contract Times under this paragraph within 30 days of the commencement of the delaying, disrupting, or interfering event.

ARTICLE 5 – AVAILABILITY OF LANDS; SUBSURFACE AND PHYSICAL CONDITIONS; HAZARDOUS ENVIRONMENTAL CONDITIONS

5.01 Availability of Lands

A. Owner shall furnish the Site. Owner shall notify Contractor of any encumbrances or restrictions not of general application but specifically related to use of the Site with which Contractor must comply in performing the Work.

B. Upon reasonable written request, Owner shall furnish Contractor with a current statement of record legal title and legal description of the lands upon which permanent improvements are to be made and Owner’s interest therein as necessary for giving notice of or filing a mechanic’s or construction lien against such lands in accordance with applicable Laws and Regulations.
C. Contractor shall provide for all additional lands and access thereto that may be required for temporary construction facilities or storage of materials and equipment.

5.02 Use of Site and Other Areas

A. Limitation on Use of Site and Other Areas:

1. Contractor shall confine construction equipment, temporary construction facilities, the storage of materials and equipment, and the operations of workers to the Site, adjacent areas that Contractor has arranged to use through construction easements or otherwise, and other adjacent areas permitted by Laws and Regulations, and shall not unreasonably encumber the Site and such other adjacent areas with construction equipment or other materials or equipment. Contractor shall assume full responsibility for (a) damage to the Site; (b) damage to any such other adjacent areas used for Contractor’s operations; (c) damage to any other adjacent land or areas; and (d) for injuries and losses sustained by the owners or occupants of any such land or areas; provided that such damage or injuries result from the performance of the Work or from other actions or conduct of the Contractor or those for which Contractor is responsible.

2. If a damage or injury claim is made by the owner or occupant of any such land or area because of the performance of the Work, or because of other actions or conduct of the Contractor or those for which Contractor is responsible, Contractor shall (a) take immediate corrective or remedial action as required by Paragraph 7.12, or otherwise; (b) promptly attempt to settle the claim as to all parties through negotiations with such owner or occupant, or otherwise resolve the claim by arbitration or other dispute resolution proceeding, or at law; and (c) to the fullest extent permitted by Laws and Regulations, indemnify and hold harmless Owner and Engineer, and the officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them from and against any such claim, and against all costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to any claim or action, legal or equitable, brought by any such owner or occupant against Owner, Engineer, or any other party indemnified hereunder to the extent caused directly or indirectly, in whole or in part by, or based upon, Contractor’s performance of the Work, or because of other actions or conduct of the Contractor or those for which Contractor is responsible.

B. Removal of Debris During Performance of the Work: During the progress of the Work the Contractor shall keep the Site and other adjacent areas free from accumulations of waste materials, rubbish, and other debris. Removal and disposal of such waste materials, rubbish, and other debris shall conform to applicable Laws and Regulations.

C. Cleaning: Prior to Substantial Completion of the Work Contractor shall clean the Site and the Work and make it ready for utilization by Owner. At the completion of the Work Contractor shall remove from the Site and adjacent areas all tools, appliances, construction equipment and machinery, and surplus materials and shall restore to original condition all property not designated for alteration by the Contract Documents.

D. Loading of Structures: Contractor shall not load nor permit any part of any structure to be loaded in any manner that will endanger the structure, nor shall Contractor subject any part of the Work or adjacent structures or land to stresses or pressures that will endanger them.

5.03 Subsurface and Physical Conditions

A. Reports and Drawings: The Supplementary Conditions identify:

1. those reports known to Owner of explorations and tests of subsurface conditions at or adjacent to the Site;

2. those drawings known to Owner of physical conditions relating to existing surface or subsurface structures at the Site (except Underground Facilities); and

3. Technical Data contained in such reports and drawings.

B. Reliance by Contractor on Technical Data Authorized: Contractor may rely upon the accuracy of the Technical Data expressly identified in the Supplementary Conditions
with respect to such reports and drawings, but such reports and drawings are not Contract Documents. If no such express identification has been made, then Contractor may rely upon the accuracy of the Technical Data (as defined in Article 1) contained in any geotechnical or environmental report prepared for the Project and made available to Contractor. Except for such reliance on Technical Data, Contractor may not rely upon or make any claim against Owner or Engineer, or any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors, with respect to:

1. the completeness of such reports and drawings for Contractor’s purposes, including, but not limited to, any aspects of the means, methods, techniques, sequences, and procedures of construction to be employed by Contractor, and safety precautions and programs incident thereto; or

2. other data, interpretations, opinions, and information contained in such reports or shown or indicated in such drawings; or

3. any Contractor interpretation of or conclusion drawn from any Technical Data or any such other data, interpretations, opinions, or information.

5.04 Differing Subsurface or Physical Conditions

A. Notice by Contractor: If Contractor believes that any subsurface or physical condition that is uncovered or revealed at the Site either:

1. is of such a nature as to establish that any Technical Data on which Contractor is entitled to rely as provided in Paragraph 5.03 is materially inaccurate; or

2. is of such a nature as to require a change in the Drawings or Specifications; or

3. differs materially from that shown or indicated in the Contract Documents; or

4. is of an unusual nature, and differs materially from conditions ordinarily encountered and generally recognized as inherent in work of the character provided for in the Contract Documents; then Contractor shall, promptly after becoming aware thereof and before further disturbing the subsurface or physical conditions or performing any Work in connection therewith (except in an emergency as required by Paragraph 7.15), notify Owner and Engineer in writing about such condition. Contractor shall not further disturb such condition or perform any Work in connection therewith (except with respect to an emergency) until receipt of a written statement permitting Contractor to do so.

B. Engineer’s Review: After receipt of written notice as required by the preceding paragraph, Engineer will promptly review the subsurface or physical condition in question; determine the necessity of Owner’s obtaining additional exploration or tests with respect to the condition; conclude whether the condition falls within any one or more of the differing site condition categories in Paragraph 5.04.A above; obtain any pertinent cost or schedule information from Contractor; prepare recommendations to Owner regarding the Contractor’s resumption of Work in connection with the subsurface or physical condition in question and the need for any change in the Drawings or Specifications; and advise Owner in writing of Engineer’s findings, conclusions, and recommendations.

C. Owner’s Statement to Contractor Regarding Site Condition: After receipt of Engineer’s written findings, conclusions, and recommendations, Owner shall issue a written statement to Contractor (with a copy to Engineer) regarding the subsurface or physical condition in question, addressing the resumption of Work in connection with such condition, indicating whether any change in the Drawings or Specifications will be made, and adopting or rejecting Engineer’s written findings, conclusions, and recommendations, in whole or in part.

D. Possible Price and Times Adjustments:

1. Contractor shall be entitled to an equitable adjustment in Contract Price or Contract Times, or both, to the extent that the existence of a differing subsurface or physical condition, or any related delay, disruption, or interference, causes an increase or decrease in Contractor’s cost of, or time required for, performance of the Work; subject, however, to the following:

   a. such condition must fall within any one or more of the categories described in Paragraph 5.04.A;

   b. with respect to Work that is paid for on a unit price basis, any adjustment in Contract Price will
be subject to the provisions of Paragraph 13.03; and, 

2. Contractor shall not be entitled to any adjustment in the Contract Price or Contract Times with respect to a subsurface or physical condition if:
   a. Contractor knew of the existence of such condition at the time Contractor made a commitment to Owner with respect to Contract Price and Contract Times by the submission of a Bid or becoming bound under a negotiated contract, or otherwise; or
   b. the existence of such condition reasonably could have been discovered or revealed as a result of any examination, investigation, exploration, test, or study of the Site and contiguous areas expressly required by the Bidding Requirements or Contract Documents to be conducted by or for Contractor prior to Contractor’s making such commitment; or
   c. Contractor failed to give the written notice as required by Paragraph 5.04.A.

3. If Owner and Contractor agree regarding Contractor’s entitlement to and the amount or extent of any adjustment in the Contract Price or Contract Times, or both, then any such adjustment shall be set forth in a Change Order.

4. Contractor may submit a Change Proposal regarding its entitlement to or the amount or extent of any adjustment in the Contract Price or Contract Times, or both, no later than 30 days after Owner’s issuance of the Owner’s written statement to Contractor regarding the subsurface or physical condition in question.

5.05 Underground Facilities

A. Contractor’s Responsibilities: The information and data shown or indicated in the Contract Documents with respect to existing Underground Facilities at or adjacent to the Site is based on information and data furnished to Owner or Engineer by the owners of such Underground Facilities, including Owner, or by others. Unless it is otherwise expressly provided in the Supplementary Conditions:

1. Owner and Engineer do not warrant or guarantee the accuracy or completeness of any such information or data provided by others; and
2. the cost of all of the following will be included in the Contract Price, and Contractor shall have full responsibility for:
   a. reviewing and checking all information and data regarding existing Underground Facilities at the Site;
   b. locating all Underground Facilities shown or indicated in the Contract Documents as being at the Site;
   c. coordination of the Work with the owners (including Owner) of such Underground Facilities, during construction; and
   d. the safety and protection of all existing Underground Facilities at the Site, and repairing any damage thereto resulting from the Work.

B. Notice by Contractor: If Contractor believes that an Underground Facility that is uncovered or revealed at the Site was not shown or indicated in the Contract Documents, or was not shown or indicated with reasonable accuracy, then Contractor shall, promptly after becoming aware thereof and before further disturbing conditions affected thereby or performing any Work in connection therewith (except in an emergency as required by Paragraph 7.15), identify the owner of such Underground Facility and give written notice to that owner and to Owner and Engineer.

C. Engineer’s Review: Engineer will promptly review the Underground Facility and conclude whether such Underground Facility was not shown or indicated in the Contract Documents, or was not shown or indicated with reasonable accuracy; obtain any pertinent cost or schedule information from Contractor; prepare recommendations to Owner regarding the Contractor’s resumption of Work in connection with the Underground Facility in question; determine the extent, if any, to
which a change is required in the Drawings or Specifications to reflect and document the consequences of the existence or location of the Underground Facility; and advise Owner in writing of Engineer’s findings, conclusions, and recommendations. During such time, Contractor shall be responsible for the safety and protection of such Underground Facility.

D. **Owner’s Statement to Contractor Regarding Underground Facility:** After receipt of Engineer’s written findings, conclusions, and recommendations, Owner shall issue a written statement to Contractor (with a copy to Engineer) regarding the Underground Facility in question, addressing the resumption of Work in connection with such Underground Facility, indicating whether any change in the Drawings or Specifications will be made, and adopting or rejecting Engineer’s written findings, conclusions, and recommendations in whole or in part.

E. **Possible Price and Times Adjustments:**

1. Contractor shall be entitled to an equitable adjustment in the Contract Price or Contract Times, or both, to the extent that any existing Underground Facility at the Site that was not shown or indicated in the Contract Documents, or was not shown or indicated with reasonable accuracy, or any related delay, disruption, or interference, causes an increase or decrease in Contractor’s cost of, or time required for, performance of the Work; subject, however, to the following:
   
   a. Contractor did not know of and could not reasonably have been expected to be aware of or to have anticipated the existence or actual location of the Underground Facility in question;
   
   b. With respect to Work that is paid for on a unit price basis, any adjustment in Contract Price will be subject to the provisions of Paragraph 13.03;
   
   c. Contractor’s entitlement to an adjustment of the Contract Times is conditioned on such adjustment being essential to Contractor’s ability to complete the Work within the Contract Times; and
   
   d. Contractor gave the notice required in Paragraph 5.05.B.

2. If Owner and Contractor agree regarding Contractor’s entitlement to and the amount or extent of any adjustment in the Contract Price or Contract Times, or both, then any such adjustment shall be set forth in a Change Order.

3. Contractor may submit a Change Proposal regarding its entitlement to or the amount or extent of any adjustment in the Contract Price or Contract Times, or both, no later than 30 days after Owner’s issuance of the Owner’s written statement to Contractor regarding the Underground Facility in question.

5.06 **Hazardous Environmental Conditions at Site**

A. **Reports and Drawings:** The Supplementary Conditions identify:

1. those reports and drawings known to Owner relating to Hazardous Environmental Conditions that have been identified at or adjacent to the Site; and

2. Technical Data contained in such reports and drawings.

B. **Reliance by Contractor on Technical Data Authorized:** Contractor may rely upon the accuracy of the Technical Data expressly identified in the Supplementary Conditions with respect to such reports and drawings, but such reports and drawings are not Contract Documents. If no such express identification has been made, then Contractor may rely on the accuracy of the Technical Data (as defined in Article 1) contained in any geotechnical or environmental report prepared for the Project and made available to Contractor. Except for such reliance on Technical Data, Contractor may not rely upon or make any claim against Owner or Engineer, or any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors with respect to:

1. the completeness of such reports and drawings for Contractor’s purposes, including, but not limited to, any aspects of the means, methods, techniques, sequences and procedures of construction to be employed by Contractor and safety precautions and programs incident thereto; or

2. other data, interpretations, opinions and information contained in such reports or shown or indicated in such drawings; or
3. any Contractor interpretation of or conclusion drawn from any Technical Data or any such other data, interpretations, opinions or information.

C. Contractor shall not be responsible for removing or remediating any Hazardous Environmental Condition encountered, uncovered, or revealed at the Site unless such removal or remediation is expressly identified in the Contract Documents to be within the scope of the Work.

D. Contractor shall be responsible for controlling, containing, and duly removing all Constituents of Concern brought to the Site by Contractor, Subcontractors, Suppliers, or anyone else for whom Contractor is responsible, and for any associated costs; and for the costs of removing and remediating any Hazardous Environmental Condition created by the presence of any such Constituents of Concern.

E. If Contractor encounters, uncovers, or reveals a Hazardous Environmental Condition whose removal or remediation is not expressly identified in the Contract Documents as being within the scope of the Work, or if Contractor or anyone for whom Contractor is responsible creates a Hazardous Environmental Condition, then Contractor shall immediately: (1) secure or otherwise isolate such condition; (2) stop all Work in connection with such condition and in any area affected thereby (except in an emergency as required by Paragraph 7.15); and (3) notify Owner and Engineer (and promptly thereafter confirm such notice in writing). Owner shall promptly consult with Engineer concerning the necessity for Owner to retain a qualified expert to evaluate such condition or take corrective action, if any. Promptly after consulting with Engineer, Owner shall take such actions as are necessary to permit Owner to timely obtain required permits and provide Contractor the written notice required by Paragraph 5.06.F. If Contractor or anyone for whom Contractor is responsible created the Hazardous Environmental Condition in question, then Owner may remove and remediate the Hazardous Environmental Condition, and impose a set-off against payments to account for the associated costs.

F. Contractor shall not resume Work in connection with such Hazardous Environmental Condition or in any affected area until after Owner has obtained any required permits related thereto, and delivered written notice to Contractor either (1) specifying that such condition and any affected area is or has been rendered safe for the resumption of Work, or (2) specifying any special conditions under which such Work may be resumed safely.

G. If Owner and Contractor cannot agree as to entitlement to or on the amount or extent, if any, of any adjustment in Contract Price or Contract Times, or both, as a result of such Work stoppage or such special conditions under which Work is agreed to be resumed by Contractor, then within 30 days of Owner’s written notice regarding the resumption of Work, Contractor may submit a Change Proposal, or Owner may impose a set-off.

H. If after receipt of such written notice Contractor does not agree to resume such Work based on a reasonable belief it is unsafe, or does not agree to resume such Work under such special conditions, then Owner may order the portion of the Work that is in the area affected by such condition to be deleted from the Work, following the contractual change procedures in Article 11. Owner may have such deleted portion of the Work performed by Owner’s own forces or others in accordance with Article 8.

I. To the fullest extent permitted by Laws and Regulations, Owner shall indemnify and hold harmless Contractor, Subcontractors, and Engineer, and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to a Hazardous Environmental Condition, provided that such Hazardous Environmental Condition (1) was not shown or indicated in the Drawings, Specifications, or other Contract Documents, identified as Technical Data entitled to limited reliance pursuant to limited reliance pursuant to Paragraph 5.06.B, or identified in the Contract Documents to be included within the scope of the Work, and (2) was not created by Contractor or by anyone for whom Contractor is responsible. Nothing in this Paragraph 5.06.H shall obligate Owner to indemnify any individual or entity from and against the consequences of that individual’s or entity’s own negligence.

J. To the fullest extent permitted by Laws and Regulations, Contractor shall indemnify and
hold harmless Owner and Engineer, and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to the failure to control, contain, or remove a Constituent of Concern brought to the Site by Contractor or by anyone for whom Contractor is responsible, or to a Hazardous Environmental Condition created by Contractor or by anyone for whom Contractor is responsible. Nothing in this Paragraph 5.06.J shall obligate Contractor to indemnify any individual or entity from and against the consequences of that individual’s or entity’s own negligence.

K. The provisions of Paragraphs 5.03, 5.04, and 5.05 do not apply to the presence of Constituents of Concern or to a Hazardous Environmental Condition uncovered or revealed at the Site.

ARTICLE 6 – BONDS AND INSURANCE

6.01 Performance, Payment, and Other Bonds

A. Contractor shall furnish a performance bond and a payment bond, each in an amount at least equal to the Contract Price, as security for the faithful performance and payment of all of Contractor’s obligations under the Contract. These bonds shall remain in effect until one year after the date when final payment becomes due or until completion of the correction period specified in Paragraph 15.08, whichever is later, except as provided otherwise by Laws or Regulations, the Supplementary Conditions, or other specific provisions of the Contract. Contractor shall also furnish such other bonds as are required by the Supplementary Conditions or other specific provisions of the Contract.

B. All bonds shall be in the form prescribed by the Contract except as provided otherwise by Laws or Regulations, and shall be executed by such sureties as are named in “Companies Holding Certificates of Authority as Acceptable Sureties on Federal Bonds and as Acceptable Reinsuring Companies” as published in Circular 570 (as amended and supplemented) by the Financial Management Service, Surety Bond Branch, U.S. Department of the Treasury. A bond signed by an agent or attorney-in-fact must be accompanied by a certified copy of that individual’s authority to bind the surety. The evidence of authority shall show that it is effective on the date the agent or attorney-in-fact signed the accompanying bond.

C. Contractor shall obtain the required bonds from surety companies that are duly licensed or authorized in the jurisdiction in which the Project is located to issue bonds in the required amounts.

D. If the surety on a bond furnished by Contractor is declared bankrupt or becomes insolvent, or its right to do business is terminated in any state or jurisdiction where any part of the Project is located, or the surety ceases to meet the requirements above, then Contractor shall promptly notify Owner and Engineer and shall, within 20 days after the event giving rise to such notification, provide another bond and surety, both of which shall comply with the bond and surety requirements above.

E. If Contractor has failed to obtain a required bond, Owner may exclude the Contractor from the Site and exercise Owner’s termination rights under Article 16.

F. Upon request, Owner shall provide a copy of the payment bond to any Subcontractor, Supplier, or other person or entity claiming to have furnished labor or materials used in the performance of the Work.

6.02 Insurance—General Provisions

A. Owner and Contractor shall obtain and maintain insurance as required in this Article and in the Supplementary Conditions.

B. All insurance required by the Contract to be purchased and maintained by Owner or Contractor shall be obtained from insurance companies that are duly licensed or authorized, in the state or jurisdiction in which the Project is located, to issue insurance policies for the required limits and coverages. Unless a different standard is indicated in the Supplementary Conditions, all companies that provide insurance policies required under this Contract shall have an A.M. Best rating of A-VII or better.

C. Contractor shall deliver to Owner, with copies to each named insured and additional insured (as identified in this Article, in the Supplementary Conditions, or elsewhere in the Contract), certificates of insurance establishing that Contractor has obtained and is maintaining the policies, coverages, and
endorsements required by the Contract. Upon request by Owner or any other insured, Contractor shall also furnish other evidence of such required insurance, including but not limited to copies of policies and endorsements, and documentation of applicable self-insured retentions and deductibles. Contractor may block out (redact) any confidential premium or pricing information contained in any policy or endorsement furnished under this provision.

D. Owner shall deliver to Contractor, with copies to each named insured and additional insured (as identified in this Article, the Supplementary Conditions, or elsewhere in the Contract), certificates of insurance establishing that Owner has obtained and is maintaining the policies, coverages, and endorsements required of Owner by the Contract (if any). Upon request by Contractor or any other insured, Owner shall also provide other evidence of such required insurance (if any), including but not limited to copies of policies and endorsements, and documentation of applicable self-insured retentions and deductibles. Owner may block out (redact) any confidential premium or pricing information contained in any policy or endorsement furnished under this provision.

E. Failure of Owner or Contractor to demand such certificates or other evidence of the other party’s full compliance with these insurance requirements, or failure of Owner or Contractor to identify a deficiency in compliance from the evidence provided, shall not be construed as a waiver of the other party’s obligation to obtain and maintain such insurance.

F. If either party does not purchase or maintain all of the insurance required of such party by the Contract, such party shall notify the other party in writing of such failure to purchase prior to the start of the Work, or of such failure to maintain prior to any change in the required coverage.

G. If Contractor has failed to obtain and maintain required insurance, Owner may exclude the Contractor from the Site, impose an appropriate set-off against payment, and exercise Owner’s termination rights under Article 16.

H. Without prejudice to any other right or remedy, if a party has failed to obtain required insurance, the other party may elect to obtain equivalent insurance to protect such other party’s interests at the expense of the party who was required to provide such coverage, and the Contract Price shall be adjusted accordingly.

I. Owner does not represent that insurance coverage and limits established in this Contract necessarily will be adequate to protect Contractor or Contractor’s interests.

J. The insurance and insurance limits required herein shall not be deemed as a limitation on Contractor’s liability under the indemnities granted to Owner and other individuals and entities in the Contract.

6.03 Contractor’s Insurance

A. Workers’ Compensation: Contractor shall purchase and maintain workers’ compensation and employer’s liability insurance for:

1. claims under workers’ compensation, disability benefits, and other similar employee benefit acts.

2. United States Longshoreman and Harbor Workers’ Compensation Act and Jones Act coverage (if applicable).

3. claims for damages because of bodily injury, occupational sickness or disease, or death of Contractor’s employees (by stop-gap endorsement in monopolist worker’s compensation states).

4. Foreign voluntary worker compensation (if applicable).

B. Commercial General Liability—Claims Covered: Contractor shall purchase and maintain commercial general liability insurance, covering all operations by or on behalf of Contractor, on an occurrence basis, against:

1. claims for damages because of bodily injury, sickness or disease, or death of any person other than Contractor’s employees.

2. claims for damages insured by reasonably available personal injury liability coverage.

3. claims for damages, other than to the Work itself, because of injury to or destruction of tangible property wherever located, including loss of use resulting therefrom.

C. Commercial General Liability—Form and Content: Contractor’s commercial liability policy shall be written on a 1996 (or later) ISO
commercial general liability form (occurrence form) and include the following coverages and endorsements:

1. **Products and completed operations coverage:**
   a. Such insurance shall be maintained for three years after final payment.
   b. Contractor shall furnish Owner and each other additional insured (as identified in the Supplementary Conditions or elsewhere in the Contract) evidence of continuation of such insurance at final payment and three years thereafter.

2. **Blanket contractual liability coverage,** to the extent permitted by law, including but not limited to coverage of Contractor’s contractual indemnity obligations in Paragraph 7.18.

3. **Broad form property damage coverage.**

4. **Severability of interest.**

5. **Underground, explosion, and collapse coverage.**

6. **Personal injury coverage.**

7. **Additional insured endorsements that include both ongoing operations and products and completed operations coverage through ISO Endorsements CG 20 10 10 01 and CG 20 37 10 01 (together); or CG 20 10 07 04 and CG 20 37 07 04 (together); or their equivalent.**

8. **For design professional additional insureds, ISO Endorsement CG 20 32 07 04, “Additional Insured—Engineers, Architects or Surveyors Not Engaged by the Named Insured” or its equivalent.**

D. **Automobile liability:** Contractor shall purchase and maintain automobile liability insurance against claims for damages because of bodily injury or death of any person or property damage arising out of the ownership, maintenance, or use of any motor vehicle. The automobile liability policy shall be written on an occurrence basis.

E. **Umbrella or excess liability:** Contractor shall purchase and maintain umbrella or excess liability insurance written over the underlying employer’s liability, commercial general liability, and automobile liability insurance described in the paragraphs above. Subject to industry-standard exclusions, the coverage afforded shall follow form as to each and every one of the underlying policies.

F. **Contractor’s pollution liability insurance:** Contractor shall purchase and maintain a policy covering third-party injury and property damage claims, including clean-up costs, as a result of pollution conditions arising from Contractor’s operations and completed operations. This insurance shall be maintained for no less than three years after final completion.

G. **Additional insureds:** The Contractor’s commercial general liability, automobile liability, umbrella or excess, and pollution liability policies shall include and list as additional insureds Owner and Engineer, and any individuals or entities identified in the Supplementary Conditions; include coverage for the respective officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of all such additional insureds; and the insurance afforded to these additional insureds shall provide primary coverage for all claims covered thereby (including as applicable those arising from both ongoing and completed operations) on a non-contributory basis. Contractor shall obtain all necessary endorsements to support these requirements.

H. **Contractor’s professional liability insurance:** If Contractor will provide or furnish professional services under this Contract, through a delegation of professional design services or otherwise, then Contractor shall be responsible for purchasing and maintaining applicable professional liability insurance. This insurance shall provide protection against claims arising out of performance of professional design or related services, and caused by a negligent error, omission, or act for which the insured party is legally liable. It shall be maintained throughout the duration of the Contract and for a minimum of two years after Substantial Completion. If such professional design services are performed by a Subcontractor, and not by Contractor itself, then the requirements of this paragraph may be satisfied through the purchasing and maintenance of such insurance by such Subcontractor.

I. **General provisions:** The policies of insurance required by this Paragraph 6.03 shall:

1. include at least the specific coverages provided in this Article.
2. be written for not less than the limits of liability provided in this Article and in the Supplementary Conditions, or required by Laws or Regulations, whichever is greater.

3. contain a provision or endorsement that the coverage afforded will not be canceled, materially changed, or renewal refused until at least 10 days prior written notice has been given to Contractor. Within three days of receipt of any such written notice, Contractor shall provide a copy of the notice to Owner, Engineer, and each other insured under the policy.

4. remain in effect at least until final payment (and longer if expressly required in this Article) and at all times thereafter when Contractor may be correcting, removing, or replacing defective Work as a warranty or correction obligation, or otherwise, or returning to the Site to conduct other tasks arising from the Contract Documents.

5. be appropriate for the Work being performed and provide protection from claims that may arise out of or result from Contractor’s performance of the Work and Contractor’s other obligations under the Contract Documents, whether it is to be performed by Contractor, any Subcontractor or Supplier, or by anyone directly or indirectly employed by any of them to perform any of the Work, or by anyone for whose acts any of them may be liable.

J. The coverage requirements for specific policies of insurance must be met by such policies, and not by reference to excess or umbrella insurance provided in other policies.

6.04 Owner’s Liability Insurance

A. In addition to the insurance required to be provided by Contractor under Paragraph 6.03, Owner, at Owner’s option, may purchase and maintain at Owner’s expense Owner’s own liability insurance as will protect Owner against claims which may arise from operations under the Contract Documents.

B. Owner’s liability policies, if any, operate separately and independently from policies required to be provided by Contractor, and Contractor cannot rely upon Owner’s liability policies for any of Contractor’s obligations to the Owner, Engineer, or third parties.

6.05 Property Insurance

A. Builder’s Risk: Unless otherwise provided in the Supplementary Conditions, Contractor shall purchase and maintain builder’s risk insurance upon the Work on a completed value basis, in the amount of the full insurable replacement cost thereof (subject to such deductible amounts as may be provided in the Supplementary Conditions or required by Laws and Regulations). This insurance shall:

1. include the Owner and Contractor as named insureds, and all Subcontractors, and any individuals or entities required by the Supplementary Conditions to be insured under such builder’s risk policy, as insureds or named insureds. For purposes of the remainder of this Paragraph 6.05, Paragraphs 6.06 and 6.07, and any corresponding Supplementary Conditions, the parties required to be insured shall collectively be referred to as “insureds.”

2. be written on a builder’s risk “all risk” policy form that shall at least include insurance for physical loss or damage to the Work, temporary buildings, falsework, and materials and equipment in transit, and shall insure against at least the following perils or causes of loss: fire; lightning; windstorm; riot; civil commotion; terrorism; vehicle impact; aircraft; smoke; theft; vandalism and malicious mischief; mechanical breakdown, boiler explosion, and artificially generated electric current; earthquake; volcanic activity, and other earth movement; flood; collapse; explosion; debris removal; demolition occasioned by enforcement of Laws and Regulations; water damage (other than that caused by flood); and such other perils or causes of loss as may be specifically required by the Supplementary Conditions. If insurance against mechanical breakdown, boiler explosion, and artificially generated electric current; earthquake; volcanic activity, and other earth movement; flood; collapse; explosion; debris removal; demolition occasioned by enforcement of Laws and Regulations; water damage (other than that caused by flood); and such other perils or causes of loss as may be specifically required by the Supplementary Conditions. If insurance against mechanical breakdown, boiler explosion, and artificially generated electric current; earthquake; volcanic activity, and other earth movement; or flood, are not commercially available under builder’s risk policies, by endorsement or otherwise, such insurance may be provided through other insurance policies acceptable to Owner and Contractor.
3. cover, as insured property, at least the following: (a) the Work and all materials, supplies, machinery, apparatus, equipment, fixtures, and other property of a similar nature that are to be incorporated into or used in the preparation, fabrication, construction, erection, or completion of the Work, including Owner-furnished or assigned property; (b) spare parts inventory required within the scope of the Contract; and (c) temporary works which are not intended to form part of the permanent constructed Work but which are intended to provide working access to the Site, or to the Work under construction, or which are intended to provide temporary support for the Work under construction, including scaffolding, form work, fences, shoring, falsework, and temporary structures.

4. cover expenses incurred in the repair or replacement of any insured property (including but not limited to fees and charges of engineers and architects).

5. extend to cover damage or loss to insured property while in temporary storage at the Site or in a storage location outside the Site (but not including property stored at the premises of a manufacturer or Supplier).

6. extend to cover damage or loss to insured property while in transit.

7. allow for partial occupation or use of the Work by Owner, such that those portions of the Work that are not yet occupied or used by Owner shall remain covered by the builder’s risk insurance.

8. allow for the waiver of the insurer’s subrogation rights, as set forth below.

9. provide primary coverage for all losses and damages caused by the perils or causes of loss covered.

10. not include a co-insurance clause.

11. include an exception for ensuing losses from physical damage or loss with respect to any defective workmanship, design, or materials exclusions.

12. include performance/hot testing and start-up.

13. be maintained in effect, subject to the provisions herein regarding Substantial Completion and partial occupancy or use of the Work by Owner, until the Work is complete.

B. Notice of Cancellation or Change: All the policies of insurance (and the certificates or other evidence thereof) required to be purchased and maintained in accordance with this Paragraph 6.05 will contain a provision or endorsement that the coverage afforded will not be canceled or materially changed or renewal refused until at least 10 days prior written notice has been given to the purchasing policyholder. Within three days of receipt of any such written notice, the purchasing policyholder shall provide a copy of the notice to each other insured.

C. Deductibles: The purchaser of any required builder’s risk or property insurance shall pay for costs not covered because of the application of a policy deductible.

D. Partial Occupation or Use by Owner: If Owner will occupy or use a portion or portions of the Work prior to Substantial Completion of all the Work as provided in Paragraph 15.04, then Owner (directly, if it is the purchaser of the builder’s risk policy, or through Contractor) will provide notice of such occupancy or use to the builder’s risk insurer. The builder’s risk insurance shall not be canceled or permitted to lapse on account of any such partial use or occupancy; rather, those portions of the Work that are occupied or used by Owner may come off the builder’s risk insurer. The builder’s risk insurance shall not be canceled or permitted to lapse on account of any such partial use or occupancy; rather, those portions of the Work that are occupied or used by Owner may come off the builder’s risk insurer.

E. Additional Insurance: If Contractor elects to obtain other special insurance to be included in or supplement the builder’s risk or property insurance policies provided under this Paragraph 6.05, it may do so at Contractor’s expense.

F. Insurance of Other Property: If the express insurance provisions of the Contract do not require or address the insurance of a property item or interest, such as tools, construction equipment, or other personal property owned by Contractor, a Subcontractor, or an employee of Contractor or a Subcontractor, then the entity or individual owning such property item will be responsible for deciding whether to insure it, and if so in what amount.
6.06 Waiver of Rights

A. All policies purchased in accordance with Paragraph 6.05, expressly including the builder’s risk policy, shall contain provisions to the effect that in the event of payment of any loss or damage the insurers will have no rights of recovery against any insureds thereunder, or against Engineer or its consultants, or their officers, directors, members, partners, employees, agents, consultants, or subcontractors. Owner and Contractor waive all rights against each other and the respective officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them, for all losses and damages caused by, arising out of, or resulting from any of the perils or causes of loss covered by such policies and any other property insurance applicable to the Work; and, in addition, waive all such rights against Engineer, its consultants, all Subcontractors, all individuals or entities identified in the Supplementary Conditions as insureds, and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them, under such policies for losses and damages so caused. None of the above waivers shall extend to the rights that any party making such waiver may have to the proceeds of insurance held by Owner or Contractor as trustee or fiduciary, or otherwise payable under any policy so issued.

B. Owner waives all rights against Contractor, Subcontractors, and Engineer, and the officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them, for:

1. loss due to business interruption, loss of use, or other consequential loss extending beyond direct physical loss or damage to Owner’s property or the Work caused by, arising out of, or resulting from fire or other perils whether or not insured by Owner; and

2. loss or damage to the completed Project or part thereof caused by, arising out of, or resulting from fire or other insured peril or cause of loss covered by any property insurance maintained on the completed Project or part thereof by Owner during partial occupancy or use pursuant to Paragraph 15.04, after Substantial Completion pursuant to Paragraph 15.03, or after final payment pursuant to Paragraph 15.06.

C. Any insurance policy maintained by Owner covering any loss, damage or consequential loss referred to in Paragraph 6.06.B shall contain provisions to the effect that in the event of payment of any such loss, damage, or consequential loss, the insurers will have no rights of recovery against Contractor, Subcontractors, or Engineer, or the officers, directors, members, partners, employees, agents, consultants, or subcontractors of each and any of them.

D. Contractor shall be responsible for assuring that the agreement under which a Subcontractor performs a portion of the Work contains provisions whereby the Subcontractor waives all rights against Owner, Contractor, all individuals or entities identified in the Supplementary Conditions as insureds, the Engineer and its consultants, and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them, for all losses and damages caused by, arising out of, relating to, or resulting from any of the perils or causes of loss covered by builder’s risk insurance and any other property insurance applicable to the Work.

6.07 Receipt and Application of Property Insurance Proceeds

A. Any insured loss under the builder’s risk and other policies of insurance required by Paragraph 6.05 will be adjusted and settled with the named insured that purchased the policy. Such named insured shall act as fiduciary for the other insureds, and give notice to such other insureds that adjustment and settlement of a claim is in progress. Any other insured may state its position regarding a claim for insured loss in writing within 15 days after notice of such claim.

B. Proceeds for such insured losses may be made payable by the insurer either jointly to multiple insureds, or to the named insured that purchased the policy in its own right and as fiduciary for other insureds, subject to the requirements of any applicable mortgage clause. A named insured receiving insurance proceeds under the builder’s risk and other policies of insurance required by Paragraph 6.05 shall distribute such proceeds in accordance with such agreement as the parties in interest may reach, or as otherwise required under the dispute resolution provisions of this Contract or applicable Laws and Regulations.
C. If no other special agreement is reached, the damaged Work shall be repaired or replaced, the money so received applied on account thereof, and the Work and the cost thereof covered by Change Order, if needed.

ARTICLE 7 – CONTRACTOR’S RESPONSIBILITIES

7.01 Supervision and Superintendence

A. Contractor shall supervise, inspect, and direct the Work competently and efficiently, devoting such attention thereto and applying such skills and expertise as may be necessary to perform the Work in accordance with the Contract Documents. Contractor shall be solely responsible for the means, methods, techniques, sequences, and procedures of construction.

B. At all times during the progress of the Work, Contractor shall assign a competent resident superintendent who shall not be replaced without written notice to Owner and Engineer except under extraordinary circumstances.

7.02 Labor; Working Hours

A. Contractor shall provide competent, suitably qualified personnel to survey and lay out the Work and perform construction as required by the Contract Documents. Contractor shall at all times maintain good discipline and order at the Site.

B. Except as otherwise required for the safety or protection of persons or the Work or property at the Site or adjacent thereto, and except as otherwise stated in the Contract Documents, all Work at the Site shall be performed during regular working hours, Monday through Friday. Contractor will not perform Work on a Saturday, Sunday, or any legal holiday. Contractor may perform Work outside regular working hours or on Saturdays, Sundays, or legal holidays only with Owner’s written consent, which will not be unreasonably withheld.

7.03 Services, Materials, and Equipment

A. Unless otherwise specified in the Contract Documents, Contractor shall provide and assume full responsibility for all services, materials, equipment, labor, transportation, construction equipment and machinery, tools, appliances, fuel, power, light, heat, telephone, water, sanitary facilities, temporary facilities, and all other facilities and incidentals necessary for the performance, testing, start up, and completion of the Work, whether or not such items are specifically called for in the Contract Documents.

B. All materials and equipment incorporated into the Work shall be of good quality and new, except as otherwise provided in the Contract Documents. All special warranties and guarantees required by the Specifications shall expressly run to the benefit of Owner. If required by Engineer, Contractor shall furnish satisfactory evidence (including reports of required tests) as to the source, kind, and quality of materials and equipment.

C. All materials and equipment shall be stored, applied, installed, connected, erected, protected, used, cleaned, and conditioned in accordance with instructions of the applicable Supplier, except as otherwise may be provided in the Contract Documents.

7.04 “Or Equals”

A. Whenever an item of material or equipment is specified or described in the Contract Documents by using the name of a proprietary item or the name of a particular Supplier, the Contract Price has been based upon Contractor furnishing such item as specified. The specification or description of such an item is intended to establish the type, function, appearance, and quality required. Unless the specification or description contains or is followed by words reading that no like, equivalent, or “or equal” item is permitted, Contractor may request that Engineer authorize the use of other items of material or equipment, or items from other proposed suppliers under the circumstances described below.

1. If Engineer in its sole discretion determines that an item of material or equipment proposed by Contractor is functionally equal to that named and sufficiently similar so that no change in related Work will be required, Engineer shall deem it an “or equal” item. For the purposes of this paragraph, a proposed item of material or equipment will be considered functionally equal to an item so named if:

a. in the exercise of reasonable judgment Engineer determines that:

1) it is at least equal in materials of construction, quality, durability, appearance,
strength, and design characteristics;
2) it will reliably perform at least equally well the function and achieve the results imposed by the design concept of the completed Project as a functioning whole;
3) it has a proven record of performance and availability of responsive service; and
4) it is not objectionable to Owner.

b. Contractor certifies that, if approved and incorporated into the Work:
1) there will be no increase in cost to the Owner or increase in Contract Times; and
2) it will conform substantially to the detailed requirements of the item named in the Contract Documents.

B. Contractor’s Expense: Contractor shall provide all data in support of any proposed “or equal” item at Contractor’s expense.

C. Engineer’s Evaluation and Determination: Engineer will be allowed a reasonable time to evaluate each “or-equal” request. Engineer may require Contractor to furnish additional data about the proposed “or-equal” item. Engineer will be the sole judge of acceptability. No “or-equal” item will be ordered, furnished, installed, or utilized until Engineer’s review is complete and Engineer determines that the proposed item is an “or-equal”, which will be evidenced by an approved Shop Drawing or other written communication. Engineer will advise Contractor in writing of any negative determination.

D. Effect of Engineer’s Determination: Neither approval nor denial of an “or-equal” request shall result in any change in Contract Price. The Engineer’s denial of an “or-equal” request shall be final and binding, and may not be reversed through an appeal under any provision of the Contract Documents.

E. Treatment as a Substitution Request: If Engineer determines that an item of material or equipment proposed by Contractor does not qualify as an “or-equal” item, Contractor may request that Engineer considered the proposed item as a substitute pursuant to Paragraph 7.05.

7.05 Substitutes

A. Unless the specification or description of an item of material or equipment required to be furnished under the Contract Documents contains or is followed by words reading that no substitution is permitted, Contractor may request that Engineer authorize the use of other items of material or equipment under the circumstances described below. To the extent possible such requests shall be made before commencement of related construction at the Site.

1. Contractor shall submit sufficient information as provided below to allow Engineer to determine if the item of material or equipment proposed is functionally equivalent to that named and an acceptable substitute therefor. Engineer will not accept requests for review of proposed substitute items of material or equipment from anyone other than Contractor.

2. The requirements for review by Engineer will be as set forth in Paragraph 7.05.B, as supplemented by the Specifications, and as Engineer may decide is appropriate under the circumstances.

3. Contractor shall make written application to Engineer for review of a proposed substitute item of material or equipment that Contractor seeks to furnish or use. The application:
   a. shall certify that the proposed substitute item will:
      1) perform adequately the functions and achieve the results called for by the general design,
      2) be similar in substance to that specified, and
      3) be suited to the same use as that specified.
   b. will state:
      1) the extent, if any, to which the use of the proposed substitute item will necessitate a change in Contract Times,
2) whether use of the proposed substitute item in the Work will require a change in any of the Contract Documents (or in the provisions of any other direct contract with Owner for other work on the Project) to adapt the design to the proposed substitute item, and

3) whether incorporation or use of the proposed substitute item in connection with the Work is subject to payment of any license fee or royalty.

c. will identify:
   1) all variations of the proposed substitute item from that specified, and
   2) available engineering, sales, maintenance, repair, and replacement services.

d. shall contain an itemized estimate of all costs or credits that will result directly or indirectly from use of such substitute item, including but not limited to changes in Contract Price, shared savings, costs of redesign, and claims of other contractors affected by any resulting change.

B. Engineer’s Evaluation and Determination: Engineer will be allowed a reasonable time to evaluate each substitute request, and to obtain comments and direction from Owner. Engineer may require Contractor to furnish additional data about the proposed substitute item. Engineer will be the sole judge of acceptability. No substitute will be ordered, furnished, installed, or utilized until Engineer’s review is complete and Engineer determines that the proposed item is an acceptable substitute. Engineer’s determination will be evidenced by a Field Order or a proposed Change Order accounting for the substitution itself and all related impacts, including changes in Contract Price or Contract Times. Engineer will advise Contractor in writing of any negative determination.

C. Special Guarantee: Owner may require Contractor to furnish at Contractor’s expense a special performance guarantee or other surety with respect to any substitute.

D. Reimbursement of Engineer’s Cost: Engineer will record Engineer’s costs in evaluating a substitute proposed or submitted by Contractor. Whether or not Engineer approves a substitute so proposed or submitted by Contractor, Contractor shall reimburse Owner for the reasonable charges of Engineer for evaluating each such proposed substitute. Contractor shall also reimburse Owner for the reasonable charges of Engineer for making changes in the Contract Documents (or in the provisions of any other direct contract with Owner) resulting from the acceptance of each proposed substitute.

E. Contractor’s Expense: Contractor shall provide all data in support of any proposed substitute at Contractor’s expense.

F. Effect of Engineer’s Determination: If Engineer approves the substitution request, Contractor shall execute the proposed Change Order and proceed with the substitution. The Engineer’s denial of a substitution request shall be final and binding, and may not be reversed through an appeal under any provision of the Contract Documents. Contractor may challenge the scope of reimbursement costs imposed under Paragraph 7.05.D, by timely submittal of a Change Proposal.

7.06 Concerning Subcontractors, Suppliers, and Others

A. Contractor may retain Subcontractors and Suppliers for the performance of parts of the Work. Such Subcontractors and Suppliers must be acceptable to Owner.

B. Contractor shall retain specific Subcontractors, Suppliers, or other individuals or entities for the performance of designated parts of the Work if required by the Contract to do so.

C. Subsequent to the submittal of Contractor’s Bid or final negotiation of the terms of the Contract, Owner may not require Contractor to retain any Subcontractor, Supplier, or other individual or entity to furnish or perform any of the Work against which Contractor has reasonable objection.

D. Prior to entry into any binding subcontract or purchase order, Contractor shall submit to Owner the identity of the proposed Subcontractor or Supplier (unless Owner has already deemed such proposed Subcontractor or Supplier acceptable, during the bidding process or otherwise). Such proposed Subcontractor or Supplier shall be deemed
acceptable to Owner unless Owner raises a substantive, reasonable objection within five days.

E. Owner may require the replacement of any Subcontractor, Supplier, or other individual or entity retained by Contractor to perform any part of the Work. Owner also may require Contractor to retain specific replacements; provided, however, that Owner may not require a replacement to which Contractor has a reasonable objection. If Contractor has submitted the identity of certain Subcontractors, Suppliers, or other individuals or entities for acceptance by Owner, and Owner has accepted it (either in writing or by failing to make written objection thereto), then Owner may subsequently revoke the acceptance of any such Subcontractor, Supplier, or other individual or entity so identified solely on the basis of substantive, reasonable objection after due investigation. Contractor shall submit an acceptable replacement for the rejected Subcontractor, Supplier, or other individual or entity.

F. If Owner requires the replacement of any Subcontractor, Supplier, or other individual or entity retained by Contractor to perform any part of the Work, then Contractor shall be entitled to an adjustment in Contract Price or Contract Times, or both, with respect to the replacement; and Contractor shall initiate a Change Proposal for such adjustment within 30 days of Owner's requirement of replacement.

G. No acceptance by Owner of any such Subcontractor, Supplier, or other individual or entity, whether initially or as a replacement, shall constitute a waiver of the right of Owner to the completion of the Work in accordance with the Contract Documents.

H. On a monthly basis Contractor shall submit to Engineer a complete list of all Subcontractors and Suppliers having a direct contract with Contractor, and of all other Subcontractors and Suppliers known to Contractor at the time of submittal.

I. Contractor shall be fully responsible to Owner and Engineer for all acts and omissions of the Subcontractors, Suppliers, and other individuals or entities performing or furnishing any of the Work just as Contractor is responsible for Contractor's own acts and omissions.

J. Contractor shall be solely responsible for scheduling and coordinating the work of Subcontractors, Suppliers, and all other individuals or entities performing or furnishing any of the Work.

K. Contractor shall restrict all Subcontractors, Suppliers, and such other individuals or entities performing or furnishing any of the Work from communicating with Engineer or Owner, except through Contractor or in case of an emergency, or as otherwise expressly allowed herein.

L. The divisions and sections of the Specifications and the identifications of any Drawings shall not control Contractor in dividing the Work among Subcontractors or Suppliers or delineating the Work to be performed by any specific trade.

M. All Work performed for Contractor by a Subcontractor or Supplier shall be pursuant to an appropriate contractual agreement that specifically binds the Subcontractor or Supplier to the applicable terms and conditions of the Contract Documents for the benefit of Owner and Engineer.

N. Owner may furnish to any Subcontractor or Supplier, to the extent practicable, information about amounts paid to Contractor on account of Work performed for Contractor by the particular Subcontractor or Supplier.

O. Nothing in the Contract Documents:

1. shall create for the benefit of any such Subcontractor, Supplier, or other individual or entity any contractual relationship between Owner or Engineer and any such Subcontractor, Supplier, or other individual or entity; nor

2. shall create any obligation on the part of Owner or Engineer to pay or to see to the payment of any money due any such Subcontractor, Supplier, or other individual or entity except as may otherwise be required by Laws and Regulations.

7.07 Patent Fees and Royalties

A. Contractor shall pay all license fees and royalties and assume all costs incident to the use in the performance of the Work or the incorporation in the Work of any invention, design, process, product, or device which is the subject of patent rights or copyrights held by others. If a particular invention, design, process, product, or device is specified in the Contract Documents for use in the performance of the Work and if, to the actual
knowledge of Owner or Engineer, its use is subject to patent rights or copyrights calling for the payment of any license fee or royalty to others, the existence of such rights shall be disclosed by Owner in the Contract Documents.

B. To the fullest extent permitted by Laws and Regulations, Owner shall indemnify and hold harmless Contractor, and its officers, directors, members, partners, employees, agents, consultants, and subcontractors from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals, and all court or arbitration or other dispute resolution costs) arising out of or relating to any infringement of patent rights or copyrights incident to the use in the performance of the Work or resulting from the incorporation in the Work of any invention, design, process, product, or device specified in the Contract Documents, but not identified as being subject to payment of any license fee or royalty to others required by patent rights or copyrights.

C. To the fullest extent permitted by Laws and Regulations, Contractor shall indemnify and hold harmless Owner and Engineer, and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to any infringement of patent rights or copyrights incident to the use in the performance of the Work or resulting from the incorporation in the Work of any invention, design, process, product, or device not specified in the Contract Documents.

7.08 Permits

A. Unless otherwise provided in the Contract Documents, Contractor shall obtain and pay for all construction permits and licenses. Owner shall assist Contractor, when necessary, in obtaining such permits and licenses. Contractor shall pay all governmental charges and inspection fees necessary for the prosecution of the Work which are applicable at the time of the submission of Contractor’s Bid (or when Contractor became bound under a negotiated contract). Owner shall pay all charges of utility owners for connections for providing permanent service to the Work.

7.09 Taxes

A. Contractor shall pay all sales, consumer, use, and other similar taxes required to be paid by Contractor in accordance with the Laws and Regulations applicable to the performance of the Work. Except where otherwise expressly required by applicable Laws and Regulations, neither Owner nor Engineer shall be responsible for monitoring Contractor’s compliance with any Laws or Regulations.

B. If Contractor performs any Work or takes any other action knowing or having reason to know that it is contrary to Laws or Regulations, Contractor shall bear all resulting costs and losses, and shall indemnify and hold harmless Owner and Engineer, and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to such Work or other action. It shall not be Contractor’s responsibility to make certain that the Work described in the Contract Documents is in accordance with Laws and Regulations, but this shall not relieve Contractor of Contractor’s obligations under Paragraph 3.03.

C. Owner or Contractor may give notice to the other party of any changes after the submission of Contractor’s Bid (or after the date when Contractor became bound under a negotiated contract) in Laws or Regulations having an effect on the cost or time of performance of the Work, including but not limited to changes in Laws or Regulations having an effect on procuring permits and on sales, use, value-added, consumption, and other similar taxes. If Owner and Contractor are unable to agree on entitlement to or on the amount or extent, if any, of any adjustment in Contract Price or Contract Times resulting from such changes, then within 30 days of
such notice Contractor may submit a Change Proposal, or Owner may initiate a Claim.

7.11 Record Documents

A. Contractor shall maintain in a safe place at the Site one printed record copy of all Drawings, Specifications, Addenda, Change Orders, Work Change Directives, Field Orders, written interpretations and clarifications, and approved Shop Drawings. Contractor shall keep such record documents in good order and annotate them to show changes made during construction. These record documents, together with all approved Samples, will be available to Engineer for reference. Upon completion of the Work, Contractor shall deliver these record documents to Engineer.

7.12 Safety and Protection

A. Contractor shall be solely responsible for initiating, maintaining, and supervising all safety precautions and programs in connection with the Work. Such responsibility does not relieve Subcontractors of their responsibility for the safety of persons or property in the performance of their work, nor for compliance with applicable safety Laws and Regulations. Contractor shall take all necessary precautions for the safety of, and shall provide the necessary protection to prevent damage, injury, or loss to:

1. all persons on the Site or who may be affected by the Work;

2. all the Work and materials and equipment to be incorporated therein, whether in storage on or off the Site; and

3. other property at the Site or adjacent thereto, including trees, shrubs, lawns, walks, pavements, roadways, structures, other work in progress, utilities, and Underground Facilities not designated for removal, relocation, or replacement in the course of construction.

B. Contractor shall comply with all applicable Laws and Regulations relating to the safety of persons or property, or to the protection of persons or property from damage, injury, or loss; and shall erect and maintain all necessary safeguards for such safety and protection. Contractor shall notify Owner; the owners of adjacent property, Underground Facilities, and other utilities; and other contractors and utility owners performing work at or adjacent to the Site, when prosecution of the Work may affect them, and shall cooperate with them in the protection, removal, relocation, and replacement of their property or work in progress.

C. Contractor shall comply with the applicable requirements of Owner’s safety programs, if any. The Supplementary Conditions identify any Owner’s safety programs that are applicable to the Work.

D. Contractor shall inform Owner and Engineer of the specific requirements of Contractor’s safety program with which Owner’s and Engineer’s employees and representatives must comply while at the Site.

E. All damage, injury, or loss to any property referred to in Paragraph 7.12.A.2 or 7.12.A.3 caused, directly or indirectly, in whole or in part, by Contractor, any Subcontractor, Supplier, or any other individual or entity directly or indirectly employed by any of them to perform any of the Work, or anyone for whose acts any of them may be liable, shall be remedied by Contractor at its expense (except damage or loss attributable to the fault of Drawings or Specifications or to the acts or omissions of Owner or Engineer or anyone employed by any of them, or anyone for whose acts any of them may be liable, and not attributable, directly or indirectly, in whole or in part, to the fault or negligence of Contractor or any Subcontractor, Supplier, or other individual or entity directly or indirectly employed by any of them).

F. Contractor’s duties and responsibilities for safety and protection shall continue until such time as all the Work is completed and Engineer has issued a notice to Owner and Contractor in accordance with Paragraph 15.06.B that the Work is acceptable (except as otherwise expressly provided in connection with Substantial Completion).

G. Contractor’s duties and responsibilities for safety and protection shall resume whenever Contractor or any Subcontractor or Supplier returns to the Site to fulfill warranty or correction obligations, or to conduct other tasks arising from the Contract Documents.

7.13 Safety Representative

A. Contractor shall designate a qualified and experienced safety representative at the Site whose duties and responsibilities shall be the prevention of accidents and the maintaining and supervising of safety precautions and programs.
7.14 **Hazard Communication Programs**

A. Contractor shall be responsible for coordinating any exchange of material safety data sheets or other hazard communication information required to be made available to or exchanged between or among employers at the Site in accordance with Laws or Regulations.

7.15 **Emergencies**

A. In emergencies affecting the safety or protection of persons or the Work or property at the Site or adjacent thereto, Contractor is obligated to act to prevent threatened damage, injury, or loss. Contractor shall give Engineer prompt written notice if Contractor believes that any significant changes in the Work or variations from the Contract Documents have been caused thereby or are required as a result thereof. If Engineer determines that a change in the Contract Documents is required because of the action taken by Contractor in response to such an emergency, a Work Change Directive or Change Order will be issued.

7.16 **Shop Drawings, Samples, and Other Submittals**

A. Shop Drawing and Sample Submittal Requirements:

1. Before submitting a Shop Drawing or Sample, Contractor shall have:
   
a. reviewed and coordinated the Shop Drawing or Sample with other Shop Drawings and Samples and with the requirements of the Work and the Contract Documents;
   
b. determined and verified all field measurements, quantities, dimensions, specified performance and design criteria, installation requirements, materials, catalog numbers, and similar information with respect thereto;
   
c. determined and verified the suitability of all materials and equipment offered with respect to the indicated application, fabrication, shipping, handling, storage, assembly, and installation pertaining to the performance of the Work; and
   
d. determined and verified all information relative to Contractor’s responsibilities for means, methods, techniques, sequences, and procedures of construction, and safety precautions and programs incident thereto.

2. Each submittal shall bear a stamp or specific written certification that Contractor has satisfied Contractor’s obligations under the Contract Documents with respect to Contractor’s review of that submittal, and that Contractor approves the submittal.

3. With each submittal, Contractor shall give Engineer specific written notice of any variations that the Shop Drawing or Sample may have from the requirements of the Contract Documents. This notice shall be set forth in a written communication separate from the Shop Drawings or Sample submittal; and, in addition, in the case of Shop Drawings by a specific notation made on each Shop Drawing submitted to Engineer for review and approval of each such variation.

B. **Submittal Procedures for Shop Drawings and Samples**: Contractor shall submit Shop Drawings and Samples to Engineer for review and approval in accordance with the accepted Schedule of Submittals. Each submittal will be identified as Engineer may require.

1. Shop Drawings:
   
a. Contractor shall submit the number of copies required in the Specifications.
   
b. Data shown on the Shop Drawings will be complete with respect to quantities, dimensions, specified performance and design criteria, materials, and similar data to show Engineer the services, materials, and equipment Contractor proposes to provide and to enable Engineer to review the information for the limited purposes required by Paragraph 7.16.D.

2. Samples:
   
a. Contractor shall submit the number of Samples required in the Specifications.
   
b. Contractor shall clearly identify each Sample as to material, Supplier, pertinent data such as catalog numbers, the use for which...
intended and other data as Engineer may require to enable Engineer to review the submittal for the limited purposes required by Paragraph 7.16.D.

3. Where a Shop Drawing or Sample is required by the Contract Documents or the Schedule of Submittals, any related Work performed prior to Engineer’s review and approval of the pertinent submittal will be at the sole expense and responsibility of Contractor.

C. Other Submittals: Contractor shall submit other submittals to Engineer in accordance with the accepted Schedule of Submittals, and pursuant to the applicable terms of the Specifications.

D. Engineer’s Review:

1. Engineer will provide timely review of Shop Drawings and Samples in accordance with the Schedule of Submittals acceptable to Engineer. Engineer’s review and approval will be only to determine if the items covered by the submittals will, after installation or incorporation in the Work, conform to the information given in the Contract Documents and be compatible with the design concept of the completed Project as a functioning whole as indicated by the Contract Documents.

2. Engineer’s review and approval will not extend to means, methods, techniques, sequences, or procedures of construction or to safety precautions or programs incident thereto.

3. Engineer’s review and approval of a separate item as such will not indicate approval of the assembly in which the item functions.

4. Engineer’s review and approval of a Shop Drawing or Sample shall not relieve Contractor from responsibility for any variation from the requirements of the Contract Documents unless Contractor has complied with the requirements of Paragraph 7.16.A.3 and Engineer has given written approval of each such variation by specific written notation thereof incorporated in or accompanying the Shop Drawing or Sample. Engineer will document any such approved variation from the requirements of the Contract Documents in a Field Order.

5. Engineer’s review and approval of a Shop Drawing or Sample shall not relieve Contractor from responsibility for complying with the requirements of Paragraph 7.16.A and B.

6. Engineer’s review and approval of a Shop Drawing or Sample, or of a variation from the requirements of the Contract Documents, shall not, under any circumstances, change the Contract Times or Contract Price, unless such changes are included in a Change Order.

7. Neither Engineer’s receipt, review, acceptance or approval of a Shop Drawing, Sample, or other submittal shall result in such item becoming a Contract Document.

8. Contractor shall perform the Work in compliance with the requirements and commitments set forth in approved Shop Drawings and Samples, subject to the provisions of Paragraph 7.16.D.4.

E. Resubmittal Procedures:

1. Contractor shall make corrections required by Engineer and shall return the required number of corrected copies of Shop Drawings and submit, as required, new Samples for review and approval. Contractor shall direct specific attention in writing to revisions other than the corrections called for by Engineer on previous submittals.

2. Contractor shall furnish required submittals with sufficient information and accuracy to obtain required approval of an item with no more than three submittals. Engineer will record Engineer’s time for reviewing a fourth or subsequent submittal of a Shop Drawings, sample, or other item requiring approval, and Contractor shall be responsible for Engineer’s charges to Owner for such time. Owner may impose a set-off against payments due to Contractor to secure reimbursement for such charges.

3. If Contractor requests a change of a previously approved submittal item, Contractor shall be responsible for Engineer’s charges to Owner for its review time, and Owner may impose a set-off against payments due to
Contractor to secure reimbursement for such charges, unless the need for such change is beyond the control of Contractor.

7.17 **Contractor’s General Warranty and Guarantee**

A. Contractor warrants and guarantees to Owner that all Work will be in accordance with the Contract Documents and will not be defective. Engineer and its officers, directors, members, partners, employees, agents, consultants, and subcontractors shall be entitled to rely on Contractor’s warranty and guarantee.

B. Contractor’s warranty and guarantee hereunder excludes defects or damage caused by:

1. abuse, modification, or improper maintenance or operation by persons other than Contractor, Subcontractors, Suppliers, or any other individual or entity for whom Contractor is responsible; or
2. normal wear and tear under normal usage.

C. Contractor’s obligation to perform and complete the Work in accordance with the Contract Documents shall be absolute. None of the following will constitute an acceptance of Work that is not in accordance with the Contract Documents or a release of Contractor’s obligation to perform the Work in accordance with the Contract Documents:

1. observations by Engineer;
2. recommendation by Engineer or payment by Owner of any progress or final payment;
3. the issuance of a certificate of Substantial Completion by Engineer or any payment related thereto by Owner;
4. use or occupancy of the Work or any part thereof by Owner;
5. any review and approval of a Shop Drawing or Sample submittal;
6. the issuance of a notice of acceptability by Engineer;
7. any inspection, test, or approval by others; or
8. any correction of defective Work by Owner.

D. If the Contract requires the Contractor to accept the assignment of a contract entered into by Owner, then the specific warranties, guarantees, and correction obligations contained in the assigned contract shall govern with respect to Contractor’s performance obligations to Owner for the Work described in the assigned contract.

7.18 **Indemnification**

A. To the fullest extent permitted by Laws and Regulations, and in addition to any other obligations of Contractor under the Contract or otherwise, Contractor shall indemnify and hold harmless Owner and Engineer, and the officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to the performance of the Work, provided that any such claim, cost, loss, or damage is attributable to bodily injury, sickness, disease, or death, or to injury to or destruction of tangible property (other than the Work itself), including the loss of use resulting therefrom but only to the extent caused by any negligent act or omission of Contractor, any Subcontractor, any Supplier, or any individual or entity directly or indirectly employed by any of them to perform any of the Work or anyone for whose acts any of them may be liable.

B. In any and all claims against Owner or Engineer or any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors by any employee (or the survivor or personal representative of such employee) of Contractor, any Subcontractor, any Supplier, or any individual or entity directly or indirectly employed by any of them to perform any of the Work, or anyone for whose acts any of them may be liable, the indemnification obligation under Paragraph 7.18.A shall not be limited in any way by any limitation on the amount or type of damages, compensation, or benefits payable by or for Contractor or any such Subcontractor, Supplier, or other individual or entity under workers’ compensation acts, disability benefit acts, or other employee benefit acts.

C. The indemnification obligations of Contractor under Paragraph 7.18.A shall not extend to the liability of Engineer and Engineer’s officers, directors, members, partners, employees,
agents, consultants and subcontractors arising out of:

1. the preparation or approval of, or the failure to prepare or approve maps, Drawings, opinions, reports, surveys, Change Orders, designs, or Specifications; or

2. giving directions or instructions, or failing to give them, if that is the primary cause of the injury or damage.

7.19 Delegation of Professional Design Services

A. Contractor will not be required to provide professional design services unless such services are specifically required by the Contract Documents for a portion of the Work or unless such services are required to carry out Contractor’s responsibilities for construction means, methods, techniques, sequences and procedures. Contractor shall not be required to provide professional services in violation of applicable Laws and Regulations.

B. If professional design services or certifications by a design professional related to systems, materials, or equipment are specifically required of Contractor by the Contract Documents, Owner and Engineer will specify all performance and design criteria that such services must satisfy. Contractor shall cause such services or certifications to be provided by a properly licensed professional, whose signature and seal shall appear on all drawings, calculations, specifications, certifications, and other submittals prepared by such professional. Shop Drawings and other submittals related to the Work designed or certified by such professional, if prepared by others, shall bear such professional’s written approval when submitted to Engineer.

C. Owner and Engineer shall be entitled to rely upon the adequacy, accuracy, and completeness of the services, certifications, or approvals performed by such design professionals, provided Owner and Engineer have specified to Contractor all performance and design criteria that such services must satisfy.

D. Pursuant to this paragraph, Engineer’s review and approval of Shop Drawings and other submittals (except design calculations and design drawings) will be only for the purpose stated in Paragraph 7.16.D.1.

E. Contractor shall not be responsible for the adequacy of the performance or design criteria specified by Owner or Engineer.

ARTICLE 8 – OTHER WORK AT THE SITE

8.01 Other Work

A. In addition to and apart from the Work under the Contract Documents, the Owner may perform other work at or adjacent to the Site. Such other work may be performed by Owner’s employees, or through contracts between the Owner and third parties. Owner may also arrange to have third-party utility owners perform work on their utilities and facilities at or adjacent to the Site.

B. If Owner performs other work at or adjacent to the Site with Owner’s employees, or through contracts for such other work, then Owner shall give Contractor written notice thereof prior to starting any such other work. If Owner has advance information regarding the start of any utility work at or adjacent to the Site, Owner shall provide such information to Contractor.

C. Contractor shall afford each other contractor that performs such other work, each utility owner performing other work, and Owner, if Owner is performing other work with Owner’s employees, proper and safe access to the Site, and provide a reasonable opportunity for the introduction and storage of materials and equipment and the execution of such other work. Contractor shall do all cutting, fitting, and patching of the Work that may be required to properly connect or otherwise make its several parts come together and properly integrate with such other work. Contractor shall not endanger any work of others by cutting, excavating, or otherwise altering such work; provided, however, that Contractor may cut or alter others’ work with the written consent of Engineer and the others whose work will be affected.

D. If the proper execution or results of any part of Contractor’s Work depends upon work performed by others under this Article 8, Contractor shall inspect such other work and promptly report to Engineer in writing any delays, defects, or deficiencies in such other
work that render it unavailable or unsuitable for the proper execution and results of Contractor’s Work. Contractor’s failure to so report will constitute an acceptance of such other work as fit and proper for integration with Contractor’s Work except for latent defects and deficiencies in such other work.

8.02 Coordination

A. If Owner intends to contract with others for the performance of other work at or adjacent to the Site, to perform other work at or adjacent to the Site with Owner’s employees, or to arrange to have utility owners perform work at or adjacent to the Site, the following will be set forth in the Supplementary Conditions or provided to Contractor prior to the start of any such other work:

1. the identity of the individual or entity that will have authority and responsibility for coordination of the activities among the various contractors;

2. an itemization of the specific matters to be covered by such authority and responsibility; and

3. the extent of such authority and responsibilities.

B. Unless otherwise provided in the Supplementary Conditions, Owner shall have sole authority and responsibility for such coordination.

8.03 Legal Relationships

A. If, in the course of performing other work at or adjacent to the Site for Owner, the Owner’s employees, any other contractor working for Owner, or any utility owner causes damage to the Work or to the property of Contractor or its Subcontractors, or delays, disrupts, interferes with, or increases the scope or cost of the performance of the Work, through actions or inaction, then Contractor shall be entitled to an equitable adjustment in the Contract Price or the Contract Times, or both. Contractor must submit any Change Proposal seeking an equitable adjustment in the Contract Price or the Contract Times under this paragraph within 30 days of the damaging, delaying, disrupting, or interfering event. The entitlement to, and extent of, any such equitable adjustment shall take into account information (if any) regarding such other work that was provided to Contractor in the Contract Documents prior to the submittal of the Bid or the final negotiation of the terms of the Contract. When applicable, any such equitable adjustment in Contract Price shall be conditioned on Contractor assigning to Owner all Contractor’s rights against such other contractor or utility owner with respect to the damage, delay, disruption, or interference that is the subject of the adjustment. Contractor’s entitlement to an adjustment of the Contract Times is conditioned on such adjustment being essential to Contractor’s ability to complete the Work within the Contract Times.

B. Contractor shall take reasonable and customary measures to avoid damaging, delaying, disrupting, or interfering with the work of Owner, any other contractor, or any utility owner performing other work at or adjacent to the Site. If Contractor fails to take such measures and as a result damages, delays, disrupts, or interferes with the work of any such other contractor or utility owner, then Owner may impose a set-off against payments due to Contractor, and assign to such other contractor or utility owner the Owner’s contractual rights against Contractor with respect to the breach of the obligations set forth in this paragraph.

C. When Owner is performing other work at or adjacent to the Site with Owner’s employees, Contractor shall be liable to Owner for damage to such other work, and for the reasonable direct delay, disruption, and interference costs incurred by Owner as a result of Contractor’s failure to take reasonable and customary measures with respect to Owner’s other work. In response to such damage, delay, disruption, or interference, Owner may impose a set-off against payments due to Contractor.

D. If Contractor damages, delays, disrupts, or interferes with the work of any other contractor, or any utility owner performing other work at or adjacent to the Site, through Contractor’s failure to take reasonable and customary measures to avoid such impacts, or if any claim arising out of Contractor’s actions, inactions, or negligence in performance of the Work at or adjacent to the Site is made by any such other contractor or utility owner against Contractor, Owner, or Engineer, then Contractor shall (1) promptly attempt to settle the claim as to all parties through negotiations with such other contractor or utility owner, or otherwise resolve the claim by arbitration or other dispute resolution proceeding or at law, and (2) indemnify and hold harmless Owner and Engineer, and the officers, directors,
members, partners, employees, agents, consultants and subcontractors of each and any of them from and against any such claims, and against all costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to such damage, delay, disruption, or interference.

ARTICLE 9 – OWNER’S RESPONSIBILITIES

9.01 Communications to Contractor
A. Except as otherwise provided in these General Conditions, Owner shall issue all communications to Contractor through Engineer.

9.02 Replacement of Engineer
A. Owner may at its discretion appoint an engineer to replace Engineer, provided Contractor makes no reasonable objection to the replacement engineer. The replacement engineer’s status under the Contract Documents shall be that of the former Engineer.

9.03 Furnish Data
A. Owner shall promptly furnish the data required of Owner under the Contract Documents.

9.04 Pay When Due
A. Owner shall make payments to Contractor when they are due as provided in the Agreement.

9.05 Lands and Easements; Reports, Tests, and Drawings
A. Owner’s duties with respect to providing lands and easements are set forth in Paragraph 5.01.
B. Owner’s duties with respect to providing engineering surveys to establish reference points are set forth in Paragraph 4.03.
C. Article 5 refers to Owner’s identifying and making available to Contractor copies of reports of explorations and tests of conditions at the Site, and drawings of physical conditions relating to existing surface or subsurface structures at the Site.

9.06 Insurance
A. Owner’s responsibilities, if any, with respect to purchasing and maintaining liability and property insurance are set forth in Article 6.

9.07 Change Orders
A. Owner’s responsibilities with respect to Change Orders are set forth in Article 11.

9.08 Inspections, Tests, and Approvals
A. Owner’s responsibility with respect to certain inspections, tests, and approvals is set forth in Paragraph 14.02.B.

9.09 Limitations on Owner’s Responsibilities
A. The Owner shall not supervise, direct, or have control or authority over, nor be responsible for, Contractor’s means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or for any failure of Contractor to comply with Laws and Regulations applicable to the performance of the Work. Owner will not be responsible for Contractor’s failure to perform the Work in accordance with the Contract Documents.

9.10 Undisclosed Hazardous Environmental Condition
A. Owner’s responsibility in respect to an undisclosed Hazardous Environmental Condition is set forth in Paragraph 5.06.

9.11 Evidence of Financial Arrangements
A. Upon request of Contractor, Owner shall furnish Contractor reasonable evidence that financial arrangements have been made to satisfy Owner’s obligations under the Contract Documents (including obligations under proposed changes in the Work).

9.12 Safety Programs
A. While at the Site, Owner’s employees and representatives shall comply with the specific applicable requirements of Contractor’s safety programs of which Owner has been informed.
B. Owner shall furnish copies of any applicable Owner safety programs to Contractor.

ARTICLE 10 – ENGINEER’S STATUS DURING CONSTRUCTION

10.01 Owner’s Representative
A. Engineer will be Owner’s representative during the construction period. The duties and responsibilities and the limitations of authority of Engineer as Owner’s representative during construction are set forth in the Contract.
10.02 Visits to Site

A. Engineer will make visits to the Site at intervals appropriate to the various stages of construction as Engineer deems necessary in order to observe as an experienced and qualified design professional the progress that has been made and the quality of the various aspects of Contractor’s executed Work. Based on information obtained during such visits and observations, Engineer, for the benefit of Owner, will determine, in general, if the Work is proceeding in accordance with the Contract Documents. Engineer will not be required to make exhaustive or continuous inspections on the Site to check the quality or quantity of the Work. Engineer’s efforts will be directed toward providing for Owner a greater degree of confidence that the completed Work will conform generally to the Contract Documents. On the basis of such visits and observations, Engineer will keep Owner informed of the progress of the Work and will endeavor to guard Owner against defective Work.

B. Engineer’s visits and observations are subject to all the limitations on Engineer’s authority and responsibility set forth in Paragraph 10.08. Particularly, but without limitation, during or as a result of Engineer’s visits or observations of Contractor’s Work, Engineer will not supervise, direct, control, or have authority over or be responsible for Contractor’s means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or for any failure of Contractor to comply with Laws and Regulations applicable to the performance of the Work.

10.03 Project Representative

A. If Owner and Engineer have agreed that Engineer will furnish a Resident Project Representative to represent Engineer at the Site and assist Engineer in observing the progress and quality of the Work, then the authority and responsibilities of any such Resident Project Representative will be as provided in the Supplementary Conditions, and limitations on the responsibilities thereof will be as provided in Paragraph 10.08. If Owner designates another representative or agent to represent Owner at the Site who is not Engineer’s consultant, agent, or employee, the responsibilities and authority and limitations thereon of such other individual or entity will be as provided in the Supplementary Conditions.

10.04 Rejecting Defective Work

A. Engineer has the authority to reject Work in accordance with Article 14.

10.05 Shop Drawings, Change Orders and Payments

A. Engineer’s authority, and limitations thereof, as to Shop Drawings and Samples, are set forth in Paragraph 7.16.

B. Engineer’s authority, and limitations thereof, as to design calculations and design drawings submitted in response to a delegation of professional design services, if any, are set forth in Paragraph 7.19.

C. Engineer’s authority as to Change Orders is set forth in Article 11.

D. Engineer’s authority as to Applications for Payment is set forth in Article 15.

10.06 Determinations for Unit Price Work

A. Engineer will determine the actual quantities and classifications of Unit Price Work performed by Contractor as set forth in Paragraph 13.03.

10.07 Decisions on Requirements of Contract Documents and Acceptability of Work

A. Engineer will render decisions regarding the requirements of the Contract Documents, and judge the acceptability of the Work, pursuant to the specific procedures set forth herein for initial interpretations, Change Proposals, and acceptance of the Work. In rendering such decisions and judgments, Engineer will not show partiality to Owner or Contractor, and will not be liable to Owner, Contractor, or others in connection with any proceedings, interpretations, decisions, or judgments conducted or rendered in good faith.

10.08 Limitations on Engineer’s Authority and Responsibilities

A. Neither Engineer’s authority or responsibility under this Article 10 or under any other provision of the Contract, nor any decision made by Engineer in good faith either to exercise or not exercise such authority or responsibility or the undertaking, exercise, or performance of any authority or responsibility by Engineer, shall create, impose, or give rise to any duty in contract, tort, or otherwise owed by Engineer to Contractor, any Subcontractor, any Supplier, any other individual or entity, or to any surety for or employee or agent of any of them.
B. Engineer will not supervise, direct, control, or have authority over or be responsible for Contractor’s means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or for any failure of Contractor to comply with Laws and Regulations applicable to the performance of the Work. Engineer will not be responsible for Contractor’s failure to perform the Work in accordance with the Contract Documents.

C. Engineer will not be responsible for the acts or omissions of Contractor or of any Subcontractor, any Supplier, or of any other individual or entity performing any of the Work.

D. Engineer’s review of the final Application for Payment and accompanying documentation and all maintenance and operating instructions, schedules, guarantees, bonds, certificates of inspection, tests and approvals, and other documentation required to be delivered by Paragraph 15.06.A will only be to determine generally that their content complies with the requirements of, and in the case of certificates of inspections, tests, and approvals, that the results certified indicate compliance with the Contract Documents.

E. The limitations upon authority and responsibility set forth in this Paragraph 10.08 shall also apply to the Resident Project Representative, if any.

10.09 Compliance with Safety Program

A. While at the Site, Engineer’s employees and representatives will comply with the specific applicable requirements of Owner’s and Contractor’s safety programs (if any) of which Engineer has been informed.

ARTICLE 11 – AMENDING THE CONTRACT DOCUMENTS; CHANGES IN THE WORK

11.01 Amending and Supplementing Contract Documents

A. The Contract Documents may be amended or supplemented by a Change Order, a Work Change Directive, or a Field Order.

1. Change Orders:
   a. If an amendment or supplement to the Contract Documents includes a change in the Contract Price or the Contract Times, such amendment or supplement must be set forth in a Change Order. A Change Order also may be used to establish amendments and supplements of the Contract Documents that do not affect the Contract Price or Contract Times.

b. Owner and Contractor may amend those terms and conditions of the Contract Documents that do not involve (1) the performance or acceptability of the Work, (2) the design (as set forth in the Drawings, Specifications, or otherwise), or (3) other engineering or technical matters, without the recommendation of the Engineer. Such an amendment shall be set forth in a Change Order.

2. Work Change Directives: A Work Change Directive will not change the Contract Price or the Contract Times but is evidence that the parties expect that the modification ordered or documented by a Work Change Directive will be incorporated in a subsequently issued Change Order, following negotiations by the parties as to the Work Change Directive’s effect, if any, on the Contract Price and Contract Times; or, if negotiations are unsuccessful, by a determination under the terms of the Contract Documents governing adjustments, expressly including Paragraph 11.04 regarding change of Contract Price. Contractor must submit any Change Proposal seeking an adjustment of the Contract Price or the Contract Times, or both, no later than 30 days after the completion of the Work set out in the Work Change Directive. Owner must submit any Claim seeking an adjustment of the Contract Price or the Contract Times, or both, no later than 60 days after issuance of the Work Change Directive.

3. Field Orders: Engineer may authorize minor changes in the Work if the changes do not involve an adjustment in the Contract Price or the Contract Times and are compatible with the design concept of the completed Project as a functioning whole as indicated by the Contract Documents. Such changes will be accomplished by a Field Order and will be binding on Owner and also on Contractor, which shall perform the Work involved promptly. If Contractor
believes that a Field Order justifies an adjustment in the Contract Price or Contract Times, or both, then before proceeding with the Work at issue, Contractor shall submit a Change Proposal as provided herein.

11.02 Owner-Authorized Changes in the Work

A. Without invalidating the Contract and without notice to any surety, Owner may, at any time or from time to time, order additions, deletions, or revisions in the Work. Such changes shall be supported by Engineer’s recommendation, to the extent the change involves the design (as set forth in the Drawings, Specifications, or otherwise), or other engineering or technical matters. Such changes may be accomplished by a Change Order, if Owner and Contractor have agreed as to the effect, if any, of the changes on Contract Times or Contract Price; or by a Work Change Directive. Upon receipt of any such document, Contractor shall promptly proceed with the Work involved; or, in the case of a deletion in the Work, promptly cease construction activities with respect to such deleted Work. Added or revised Work shall be performed under the applicable conditions of the Contract Documents. Nothing in this paragraph shall obligate Contractor to undertake work that Contractor reasonably concludes cannot be performed in a manner consistent with Contractor’s safety obligations under the Contract Documents or Laws and Regulations.

11.03 Unauthorized Changes in the Work

A. Contractor shall not be entitled to an increase in the Contract Price or an extension of the Contract Times with respect to any work performed that is not required by the Contract Documents, as amended, modified, or supplemented, except in the case of an emergency as provided in Paragraph 7.15 or in the case of uncovering Work as provided in Paragraph 14.05.

11.04 Change of Contract Price

A. The Contract Price may only be changed by a Change Order. Any Change Proposal for an adjustment in the Contract Price shall comply with the provisions of Paragraph 11.06. Any Claim for an adjustment of Contract Price shall comply with the provisions of Article 12.

B. An adjustment in the Contract Price will be determined as follows:

1. where the Work involved is covered by unit prices contained in the Contract Documents, then by application of such unit prices to the quantities of the items involved (subject to the provisions of Paragraph 13.03); or

2. where the Work involved is not covered by unit prices contained in the Contract Documents, then by a mutually agreed lump sum (which may include an allowance for overhead and profit not necessarily in accordance with Paragraph 11.04.C.2); or

3. where the Work involved is not covered by unit prices contained in the Contract Documents and the parties do not reach mutual agreement to a lump sum, then on the basis of the Cost of the Work (determined as provided in Paragraph 13.01) plus a Contractor’s fee for overhead and profit (determined as provided in Paragraph 11.04.C).

C. Contractor’s Fee: When applicable, the Contractor’s fee for overhead and profit shall be determined as follows:

1. a mutually acceptable fixed fee; or

2. if a fixed fee is not agreed upon, then a fee based on the following percentages of the various portions of the Cost of the Work:
   a. for costs incurred under Paragraphs 13.01.B.1 and 13.01.B.2, the Contractor’s fee shall be 15 percent;
   b. for costs incurred under Paragraph 13.01.B.3, the Contractor’s fee shall be five percent;
   c. where one or more tiers of subcontracts are on the basis of Cost of the Work plus a fee and no fixed fee is agreed upon, the intent of Paragraphs 11.01.C.2.a and 11.01.C.2.b is that the Contractor’s fee shall be based on: (1) a fee of 15 percent of the costs incurred under Paragraphs 13.01.A.1 and 13.01.A.2 by the Subcontractor that actually performs the Work, at whatever tier, and (2) with respect to Contractor itself and to any Subcontractors of a tier higher than that of the Subcontractor that actually performs the Work, a fee of five percent of the amount (fee
plus underlying costs incurred) attributable to the next lower tier Subcontractor; provided, however, that for any such subcontracted work the maximum total fee to be paid by Owner shall be no greater than 27 percent of the costs incurred by the Subcontractor that actually performs the work;

d. no fee shall be payable on the basis of costs itemized under Paragraphs 13.01.B.4, 13.01.B.5, and 13.01.C;

e. the amount of credit to be allowed by Contractor to Owner for any change which results in a net decrease in cost will be the amount of the actual net decrease in cost plus a deduction in Contractor’s fee by an amount equal to five percent of such net decrease; and

f. when both additions and credits are involved in any one change, the adjustment in Contractor’s fee shall be computed on the basis of the net change in accordance with Paragraphs 11.04.C.2.a through 11.04.C.2.e, inclusive.

11.05 Change of Contract Times

A. The Contract Times may only be changed by a Change Order. Any Change Proposal for an adjustment in the Contract Times shall comply with the provisions of Paragraph 11.06. Any Claim for an adjustment in the Contract Times shall comply with the provisions of Article 12.

B. An adjustment of the Contract Times shall be subject to the limitations set forth in Paragraph 4.05, concerning delays in Contractor’s progress.

11.06 Change Proposals

A. Contractor shall submit a Change Proposal to Engineer to request an adjustment in the Contract Times or Contract Price; appeal an initial decision by Engineer concerning the requirements of the Contract Documents or relating to the acceptability of the Work under the Contract Documents; contest a set-off against payment due; or seek other relief under the Contract. The Change Proposal shall specify any proposed change in Contract Times or Contract Price, or both, or other proposed relief, and explain the reason for the proposed change, with citations to any governing or applicable provisions of the Contract Documents.

B. Resolution of Certain Change Proposals: If the Change Proposal does not involve the design (as set forth in the Drawings, Specifications, or otherwise), the acceptability of the Work, or other engineering or technical matters, then Engineer will notify the parties that the Engineer is unable to resolve the Change Proposal. For purposes of further resolution of such a Change Proposal, such notice shall be deemed a denial, and Contractor may choose to seek resolution under the terms of Article 12.
11.07 Execution of Change Orders

A. Owner and Contractor shall execute appropriate Change Orders covering:

1. changes in the Contract Price or Contract Times which are agreed to by the parties, including any undisputed sum or amount of time for Work actually performed in accordance with a Work Change Directive;
2. changes in Contract Price resulting from an Owner set-off, unless Contractor has duly contested such set-off;
3. changes in the Work which are: (a) ordered by Owner pursuant to Paragraph 11.02, (b) required because of Owner’s acceptance of defective Work under Paragraph 14.04 or Owner’s correction of defective Work under Paragraph 14.07, or (c) agreed to by the parties, subject to the need for Engineer’s recommendation if the change in the Work involves the design (as set forth in the Drawings, Specifications, or otherwise), or other engineering or technical matters; and
4. changes in the Contract Price or Contract Times, or other changes, which embody the substance of any final and binding results under Paragraph 11.06, or Article 12.

B. If Owner or Contractor refuses to execute a Change Order that is required to be executed under the terms of this Paragraph 11.07, it shall be deemed to be of full force and effect, as if fully executed.

11.08 Notification to Surety

A. If the provisions of any bond require notice to be given to a surety of any change affecting the general scope of the Work or the provisions of the Contract Documents (including, but not limited to, Contract Price or Contract Times), the giving of any such notice will be Contractor’s responsibility. The amount of each applicable bond will be adjusted to reflect the effect of any such change.

ARTICLE 12 – CLAIMS

12.01 Claims

A. Claims Process: The following disputes between Owner and Contractor shall be submitted to the Claims process set forth in this Article:

1. Appeals by Owner or Contractor of Engineer’s decisions regarding Change Proposals;
2. Owner demands for adjustments in the Contract Price or Contract Times, or other relief under the Contract Documents; and
3. Disputes that Engineer has been unable to address because they do not involve the design (as set forth in the Drawings, Specifications, or otherwise), the acceptability of the Work, or other engineering or technical matters.

B. Submittal of Claim: The party submitting a Claim shall deliver it directly to the other party to the Contract promptly (but in no event later than 30 days) after the start of the event giving rise thereto; in the case of appeals regarding Change Proposals within 30 days of the decision under appeal. The party submitting the Claim shall also furnish a copy to the Engineer, for its information only. The responsibility to substantiate a Claim shall rest with the party making the Claim. In the case of a Claim by Contractor seeking an increase in the Contract Times or Contract Price, or both, Contractor shall certify that the Claim is made in good faith, that the supporting data are accurate and complete, and that to the best of Contractor’s knowledge and belief the amount of time or money requested accurately reflects the full amount to which Contractor is entitled.

C. Review and Resolution: The party receiving a Claim shall review it thoroughly, giving full consideration to its merits. The two parties shall seek to resolve the Claim through the exchange of information and direct negotiations. The parties may extend the time for resolving the Claim by mutual agreement. All actions taken on a Claim shall be stated in writing and submitted to the other party, with a copy to Engineer.

D. Mediation:

1. At any time after initiation of a Claim, Owner and Contractor may mutually agree to mediation of the underlying dispute. The agreement to mediate shall stay the Claim submittal and response process.
2. If Owner and Contractor agree to mediation, then after 60 days from such
agreement, either Owner or Contractor may unilaterally terminate the mediation process, and the Claim submittal and decision process shall resume as of the date of the termination. If the mediation proceeds but is unsuccessful in resolving the dispute, the Claim submittal and decision process shall resume as of the date of the conclusion of the mediation, as determined by the mediator.

3. Owner and Contractor shall each pay one-half of the mediator's fees and costs.

E. Partial Approval: If the party receiving a Claim approves the Claim in part and denies it in part, such action shall be final and binding unless within 30 days of such action the other party invokes the procedure set forth in Article 17 for final resolution of disputes.

F. Denial of Claim: If efforts to resolve a Claim are not successful, the party receiving the Claim may deny it by giving written notice of denial to the other party. If the receiving party does not take action on the Claim within 90 days, then either Owner or Contractor may at any time thereafter submit a letter to the other party indicating that as a result of the inaction, the Claim is deemed denied, thereby commencing the time for appeal of the denial. A denial of the Claim shall be final and binding unless within 30 days of the denial the other party invokes the procedure set forth in Article 17 for the final resolution of disputes.

G. Final and Binding Results: If the parties reach a mutual agreement regarding a Claim, whether through approval of the Claim, direct negotiations, mediation, or otherwise; or if a Claim is approved in part and denied in part, or denied in full, and such actions become final and binding; then the results of the agreement or action on the Claim shall be incorporated in a Change Order to the extent they affect the Contract, including the Work, the Contract Times, or the Contract Price.

ARTICLE 13 – COST OF THE WORK; ALLOWANCES; UNIT PRICE WORK

13.01 Cost of the Work

A. Purposes for Determination of Cost of the Work: The term Cost of the Work means the sum of all costs necessary for the proper performance of the Work at issue, as further defined below. The provisions of this Paragraph 13.01 are used for two distinct purposes:

1. To determine Cost of the Work when Cost of the Work is a component of the Contract Price, under cost-plus-fee, time-and-materials, or other cost-based terms; or

2. To determine the value of a Change Order, Change Proposal, Claim, set-off, or other adjustment in Contract Price. When the value of any such adjustment is determined on the basis of Cost of the Work, Contractor is entitled only to those additional or incremental costs required because of the change in the Work or because of the event giving rise to the adjustment.

B. Costs Included: Except as otherwise may be agreed to in writing by Owner, costs included in the Cost of the Work shall be in amounts no higher than those prevailing in the locality of the Project, shall not include any of the costs itemized in Paragraph 13.01.C, and shall include only the following items:

1. Payroll costs for employees in the direct employ of Contractor in the performance of the Work under schedules of job classifications agreed upon by Owner and Contractor. Such employees shall include, without limitation, superintendents, foremen, and other personnel employed full time on the Work. Payroll costs for employees not employed full time on the Work shall be apportioned on the basis of their time spent on the Work. Payroll costs shall include, but not be limited to, salaries and wages plus the cost of fringe benefits, which shall include social security contributions, unemployment, excise, and payroll taxes, workers’ compensation, health and retirement benefits, bonuses, sick leave, and vacation and holiday pay applicable thereto. The expenses of performing Work outside of regular working hours, on Saturday, Sunday, or legal holidays, shall be included in the above to the extent authorized by Owner.

2. Cost of all materials and equipment furnished and incorporated in the Work, including costs of transportation and storage thereof, and Suppliers’ field services required in connection therewith. All cash discounts shall accrue to Contractor unless Owner deposits funds with Contractor with which to make payments, in which case
the cash discounts shall accrue to Owner. All trade discounts, rebates, and refunds and returns from sale of surplus materials and equipment shall accrue to Owner, and Contractor shall make provisions so that they may be obtained.

3. Payments made by Contractor to Subcontractors for Work performed by Subcontractors. If required by Owner, Contractor shall obtain competitive bids from subcontractors acceptable to Owner and Contractor and shall deliver such bids to Owner, who will then determine, with the advice of Engineer, which bids, if any, will be acceptable. If any subcontract provides that the Subcontractor is to be paid on the basis of Cost of the Work plus a fee, the Subcontractor’s Cost of the Work and fee shall be determined in the same manner as Contractor’s Cost of the Work and fee as provided in this Paragraph 13.01.

4. Costs of special consultants (including but not limited to engineers, architects, testing laboratories, surveyors, attorneys, and accountants) employed for services specifically related to the Work.

5. Supplemental costs including the following:
   a. The proportion of necessary transportation, travel, and subsistence expenses of Contractor’s employees incurred in discharge of duties connected with the Work.
   b. Cost, including transportation and maintenance, of all materials, supplies, equipment, machinery, appliances, office, and temporary facilities at the Site, and hand tools not owned by the workers, which are consumed in the performance of the Work, and cost, less market value, of such items used but not consumed which remain the property of Contractor.
   c. Rentals of all construction equipment and machinery, and the parts thereof, whether rented from Contractor or others in accordance with rental agreements approved by Owner with the advice of Engineer, and the costs of transportation, loading, unloading, assembly, dismantling, and removal thereof. All such costs shall be in accordance with the terms of said rental agreements. The rental of any such equipment, machinery, or parts shall cease when the use thereof is no longer necessary for the Work.
   d. Sales, consumer, use, and other similar taxes related to the Work, and for which Contractor is liable, as imposed by Laws and Regulations.
   e. Deposits lost for causes other than negligence of Contractor, any Subcontractor, or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable, and royalty payments and fees for permits and licenses.
   f. Losses and damages (and related expenses) caused by damage to the Work, not compensated by insurance or otherwise, sustained by Contractor in connection with the performance of the Work (except losses and damages within the deductible amounts of property insurance established in accordance with Paragraph 6.05), provided such losses and damages have resulted from causes other than the negligence of Contractor, any Subcontractor, or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable. Such losses shall include settlements made with the written consent and approval of Owner. No such losses, damages, and expenses shall be included in the Cost of the Work for the purpose of determining Contractor’s fee.
   g. The cost of utilities, fuel, and sanitary facilities at the Site.
   h. Minor expenses such as communication service at the Site, express and courier services, and similar petty cash items in connection with the Work.
   i. The costs of premiums for all bonds and insurance that
Contractor is required by the Contract Documents to purchase and maintain.

C. Costs Excluded: The term Cost of the Work shall not include any of the following items:

1. Payroll costs and other compensation of Contractor’s officers, executives, principals (of partnerships and sole proprietorships), general managers, safety managers, engineers, architects, estimators, attorneys, auditors, accountants, purchasing and contracting agents, expediters, timekeepers, clerks, and other personnel employed by Contractor, whether at the Site or in Contractor’s principal or branch office for general administration of the Work and not specifically included in the agreed upon schedule of job classifications referred to in Paragraph 13.01.B.1 or specifically covered by Paragraph 13.01.B.4. The payroll costs and other compensation excluded here are to be considered administrative costs covered by the Contractor’s fee.

2. Expenses of Contractor’s principal and branch offices other than Contractor’s office at the Site.

3. Any part of Contractor’s capital expenses, including interest on Contractor’s capital employed for the Work and charges against Contractor for delinquent payments.

4. Costs due to the negligence of Contractor, any Subcontractor, or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable, including but not limited to, the correction of defective Work, disposal of materials or equipment wrongly supplied, and making good any damage to property.

5. Other overhead or general expense costs of any kind and the costs of any item not specifically and expressly included in Paragraph 13.01.B.

D. Contractor’s Fee: When the Work as a whole is performed on the basis of cost-plus, Contractor’s fee shall be determined as set forth in the Agreement. When the value of any Work covered by a Change Order, Change Proposal, Claim, set-off, or other adjustment in Contract Price is determined on the basis of Cost of the Work, Contractor’s fee shall be determined as set forth in Paragraph 11.04.C.

E. Documentation: Whenever the Cost of the Work for any purpose is to be determined pursuant to this Article 13, Contractor will establish and maintain records thereof in accordance with generally accepted accounting practices and submit in a form acceptable to Engineer an itemized cost breakdown together with supporting data.

13.02 Allowances

A. It is understood that Contractor has included in the Contract Price all allowances so named in the Contract Documents and shall cause the Work so covered to be performed for such sums and by such persons or entities as may be acceptable to Owner and Engineer.

B. Cash Allowances: Contractor agrees that:

1. the cash allowances include the cost to Contractor (less any applicable trade discounts) of materials and equipment required by the allowances to be delivered at the Site, and all applicable taxes; and

2. Contractor’s costs for unloading and handling on the Site, labor, installation, overhead, profit, and other expenses contemplated for the cash allowances have been included in the Contract Price and not in the allowances, and no demand for additional payment on account of any of the foregoing will be valid.

C. Contingency Allowance: Contractor agrees that a contingency allowance, if any, is for the sole use of Owner to cover unanticipated costs.

D. Prior to final payment, an appropriate Change Order will be issued as recommended by Engineer to reflect actual amounts due Contractor on account of Work covered by allowances, and the Contract Price shall be correspondingly adjusted.

13.03 Unit Price Work

A. Where the Contract Documents provide that all or part of the Work is to be Unit Price Work, initially the Contract Price will be deemed to include for all Unit Price Work an amount equal to the sum of the unit price for each separately identified item of Unit Price Work times the estimated quantity of each item as indicated in the Agreement.
B. The estimated quantities of items of Unit Price Work are not guaranteed and are solely for the purpose of comparison of Bids and determining an initial Contract Price. Payments to Contractor for Unit Price Work will be based on actual quantities.

C. Each unit price will be deemed to include an amount considered by Contractor to be adequate to cover Contractor’s overhead and profit for each separately identified item.

D. Engineer will determine the actual quantities and classifications of Unit Price Work performed by Contractor. Engineer will review with Contractor the Engineer’s preliminary determinations on such matters before rendering a written decision thereon (by recommendation of an Application for Payment or otherwise). Engineer’s written decision thereon will be final and binding (except as modified by Engineer to reflect changed factual conditions or more accurate data) upon Owner and Contractor, subject to the provisions of the following paragraph.

E. Within 30 days of Engineer’s written decision under the preceding paragraph, Contractor may submit a Change Proposal, or Owner may file a Claim, seeking an adjustment in the Contract Price if:

1. the quantity of any item of Unit Price Work performed by Contractor differs materially and significantly from the estimated quantity of such item indicated in the Agreement;
2. there is no corresponding adjustment with respect to any other item of Work; and
3. Contractor believes that it is entitled to an increase in Contract Price as a result of having incurred additional expense or Owner believes that Owner is entitled to a decrease in Contract Price, and the parties are unable to agree as to the amount of any such increase or decrease.

14.02 Tests, Inspections, and Approvals

A. Contractor shall give Engineer timely notice of readiness of the Work (or specific parts thereof) for all required inspections and tests, and shall cooperate with inspection and testing personnel to facilitate required inspections and tests.

B. Owner shall retain and pay for the services of an independent inspector, testing laboratory, or other qualified individual or entity to perform all inspections and tests expressly required by the Contract Documents to be furnished and paid for by Owner, except that costs incurred in connection with tests or inspections of covered Work shall be governed by the provisions of Paragraph 14.05.

C. If Laws or Regulations of any public body having jurisdiction require any Work (or part thereof) specifically to be inspected, tested, or approved by an employee or other representative of such public body, Contractor shall assume full responsibility for arranging and obtaining such inspections, tests, or approvals, pay all costs in connection therewith, and furnish Engineer the required certificates of inspection or approval.

D. Contractor shall be responsible for arranging, obtaining, and paying for all inspections and tests required:

1. by the Contract Documents, unless the Contract Documents expressly allocate responsibility for a specific inspection or test to Owner;
2. to attain Owner’s and Engineer’s acceptance of materials or equipment to be incorporated in the Work;
3. by manufacturers of equipment furnished under the Contract Documents;
4. for testing, adjusting, and balancing of mechanical, electrical, and other equipment to be incorporated into the Work; and
5. for acceptance of materials, mix designs, or equipment submitted for approval times for their observation, inspection, and testing. Contractor shall provide them proper and safe conditions for such access and advise them of Contractor’s safety procedures and programs so that they may comply therewith as applicable.
prior to Contractor’s purchase thereof for incorporation in the Work.

Such inspections and tests shall be performed by independent inspectors, testing laboratories, or other qualified individuals or entities acceptable to Owner and Engineer.

E. If the Contract Documents require the Work (or part thereof) to be approved by Owner, Engineer, or another designated individual or entity, then Contractor shall assume full responsibility for arranging and obtaining such approvals.

F. If any Work (or the work of others) that is to be inspected, tested, or approved is covered by Contractor without written concurrence of Engineer, Contractor shall, if requested by Engineer, uncover such Work for observation. Such uncovering shall be at Contractor’s expense unless Contractor had given Engineer timely notice of Contractor’s intention to cover the same and Engineer had not acted with reasonable promptness in response to such notice.

14.03 Defective Work

A. Contractor’s Obligation: It is Contractor’s obligation to assure that the Work is not defective.

B. Engineer’s Authority: Engineer has the authority to determine whether Work is defective, and to reject defective Work.

C. Notice of Defects: Prompt notice of all defective Work of which Owner or Engineer has actual knowledge will be given to Contractor.

D. Correction, or Removal and Replacement: Promptly after receipt of written notice of defective Work, Contractor shall correct all such defective Work, whether or not fabricated, installed, or completed, or, if Engineer has rejected the defective Work, remove it from the Project and replace it with Work that is not defective.

E. Preservation of Warranties: When correcting defective Work, Contractor shall take no action that would void or otherwise impair Owner’s special warranty and guarantee, if any, on said Work.

F. Costs and Damages: In addition to its correction, removal, and replacement obligations with respect to defective Work, Contractor shall pay all claims, costs, losses, and damages arising out of or relating to defective Work, including but not limited to the cost of the inspection, testing, correction, removal, replacement, or reconstruction of such defective Work, fines levied against Owner by governmental authorities because the Work is defective, and the costs of repair or replacement of work of others resulting from defective Work. Prior to final payment, if Owner and Contractor are unable to agree as to the measure of such claims, costs, losses, and damages resulting from defective Work, then Owner may impose a reasonable set-off against payments due under Article 15.

14.04 Acceptance of Defective Work

A. If, instead of requiring correction or removal and replacement of defective Work, Owner prefers to accept it, Owner may do so (subject, if such acceptance occurs prior to final payment, to Engineer’s confirmation that such acceptance is in general accord with the design intent and applicable engineering principles, and will not endanger public safety). Contractor shall pay all claims, costs, losses, and damages attributable to Owner’s evaluation of and determination to accept such defective Work (such costs to be approved by Engineer as to reasonableness), and for the diminished value of the Work to the extent not otherwise paid by Contractor. If any such acceptance occurs prior to final payment, the necessary revisions in the Contract Documents with respect to the Work shall be incorporated in a Change Order. If the parties are unable to agree as to the decrease in the Contract Price, reflecting the diminished value of Work so accepted, then Owner may impose a reasonable set-off against payments due under Article 15. If the acceptance of defective Work occurs after final payment, Contractor shall pay an appropriate amount to Owner.

14.05 Uncovering Work

A. Engineer has the authority to require special inspection or testing of the Work, whether or not the Work is fabricated, installed, or completed.

B. If any Work is covered contrary to the written request of Engineer, then Contractor shall, if requested by Engineer, uncover such Work for Engineer’s observation, and then replace the covering, all at Contractor’s expense.

C. If Engineer considers it necessary or advisable that covered Work be observed by Engineer or inspected or tested by others, then Contractor, at Engineer’s request, shall uncover, expose,
or otherwise make available for observation, inspection, or testing as Engineer may require, that portion of the Work in question, and provide all necessary labor, material, and equipment.

1. If it is found that the uncovered Work is defective, Contractor shall be responsible for all claims, costs, losses, and damages arising out of or relating to such uncovering, exposure, observation, inspection, and testing, and of satisfactory replacement or reconstruction (including but not limited to all costs of repair or replacement of work of others); and pending Contractor’s full discharge of this responsibility the Owner shall be entitled to impose a reasonable set-off against payments due under Article 15.

2. If the uncovered Work is not found to be defective, Contractor shall be allowed an increase in the Contract Price or an extension of the Contract Times, or both, directly attributable to such uncovering, exposure, observation, inspection, testing, replacement, and reconstruction. If the parties are unable to agree as to the amount or extent thereof, then Contractor may submit a Change Proposal within 30 days of the determination that the Work is not defective.

14.06 Owner May Stop the Work

A. If the Work is defective, or Contractor fails to supply sufficient skilled workers or suitable materials or equipment, or fails to perform the Work in such a way that the completed Work will conform to the Contract Documents, then Owner may order Contractor to stop the Work, or any portion thereof, until the cause for such order has been eliminated; however, this right of Owner to stop the Work shall not give rise to any duty on the part of Owner to exercise this right for the benefit of Contractor, any Subcontractor, any Supplier, any other individual or entity, or any surety for, or employee or agent of any of them.

14.07 Owner May Correct Defective Work

A. If Contractor fails within a reasonable time after written notice from Engineer to correct defective Work, or to remove and replace rejected Work as required by Engineer, or if Contractor fails to perform the Work in accordance with the Contract Documents, or if Contractor fails to comply with any other provision of the Contract Documents, then Owner may, after seven days written notice to Contractor, correct or remedy any such deficiency.

B. In exercising the rights and remedies under this Paragraph 14.07, Owner shall proceed expeditiously. In connection with such corrective or remedial action, Owner may exclude Contractor from all or part of the Site, take possession of all or part of the Work and suspend Contractor’s services related thereto, and incorporate in the Work all materials and equipment stored at the Site or for which Owner has paid Contractor but which are stored elsewhere. Contractor shall allow Owner, Owner's representatives, agents and employees, Owner’s other contractors, and Engineer and Engineer’s consultants access to the Site to enable Owner to exercise the rights and remedies under this paragraph.

C. All claims, costs, losses, and damages incurred or sustained by Owner in exercising the rights and remedies under this Paragraph 14.07 will be charged against Contractor as set-offs against payments due under Article 15. Such claims, costs, losses and damages will include but not be limited to all costs of repair, or replacement of work of others destroyed or damaged by correction, removal, or replacement of Contractor’s defective Work.

D. Contractor shall not be allowed an extension of the Contract Times because of any delay in the performance of the Work attributable to the exercise by Owner of Owner’s rights and remedies under this Paragraph 14.07.

ARTICLE 15 – PAYMENTS TO CONTRACTOR; SET-OFFS; COMPLETION; CORRECTION PERIOD

15.01 Progress Payments

A. Basis for Progress Payments: The Schedule of Values established as provided in Article 2 will serve as the basis for progress payments and will be incorporated into a form of Application for Payment acceptable to Engineer. Progress payments on account of Unit Price Work will be based on the number of units completed during the pay period, as determined under the provisions of Paragraph 13.03. Progress payments for cost-based Work will be based on Cost of the Work completed by Contractor during the pay period.
B. Applications for Payments:

1. At least 20 days before the date established in the Agreement for each progress payment (but not more often than once a month), Contractor shall submit to Engineer for review an Application for Payment filled out and signed by Contractor covering the Work completed as of the date of the Application and accompanied by such supporting documentation as is required by the Contract Documents. If payment is requested on the basis of materials and equipment not incorporated in the Work but delivered and suitably stored at the Site or at another location agreed to in writing, the Application for Payment shall also be accompanied by a bill of sale, invoice, or other documentation warranting that Owner has received the materials and equipment free and clear of all Liens, and evidence that the materials and equipment are covered by appropriate property insurance, a warehouse bond, or other arrangements to protect Owner’s interest therein, all of which must be satisfactory to Owner.

2. Beginning with the second Application for Payment, each Application shall include an affidavit of Contractor stating that all previous progress payments received on account of the Work have been applied on account to discharge Contractor’s legitimate obligations associated with prior Applications for Payment.

3. The amount of retainage with respect to progress payments will be as stipulated in the Agreement.

C. Review of Applications:

1. Engineer will, within 10 days after receipt of each Application for Payment, including each resubmittal, either indicate in writing a recommendation of payment and present the Application to Owner, or return the Application to Contractor indicating in writing Engineer’s reasons for refusing to recommend payment. In the latter case, Contractor may make the necessary corrections and resubmit the Application.

2. Engineer’s recommendation of any payment requested in an Application for Payment will constitute a representation by Engineer to Owner, based on Engineer’s observations of the executed Work as an experienced and qualified design professional, and on Engineer’s review of the Application for Payment and the accompanying data and schedules, that to the best of Engineer’s knowledge, information and belief:

   a. the Work has progressed to the point indicated;

   b. the quality of the Work is generally in accordance with the Contract Documents (subject to an evaluation of the Work as a functioning whole prior to or upon Substantial Completion, the results of any subsequent tests called for in the Contract Documents, a final determination of quantities and classifications for Unit Price Work under Paragraph 13.03, and any other qualifications stated in the recommendation); and

   c. the conditions precedent to Contractor’s being entitled to such payment appear to have been fulfilled in so far as it is Engineer’s responsibility to observe the Work.

3. By recommending any such payment Engineer will not thereby be deemed to have represented that:

   a. inspections made to check the quality or the quantity of the Work as it has been performed have been exhaustive, extended to every aspect of the Work in progress, or involved detailed inspections of the Work beyond the responsibilities specifically assigned to Engineer in the Contract; or

   b. there may not be other matters or issues between the parties that might entitle Contractor to be paid additionally by Owner or entitle Owner to withhold payment to Contractor.

4. Neither Engineer’s review of Contractor’s Work for the purposes of recommending payments nor Engineer’s recommendation of any payment, including final payment, will impose responsibility on Engineer:

   a. to supervise, direct, or control the Work, or
b. for the means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or

c. for Contractor’s failure to comply with Laws and Regulations applicable to Contractor’s performance of the Work, or

d. to make any examination to ascertain how or for what purposes Contractor has used the money paid on account of the Contract Price, or

e. to determine that title to any of the Work, materials, or equipment has passed to Owner free and clear of any Liens.

5. Engineer may refuse to recommend the whole or any part of any payment if, in Engineer’s opinion, it would be incorrect to make the representations to Owner stated in Paragraph 15.01.C.2.

6. Engineer will recommend reductions in payment (set-offs) necessary in Engineer’s opinion to protect Owner from loss because:

a. the Work is defective, requiring correction or replacement;

b. the Contract Price has been reduced by Change Orders;

c. Owner has been required to correct defective Work in accordance with Paragraph 14.07, or has accepted defective Work pursuant to Paragraph 14.04;

d. Owner has been required to remove or remediate a Hazardous Environmental Condition for which Contractor is responsible; or

e. Engineer has actual knowledge of the occurrence of any of the events that would constitute a default by Contractor and therefore justify termination for cause under the Contract Documents.

D. Payment Becomes Due:

1. Ten days after presentation of the Application for Payment to Owner with Engineer’s recommendation, the amount recommended (subject to any Owner set-offs) will become due, and when due will be paid by Owner to Contractor.

E. Reductions in Payment by Owner:

1. In addition to any reductions in payment (set-offs) recommended by Engineer, Owner is entitled to impose a set-off against payment based on any of the following:

a. claims have been made against Owner on account of Contractor’s conduct in the performance or furnishing of the Work, or Owner has incurred costs, losses, or damages on account of Contractor’s conduct in the performance or furnishing of the Work, including but not limited to claims, costs, losses, or damages from workplace injuries, adjacent property damage, non-compliance with Laws and Regulations, and patent infringement;

b. Contractor has failed to take reasonable and customary measures to avoid damage, delay, disruption, and interference with other work at or adjacent to the Site;

c. Contractor has failed to provide and maintain required bonds or insurance;

d. Owner has been required to remove or remediate a Hazardous Environmental Condition for which Contractor is responsible;

e. Owner has incurred extra charges or engineering costs related to submittal reviews, evaluations of proposed substitutes, tests and inspections, or return visits to manufacturing or assembly facilities;

f. the Work is defective, requiring correction or replacement;

g. Owner has been required to correct defective Work in accordance with Paragraph 14.07, or has accepted defective Work pursuant to Paragraph 14.04;

h. the Contract Price has been reduced by Change Orders;
i. an event that would constitute a default by Contractor and therefore justify a termination for cause has occurred;

j. liquidated damages have accrued as a result of Contractor’s failure to achieve Milestones, Substantial Completion, or final completion of the Work;

k. Liens have been filed in connection with the Work, except where Contractor has delivered a specific bond satisfactory to Owner to secure the satisfaction and discharge of such Liens;

l. there are other items entitling Owner to a set off against the amount recommended.

2. If Owner imposes any set-off against payment, whether based on its own knowledge or on the written recommendations of Engineer, Owner will give Contractor immediate written notice (with a copy to Engineer) stating the reasons for such action and the specific amount of the reduction, and promptly pay Contractor any amount remaining after deduction of the amount so withheld. Owner shall promptly pay Contractor the amount so withheld, or any adjustment thereto agreed to by Owner and Contractor, if Contractor remedies the reasons for such action. The reduction imposed shall be binding on Contractor unless it duly submits a Change Proposal contesting the reduction.

3. Upon a subsequent determination that Owner’s refusal of payment was not justified, the amount wrongfully withheld shall be treated as an amount due as determined by Paragraph 15.01.C.1 and subject to interest as provided in the Agreement.

15.03 Substantial Completion

A. When Contractor considers the entire Work ready for its intended use Contractor shall notify Owner and Engineer in writing that the entire Work is substantially complete and request that Engineer issue a certificate of Substantial Completion. Contractor shall at the same time submit to Owner and Engineer an initial draft of punch list items to be completed or corrected before final payment.

B. Promptly after Contractor’s notification, Owner, Contractor, and Engineer shall make an inspection of the Work to determine the status of completion. If Engineer does not consider the Work substantially complete, Engineer will notify Contractor in writing giving the reasons therefor.

C. If Engineer considers the Work substantially complete, Engineer will deliver to Owner a preliminary certificate of Substantial Completion which shall fix the date of Substantial Completion. Engineer shall attach to the certificate a punch list of items to be completed or corrected before final payment. Owner shall have seven days after receipt of the preliminary certificate during which to make written objection to Engineer as to any provisions of the certificate or attached punch list. If, after considering the objections to the provisions of the preliminary certificate, Engineer concludes that the Work is not substantially complete, Engineer will, within 14 days after submission of the preliminary certificate to Owner, notify Contractor in writing that the Work is not substantially complete, stating the reasons therefor. If Owner does not object to the provisions of the certificate, or if despite consideration of Owner’s objections Engineer concludes that the Work is substantially complete, Engineer will, within 14 days, execute and deliver to Owner and Contractor a final certificate of Substantial Completion (with a revised punch list of items to be completed or corrected) reflecting such changes from the preliminary certificate as Engineer believes justified after consideration of any objections from Owner.

D. At the time of receipt of the preliminary certificate of Substantial Completion, Owner and Contractor will confer regarding Owner’s use or occupancy of the Work following Substantial Completion, review the builder’s risk insurance policy with respect to the end of the builder’s risk coverage, and confirm the transition to coverage of the Work under a
permanent property insurance policy held by Owner. Unless Owner and Contractor agree otherwise in writing, Owner shall bear responsibility for security, operation, protection of the Work, property insurance, maintenance, heat, and utilities upon Owner’s use or occupancy of the Work.

E. After Substantial Completion the Contractor shall promptly begin work on the punch list of items to be completed or corrected prior to final payment. In appropriate cases Contractor may submit monthly Applications for Payment for completed punch list items, following the progress payment procedures set forth above.

F. Owner shall have the right to exclude Contractor from the Site after the date of Substantial Completion subject to allowing Contractor reasonable access to remove its property and complete or correct items on the punch list.

15.04 Partial Use or Occupancy

A. Prior to Substantial Completion of all the Work, Owner may use or occupy any substantially completed part of the Work which has specifically been identified in the Contract Documents, or which Owner, Engineer, and Contractor agree constitutes a separately functioning and usable part of the Work that can be used by Owner for its intended purpose without significant interference with Contractor’s performance of the remainder of the Work, subject to the following conditions:

1. At any time Owner may request in writing that Contractor permit Owner to use or occupy any such part of the Work that Owner believes to be substantially complete. If and when Contractor agrees that such part of the Work is substantially complete, Contractor, Owner, and Engineer will follow the procedures of Paragraph 15.03.A through E for that part of the Work.

2. At any time Contractor may notify Owner and Engineer in writing that Contractor considers any such part of the Work substantially complete and request Engineer to issue a certificate of Substantial Completion for that part of the Work.

3. Within a reasonable time after either such request, Owner, Contractor, and Engineer shall make an inspection of that part of the Work to determine its status of completion. If Engineer does not consider that part of the Work to be substantially complete, Engineer will notify Owner and Contractor in writing giving the reasons therefor. If Engineer considers that part of the Work to be substantially complete, the provisions of Paragraph 15.03 will apply with respect to certification of Substantial Completion of that part of the Work and the division of responsibility in respect thereof and access thereto.

4. No use or occupancy or separate operation of part of the Work may occur prior to compliance with the requirements of Paragraph 6.05 regarding builder’s risk or other property insurance.

15.05 Final Inspection

A. Upon written notice from Contractor that the entire Work or an agreed portion thereof is complete, Engineer will promptly make a final inspection with Owner and Contractor and will notify Contractor in writing of all particulars in which this inspection reveals that the Work, or agreed portion thereof, is incomplete or defective. Contractor shall immediately take such measures as are necessary to complete such Work or remedy such deficiencies.

15.06 Final Payment

A. Application for Payment:

1. After Contractor has, in the opinion of Engineer, satisfactorily completed all corrections identified during the final inspection and has delivered, in accordance with the Contract Documents, all maintenance and operating instructions, schedules, guarantees, bonds, certificates or other evidence of insurance, certificates of inspection, annotated record documents (as provided in Paragraph 7.11), and other documents, Contractor may make application for final payment.

2. The final Application for Payment shall be accompanied (except as previously delivered) by:

   a. all documentation called for in the Contract Documents;

   b. consent of the surety, if any, to final payment;
c. satisfactory evidence that all title issues have been resolved such that title to all Work, materials, and equipment has passed to Owner free and clear of any Liens or other title defects, or will so pass upon final payment.

d. a list of all disputes that Contractor believes are unsettled; and

e. complete and legally effective releases or waivers (satisfactory to Owner) of all Lien rights arising out of the Work, and of Liens filed in connection with the Work.

3. In lieu of the releases or waivers of Liens specified in Paragraph 15.06.A.2 and as approved by Owner, Contractor may furnish receipts or releases in full and an affidavit of Contractor that: (a) the releases and receipts include all labor, services, material, and equipment for which a Lien could be filed; and (b) all payrolls, material and equipment bills, and other indebtedness connected with the Work for which Owner might in any way be responsible, or which might in any way result in liens or other burdens on Owner's property, have been paid or otherwise satisfied. If any Subcontractor or Supplier fails to furnish such a release or receipt in full, Contractor may furnish a bond or other collateral satisfactory to Owner to indemnify Owner against any Lien, or Owner at its option may issue joint checks payable to Contractor and specified Subcontractors and Suppliers.

B. Engineer’s Review of Application and Acceptance:

1. If, on the basis of Engineer’s observation of the Work during construction and final inspection, and Engineer’s review of the final Application for Payment and accompanying documentation as required by the Contract Documents, Engineer is satisfied that the Work has been completed and Contractor’s other obligations under the Contract have been fulfilled, Engineer will, within ten days after receipt of the final Application for Payment, indicate in writing Engineer’s recommendation of final payment and present the Application for Payment to Owner for payment. Such recommendation shall account for any set-offs against payment that are necessary in Engineer’s opinion to protect Owner from loss for the reasons stated above with respect to progress payments. At the same time Engineer will also give written notice to Owner and Contractor that the Work is acceptable, subject to the provisions of Paragraph 15.07. Otherwise, Engineer will return the Application for Payment to Contractor, indicating in writing the reasons for refusing to recommend final payment, in which case Contractor shall make the necessary corrections and resubmit the Application for Payment.

C. Completion of Work: The Work is complete (subject to surviving obligations) when it is ready for final payment as established by the Engineer’s written recommendation of final payment.

D. Payment Becomes Due: Thirty days after the presentation to Owner of the final Application for Payment and accompanying documentation, the amount recommended by Engineer (less any further sum Owner is entitled to set off against Engineer’s recommendation, including but not limited to set-offs for liquidated damages and set-offs allowed under the provisions above with respect to progress payments) will become due and shall be paid by Owner to Contractor.

15.07 Waiver of Claims

A. The making of final payment will not constitute a waiver by Owner of claims or rights against Contractor. Owner expressly reserves claims and rights arising from unsettled Liens, from defective Work appearing after final inspection pursuant to Paragraph 15.05, from Contractor’s failure to comply with the Contract Documents or the terms of any special guarantees specified therein, from outstanding Claims by Owner, or from Contractor’s continuing obligations under the Contract Documents.

B. The acceptance of final payment by Contractor will constitute a waiver by Contractor of all claims and rights against Owner other than those pending matters that have been duly submitted or appealed under the provisions of Article 17.

15.08 Correction Period

A. If within one year after the date of Substantial Completion (or such longer period of time as may be prescribed by the terms of any applicable special guarantee required by the
Contract Documents, or by any specific provision of the Contract Documents), any Work is found to be defective, or if the repair of any damages to the Site, adjacent areas that Contractor has arranged to use through construction easements or otherwise, and other adjacent areas used by Contractor as permitted by Laws and Regulations, is found to be defective, then Contractor shall promptly, without cost to Owner and in accordance with Owner’s written instructions:

1. correct the defective repairs to the Site or such other adjacent areas;
2. correct such defective Work;
3. if the defective Work has been rejected by Owner, remove it from the Project and replace it with Work that is not defective, and
4. satisfactorily correct or repair or remove and replace any damage to other Work, to the work of others, or to other land or areas resulting therefrom.

B. If Contractor does not promptly comply with the terms of Owner’s written instructions, or in an emergency where delay would cause serious risk of loss or damage, Owner may have the defective Work corrected or repaired or may have the rejected Work removed and replaced. Contractor shall pay all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to such correction or repair or such removal and replacement (including but not limited to all costs of repair or replacement of work of others).

C. In special circumstances where a particular item of equipment is placed in continuous service before Substantial Completion of all the Work, the correction period for that item may start to run from an earlier date if so provided in the Specifications.

D. Where defective Work (and damage to other Work resulting therefrom) has been corrected or removed and replaced under this paragraph, the correction period hereunder with respect to such Work will be extended for an additional period of one year after such correction or removal and replacement has been satisfactorily completed.

E. Contractor’s obligations under this paragraph are in addition to all other obligations and warranties. The provisions of this paragraph shall not be construed as a substitute for, or a waiver of, the provisions of any applicable statute of limitation or repose.

**ARTICLE 16 – SUSPENSION OF WORK AND TERMINATION**

**16.01 Owner May Suspend Work**

A. At any time and without cause, Owner may suspend the Work or any portion thereof for a period of not more than 90 consecutive days by written notice to Contractor and Engineer. Such notice will fix the date on which Work will be resumed. Contractor shall resume the Work on the date so fixed. Contractor shall be entitled to an adjustment in the Contract Price or an extension of the Contract Times, or both, directly attributable to any such suspension. Any Change Proposal seeking such adjustments shall be submitted no later than 30 days after the date fixed for resumption of Work.

**16.02 Owner May Terminate for Cause**

A. The occurrence of any one or more of the following events will constitute a default by Contractor and justify termination for cause:

1. Contractor’s persistent failure to perform the Work in accordance with the Contract Documents (including, but not limited to, failure to supply sufficient skilled workers or suitable materials or equipment or failure to adhere to the Progress Schedule);
2. Failure of Contractor to perform or otherwise to comply with a material term of the Contract Documents;
3. Contractor’s disregard of Laws or Regulations of any public body having jurisdiction; or
4. Contractor’s repeated disregard of the authority of Owner or Engineer.

B. If one or more of the events identified in Paragraph 16.02.A occurs, then after giving Contractor (and any surety) ten days written notice that Owner is considering a declaration that Contractor is in default and termination of the contract, Owner may proceed to:

1. declare Contractor to be in default, and give Contractor (and any surety) notice that the Contract is terminated; and
2. enforce the rights available to Owner under any applicable performance bond.

C. Subject to the terms and operation of any applicable performance bond, if Owner has terminated the Contract for cause, Owner may exclude Contractor from the Site, take possession of the Work, incorporate in the Work all materials and equipment stored at the Site or for which Owner has paid Contractor but which are stored elsewhere, and complete the Work as Owner may deem expedient.

D. Owner may not proceed with termination of the Contract under Paragraph 16.02.B if Contractor within seven days of receipt of notice of intent to terminate begins to correct its failure to perform and proceeds diligently to cure such failure.

E. If Owner proceeds as provided in Paragraph 16.02.B, Contractor shall not be entitled to receive any further payment until the Work is completed. If the unpaid balance of the Contract Price exceeds the cost to complete the Work, including all related claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals) sustained by Owner, such excess will be paid to Contractor. If the cost to complete the Work including such related claims, costs, losses, and damages exceeds such unpaid balance, Contractor shall pay the difference to Owner. Such claims, costs, losses, and damages incurred by Owner will be reviewed by Engineer as to their reasonableness and, when so approved by Engineer, incorporated in a Change Order. When exercising any rights or remedies under this paragraph, Owner shall not be required to obtain the lowest price for the Work performed.

F. Where Contractor’s services have been so terminated by Owner, the termination will not affect any rights or remedies of Owner against Contractor then existing or which may thereafter accrue, or any rights or remedies of Owner against Contractor or any surety under any payment bond or performance bond. Any retention or payment of money due Contractor by Owner will not release Contractor from liability.

G. If and to the extent that Contractor has provided a performance bond under the provisions of Paragraph 6.01.A, the provisions of that bond shall govern over any inconsistent provisions of Paragraphs 16.02.B and 16.02.D.

16.03 **Owner May Terminate For Convenience**

A. Upon seven days written notice to Contractor and Engineer, Owner may, without cause and without prejudice to any other right or remedy of Owner, terminate the Contract. In such case, Contractor shall be paid for (without duplication of any items):

1. completed and acceptable Work executed in accordance with the Contract Documents prior to the effective date of termination, including fair and reasonable sums for overhead and profit on such Work;

2. expenses sustained prior to the effective date of termination in performing services and furnishing labor, materials, or equipment as required by the Contract Documents in connection with uncompleted Work, plus fair and reasonable sums for overhead and profit on such expenses; and

3. other reasonable expenses directly attributable to termination, including costs incurred to prepare a termination for convenience cost proposal.

B. Contractor shall not be paid on account of loss of anticipated overhead, profits, or revenue, or other economic loss arising out of or resulting from such termination.

16.04 **Contractor May Stop Work or Terminate**

A. If, through no act or fault of Contractor, (1) the Work is suspended for more than 90 consecutive days by Owner or under an order of court or other public authority, or (2) Engineer fails to act on any Application for Payment within 30 days after it is submitted, or (3) Owner fails for 30 days to pay Contractor any sum finally determined to be due, then Contractor may, upon seven days written notice to Owner and Engineer, and provided Owner or Engineer do not remedy such suspension or failure within that time, terminate the contract and recover from Owner payment on the same terms as provided in Paragraph 16.03.

B. In lieu of terminating the Contract and without prejudice to any other right or remedy, if Engineer has failed to act on an Application for Payment within 30 days after it is submitted, or Owner has failed for 30 days to pay Contractor any sum finally determined to be due, Contractor may, seven days after written notice to Owner and Engineer, stop the Work until payment is made of all such
amounts due Contractor, including interest thereon. The provisions of this paragraph are not intended to preclude Contractor from submitting a Change Proposal for an adjustment in Contract Price or Contract Times or otherwise for expenses or damage directly attributable to Contractor’s stopping the Work as permitted by this paragraph.

ARTICLE 17 – FINAL RESOLUTION OF DISPUTES

17.01 Methods and Procedures

A. Disputes Subject to Final Resolution: The following disputed matters are subject to final resolution under the provisions of this Article:

1. A timely appeal of an approval in part and denial in part of a Claim, or of a denial in full; and
2. Disputes between Owner and Contractor concerning the Work or obligations under the Contract Documents, and arising after final payment has been made.

B. Final Resolution of Disputes: For any dispute subject to resolution under this Article, Owner or Contractor may:

1. Elect in writing to invoke the dispute resolution process provided for in the Supplementary Conditions; or
2. Agree with the other party to submit the dispute to another dispute resolution process; or
3. If no dispute resolution process is provided for in the Supplementary Conditions or mutually agreed to, give written notice to the other party of the intent to submit the dispute to a court of competent jurisdiction.

ARTICLE 18 – MISCELLANEOUS

18.01 Giving Notice

A. Whenever any provision of the Contract Documents requires the giving of written notice, it will be deemed to have been validly given if:

1. delivered in person, by a commercial courier service or otherwise, to the individual or to a member of the firm or to an officer of the corporation for which it is intended; or
2. delivered at or sent by registered or certified mail, postage prepaid, to the last business address known to the sender of the notice.

18.02 Computation of Times

A. When any period of time is referred to in the Contract by days, it will be computed to exclude the first and include the last day of such period. If the last day of any such period falls on a Saturday or Sunday or on a day made a legal holiday by the law of the applicable jurisdiction, such day will be omitted from the computation.

18.03 Cumulative Remedies

A. The duties and obligations imposed by these General Conditions and the rights and remedies available hereunder to the parties hereto are in addition to, and are not to be construed in any way as a limitation of, any rights and remedies available to any or all of them which are otherwise imposed or available by Laws or Regulations, by special warranty or guarantee, or by other provisions of the Contract. The provisions of this paragraph will be as effective as if repeated specifically in the Contract Documents in connection with each particular duty, obligation, right, and remedy to which they apply.

18.04 Limitation of Damages

A. With respect to any and all Change Proposals, Claims, disputes subject to final resolution, and other matters at issue, neither Owner nor Engineer, nor any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors, shall be liable to Contractor for any claims, costs, losses, or damages sustained by Contractor on or in connection with any other project or anticipated project.

18.05 No Waiver

A. A party’s non-enforcement of any provision shall not constitute a waiver of that provision, nor shall it affect the enforceability of that provision or of the remainder of this Contract.

18.06 Survival of Obligations

A. All representations, indemnifications, warranties, and guarantees made in, required by, or given in accordance with the Contract, as well as all continuing obligations indicated in the Contract, will survive final payment, completion, and acceptance of the Work or
termination or completion of the Contract or termination of the services of Contractor.

18.07 Controlling Law
A. This Contract is to be governed by the law of the state in which the Project is located.

18.08 Headings
A. Article and paragraph headings are inserted for convenience only and do not constitute parts of these General Conditions.
SUPPLEMENTARY CONDITIONS

These Supplementary Conditions amend or supplement the Standard General Conditions of the Construction Contract as indicated below. All provisions that are not so amended or supplemented remain in full force and effect.

The terms used in these Supplementary Conditions have the meanings stated in the General Conditions. Additional terms used in these Supplementary Conditions have the meanings stated below, which are applicable to both the singular and plural thereof. The address system used in these Supplementary Conditions is the same as the address system used in the General Conditions, with the prefix “SC” added thereto.

SC-1.01. Renumber Paragraph 1.01.A.38 to 1.01.A.38.a, and add the following new paragraphs:

1.01.A.38.b. *Specialist*—The term Specialist refers to a person, partnership, firm, or corporation of established reputation (or if newly organized, whose personnel have previously established a reputation in the same field), which is regularly engaged in, and which maintains a regular force of workers skilled in either (as applicable) manufacturing or fabricating items required by the Contract Documents, or otherwise performing Work required by the Contract Documents. Where the Specifications require the installation by a Specialist, that term shall also be deemed to mean either the manufacturer of the item, a person, partnership, firm, or corporation licensed by the manufacturer, or a person, partnership, firm, or corporation who will perform the Work under the manufacturer’s direct supervision.

1.01.A.38.c. *Standard Specifications*—Wherever in these Contract Documents reference is made to the Standard Specifications, said reference shall be understood as referring to the Idaho Department of Transportation Standards which applicable parts are incorporated herein and made a part of these Documents by specific reference thereto. If requirements contained in the Standard Specifications are modified by or are in conflict with supplemental information in these Contract Documents, the requirements of these Contract Documents shall prevail.

SC-1.01. Add the following language at the end of Paragraph 1.01.A.40:

Substantial Completion is further defined as (i) that degree of completion of the Project’s operating facilities or systems sufficient to provide Owner the full time, uninterrupted, and continuous beneficial operation of the Work; and (ii) required functional, performance and acceptance, or startup testing has been successfully demonstrated for components, devices, equipment, and instrumentation and control to the satisfaction of Engineer in accordance with the requirements of the Specifications.
SC-2.01 Delete Paragraph 2.01.B. and Paragraph 2.01.C. in their entirety and insert the following in their place:

2.01.B. Evidence of Contractor’s Insurance: When Contractor delivers the executed counterparts of the Agreement to Owner, Contractor shall also deliver to Owner copies of the policies of insurance (including all endorsements, and identification of applicable self-insured retentions and deductibles) required to be provided by Contractor in Article 6. Contractor may block out (redact) any confidential premium or pricing information contained in any policy or endorsement furnished under this provision.

2.01.C. Evidence of Owner’s Insurance: After receipt from Contractor of the executed counterparts of the Agreement and all required bonds and insurance documentation, Owner shall promptly deliver to Contractor copies of the policies of insurance to be provided by Owner under Article 6 (if any). Owner may block out (redact) any confidential premium or pricing information contained in any policy or endorsement furnished under this provision.

SC-2.02. Amend first sentence in Paragraph 2.02.A to read as follows:

Owner will furnish to Contractor three hard copies of the Contract Documents (including one fully executed counterpart of the Agreement), two hard copies of the full-sized Drawings, and one copy in electronic portable document format (PDF). Additional printed copies of the conformed Contract Documents will be furnished upon request at the cost of reproduction.

SC-3.01. Delete Paragraph 3.01.C in its entirety.

SC-3.01. Add the following new paragraph immediately after Paragraph 3.01.E:

3.01.F. Sections of Division 01, General Requirements, govern the execution of the Work of all sections of the Specifications.

SC-5.02. Add the following sentence to the end of Paragraph 5.02.A.1:

Contractor shall not enter upon nor use property not under Owner control until appropriate easements have been executed and a copy is on file at the Site.

SC-5.02. Add the following language after 5.02.A.2:

5.02.A.3: Owner shall have no responsibility for security or protection of Contractor’s supplies or equipment.
SC-5.03 and SC-5.04. Delete Paragraph 5.03 and Paragraph 5.04 of the General Conditions in their entireties and replace with the following provisions:

5.03 Subsurface and Physical Conditions:

5.03.A. Reports and Drawings: The Supplementary Conditions hereby identify:

5.03.A.1. Those reports known to Owner of explorations and tests of subsurface conditions at or adjacent to the Site, and Technical Data contained in such reports. Such reports are as follows:

5.03.A.1.a. Report dated September 1999 prepared by CH2M HILL entitled CUP Appendix C: Hydrogeologic and Geotechnical Report. The Technical Data contained in such report upon whose accuracy Contractor may rely are those indicated in the definition of Technical Data in the General Conditions.

5.03.A.1.b. Report dated November 29, 2016, prepared by CH2M HILL entitled Field Investigation Data Summary for the South Cell Expansion and North Borrow Areas, Kootenai County Farm Landfill, Kootenai County, Idaho, consisting of 145 pages. The Technical Data contained in such report upon whose accuracy Contractor may rely are those indicated in the definition of Technical Data in the General Conditions.

5.03.A.1.c Report dated October 23, 2017, prepared by CH2M HILL entitled Addendum to Field Investigation Data Summary for the Kootenai County Farm Landfill, Kootenai County, Idaho, consisting of 45 pages. The Technical Data contained in such report upon whose accuracy Contractor may rely are those indicated in the definition of Technical Data in the General Conditions.

5.03.A.2. Those Drawings known to Owner of physical conditions relating to existing surface or subsurface structures at the Site (except Underground Facilities), and Technical Data contained in such drawings. Such drawings are as follows:


5.03.A.2.e. None of the contents of such drawings is Technical Data on whose accuracy Contractor may rely. Contractor to field verify all construction interface elements with Work for this Contract.

5.03.A.3. Contractor may examine copies of reports and drawings identified immediately above that were not included with the Bidding Documents at Kootenai County Solid Waste Department during regular business hours, or may request copies from Engineer, at the cost of reproduction.

5.03.B. Reliance by Contractor on Technical Data Authorized: Contractor may rely upon the accuracy of the Technical Data contained in such reports and drawings, but such reports and drawings are not Contract Documents. Except for such reliance on Technical Data, Contractor may not rely upon or make any claim against Owner or Engineer, or any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors, with respect to:

5.03.B.1. The completeness of such reports and drawings for Contractor’s purposes, including, but not limited to, any aspects of the means, methods, techniques, sequences, and procedures of construction to be employed by Contractor, and safety precautions and programs incident thereto; or

5.03.B.2. Other data, interpretations, opinions, and information contained in such reports or shown or indicated in such drawings; or

5.03.B.3. Any Contractor interpretation of or conclusion drawn from any Technical Data or any such other data, interpretations, opinions, or information.

SC-5.04 Differing Subsurface or Physical Conditions:

5.04.A. Notice: If Contractor believes that any subsurface condition that is uncovered or revealed at the Site:

5.04.A.1. To the extent the Technical Data are inapplicable, is of an unusual nature, and differs materially from conditions ordinarily encountered and generally recognized as inherent in work of the character provided for in the Contract Documents; then Contractor shall, promptly after becoming aware thereof and before further disturbing the subsurface conditions or performing any Work in connection therewith (except in an emergency as required by
Paragraph 7.15), notify Owner and Engineer in writing about such condition. Contractor shall not further disturb such condition or perform any Work in connection therewith (except with respect to an emergency) until receipt of a written statement permitting Contractor to do so.

5.04.B. Engineer’s Review: After receipt of written notice as required by the preceding paragraph, Engineer will promptly review the subsurface or physical condition in question; determine the necessity of Owner’s obtaining additional exploration or tests with respect to the condition; conclude whether the condition falls within any one or more of the differing site condition categories in Paragraph SC-5.04.A above; obtain any pertinent cost or schedule information from Contractor; prepare recommendations to Owner regarding the Contractor’s resumption or continuation of Work in connection with the subsurface or physical condition in question and the need for any change in the Drawings or Specifications; and advise Owner in writing of Engineer’s findings, conclusions, and recommendations.

5.04.C. Owner’s Statement to Contractor Regarding Site Condition: After receipt of Engineer’s written findings, conclusions, and recommendations, Owner shall issue a written statement to Contractor (with a copy to Engineer) regarding the subsurface or physical condition in question, addressing the resumption or continuation of Work in connection with such condition, indicating whether any change in the Drawings or Specifications will be made, and adopting or rejecting Engineer’s written findings, conclusions, and recommendations, in whole or in part.

5.04.D. Possible Price and Times Adjustments:

5.04.D.1. Contractor shall be entitled to an equitable adjustment in Contract Price or Contract Times, or both, to the extent that the existence of a differing subsurface or physical condition, or any related delay, disruption, or interference, causes an increase or decrease in Contractor’s cost of, or time required for, performance of the Work; subject, however, to the following:

5.04.D.1.a. such condition must fall within any one or more of the categories described in Paragraph SC-5.04.A;

5.04.D.1.b. with respect to Work that is paid for on a unit price basis, any adjustment in Contract Price will be subject to the provisions of Paragraph 13.03 of the General Conditions; and,

5.04.D.1.c. Contractor’s entitlement to an adjustment of the Contract Times is conditioned on such adjustment being essential to Contractor’s ability to complete the Work within the Contract Times.
5.04.D.2. Contractor shall not be entitled to any adjustment in the Contract Price or Contract Times with respect to a subsurface or physical condition if:

5.04.D.2.a. Contractor knew of the existence of such condition at the time Contractor made a commitment to Owner with respect to Contract Price and Contract Times by the submission of a Bid or becoming bound under a negotiated contract, or otherwise; or

5.04.D.2.b. The existence of such condition reasonably could have been discovered or revealed as a result of any examination, investigation, exploration, test, or study of the Site and contiguous areas expressly required by the Bidding Requirements or Contract Documents to be conducted by or for Contractor prior to Contractor’s making such commitment; or

5.04.D.2.c. Contractor failed to give the written notice as required by Paragraph SC/GBR 5.04.A.

5.04.D.3. If Owner and Contractor agree regarding Contractor’s entitlement to and the amount or extent of any adjustment in the Contract Price or Contract Times, or both, then any such adjustment shall be set forth in a Change Order.

5.04.D.4. Contractor may submit a Change Proposal regarding its entitlement to or the amount or extent of any adjustment in the Contract Price or Contract Times, or both, no later than 30 days after Owner’s issuance of the Owner’s written statement to Contractor regarding the subsurface or physical condition in question.

SC-5.06. Delete Paragraph 5.06.A and Paragraph 5.06.B in their entirety and insert the following in their place:

5.06.A. Landfill leachate and landfill gas systems are present within the Kootenai County Farm Landfill within the active landfill area located adjacent to the Central Corridor construction area of Work. Contractor will be abandoning and removing previously decommissioned landfill gas and leachate recirculation system components in this area. In addition, Contractor will be rerouting existing landfill gas collection header pipes in areas of Work and will be interfacing with existing leachate conveyance at MH#6. Chemical analyses of selected constituents for leachate and landfill gas are available for Contractor’s use in development of Health and Safety Plans for the Work.

SC-6.02. Add the following new paragraph immediately after Paragraph 6.02.A:

6.02.A.1. Surety and insurance companies from which the bonds and insurance for this Project are purchased shall have an A.M. Best’s rating of no less than VII, in addition to other requirements specified herein.
SC-6.03. Add the following new paragraph immediately following Paragraph 6.03.A.4:

6.03.A.5. The limits of liability for the insurance required by Paragraph 6.03 of the General Conditions shall provide coverage for not less than the following amounts or greater where required by Laws and Regulations:

6.03.A.5.a. Workers’ Compensation and related coverages under Paragraph 6.03.A.1 and Paragraph 6.03.A.3 of the General Conditions:


6.03.A.5.a.2. Applicable Federal (e.g., Longshoreman’s): Statutory.

6.03.A.5.a.5. Employer’s Liability:

  Bodily Injury, Each Accident: $ 500,000

SC-6.03. Add the following new paragraph immediately following Paragraph 6.03.C.8:

6.03.C.9. Contractor’s General Liability under Paragraph 6.03.B. and Paragraph 6.03.C of the General Conditions which shall eliminate the exclusion with respect to property under the care, custody and control of Contractor:

6.03.C.9.a. General Aggregate $ 2,000,000

6.03.C.9.b. Products - Completed Operations Aggregate  $ 2,000,000

6.03.C.9.c. Personal and Advertising Injury (per person/Organization)  $ 1,000,000

6.03.C.9.d. Each Occurrence (Bodily Injury and Property Damage)  $ 1,000,000

6.03.C.9.e. Property Damage liability insurance will provide Explosion, Collapse, and Underground coverages where applicable.

SC-6.03. Add the following new paragraph immediately following Paragraph 6.03.D:

6.03.D.1. Contractor’s Automobile Liability:

6.03.D.1.a. Bodily Injury:

  Each Person $ 1,000,000

  Each Accident  $ 1,000,000
6.03.D.1.b. Property Damage:

Each Accident $1,000,000

6.03.D.1.a. Combined Single Limit of $2,000,000

SC-6.03. Add the following new paragraph immediately following Paragraph 6.03.E:

6.03.E.1. Excess or Umbrella Liability:

a) General Aggregate $2,000,000

b) Each Occurrence $2,000,000

SC-6.03. Add the following new paragraph immediately following Paragraph 6.03.F:

6.03.F.1. Pollution Liability:

a) Each Occurrence $1,000,000

b) General Aggregate $1,000,000

☐ If box is checked, Contractor is not required to provide Contractor’s Pollution Liability insurance under this Contract.

SC-6.03. Add the following language after Paragraph 6.03.G:

6.03.G.1. Include the following parties or entities as additional insured:


6.03.G.1.b. CH2M, 999 West Riverside Avenue, Suite 500, Spokane, WA, 99201.

SC-6.05. Add the following language as Paragraph 6.05.A.15:

6.05.A.15. Property insurance furnished under this Contract shall have deductibles no greater than $10,000 for direct physical loss in any one occurrence for sublimits.

6.05.A.19. Include by express endorsement coverage of damage to Contractor’s equipment.

SC-7.02. Add the following language to the end of Paragraph 7.02.B:

7.02.B.1. Contractor and Subcontractor regular working hours consist of up to 10 working hours within an 11-hour period between 6:30 a.m. and 5:00 p.m., on a
regularly scheduled basis, excluding Saturdays, Sundays, and holidays. Overtime work is work in excess of 50 hours per week. Saturdays may be allowed if approved by Owner.

7.02.B.2. Owner’s legal holidays are: New Year’s Day; Memorial Day; Independence Day; Labor Day; Thanksgiving Day; and Christmas Day.

SC-7.02. Add the following new paragraph immediately after Paragraph 7.02.B:

7.02.C. Contractor shall be responsible for the cost of any overtime pay or other expense incurred by the Owner for Engineer’s services (including those of the Resident Project Representative, if any), Owner’s representative, and construction observation services, occasioned by the performance of Work on Saturday, Sunday, any legal holiday, or as overtime on any regular work day. If Contractor is responsible but does not pay, or if the parties are unable to agree as to the amount owed, then Owner may impose a reasonable set-off against payments due under Article 15.

SC-7.02.C. Add the following new subparagraph immediately after Paragraph 7.02.C:

7.02.C.1. For purposes of administering the foregoing requirement, additional overtime costs are defined as labor and expenses for engineering staff and their subcontractors as required to observe, inspect, and/or test Work performed outside of regularly schedules working hours.

SC-7.05. Add the following language at the end of Paragraph 7.05.D:

Reimbursement rates for Engineer or their officers, directors, members, partners, employees, agents, and other consultants and subcontractors for evaluation of proposed substitutes shall be on the basis established in Paragraph 15.01.E. of these Supplementary Conditions.

SC-7.06. Add the following language at the end of Paragraph 7.06.A:

Contractor shall perform a minimum of 25 percent of the onsite labor with its own employees.

SC-7.08. Add the following new paragraphs immediately after Paragraph 7.08.A:

7.08.B. Owner will obtain and pay for the following construction permits and licenses:

7.08.B.1. Kootenai County Community Development – Site Disturbance Permit.
7.08.C. A copy of each permit is available at Owner’s office. Contractor shall examine the permits and conform to the requirements contained therein, including the purchase of additional bonds or insurance as specified therein, and such requirements are hereby made a part of these Contract Documents as fully and completely as though the same were set forth herein. Failure to examine the permit(s) will not relieve Contractor from compliance with the requirements stated therein. Within 10 days after the date of signing the Agreement, Contractor shall confer with an agent of the permitting agency so that insurance requirements and similar matters can be arranged prior to the time set for that portion of the Work.

SC-7.09. Add the following new paragraph immediately after Paragraph 7.09.A:

7.09.B. In accordance with Idaho Code 63-1503, Contractor shall:

7.09.B.1. pay promptly when due all taxes, (other than on real property), excises, and license fees due to the state, its subdivisions, and municipal and quasi-municipal corporations therein, accrued or accruing during the term of this Contract, whether or not the same shall be payable at the end of such term;

7.09.B.2. if the said taxes, excises, and license fees are not payable at the end of said term, but liability for the payment thereof exists, even though the same constitute liens upon its property, secure the same to the satisfaction of the respective officers charged with the collection thereof; and

7.09.B.3. in the event that its default in the payment or securing of such taxes, excises, and license fees, consent that Owner entering into this Contract may withhold any payment due it hereunder the estimated amount of such accrued and accruing taxes, excises, and license fees for the benefit of all taxing units to which said Contractor is liable.

SC-7.10. Add the following new paragraph(s) immediately after Paragraph 7.10.C:

7.10.D. While not intended to be inclusive of all Laws or Regulations for which Contractor may be responsible under Paragraph 7.10, the following Laws or Regulations are included as mandated by statute or for the convenience of Contractor:

7.10.D.1. Employment of Idaho State Residents: Pursuant to Idaho Codes 44-1001 and 44-1002, Contractor shall employ 95 percent bona fide Idaho residents as employees, except contracts where 50 or less persons are employed Contractor may employ 10 percent nonresidents provided Contractor gives preference to employment of bona fide residents in performance of said Work.
SC-7.12. Add the following new paragraph immediately after 7.12.C:

7.12.C.1. The following Owner safety program(s) are applicable to the Work:
Must follow Owner’s site safety and security rules and regulations (e.g.,
hardhats and safety vests, speed limits, site security.

SC-8.02. Add the following new paragraph immediately following Paragraph 8.02.B:

8.02.C. Other work anticipated to be performed at the Site by others that is either
directly or indirectly related to the scheduled performance of the Work under these
Contract Documents is described in Section 01 31 13, Project Coordination.

SC-8.04. Add the following new paragraph immediately after Paragraph 8.03:

SC-8.04. Claims Between Contractors

8.04.A. Should Contractor cause damage to the work or property of any other
contractor at the Site, or should any claim arising out of Contractor’s performance of
the Work at the Site be made by any other contractor against Contractor, Owner,
Engineer, or the Construction Coordinator, if applicable, Contractor shall (without
involving Owner, Engineer, or Construction Coordinator) either i) remedy the
damage; ii) agree to compensate the other contractor for remedy of the damages; or
iii) remedy the damages and attempt to settle with such other contractor by
agreement, or to otherwise resolve the dispute by arbitration or at law.

8.04.B. Contractor shall, to the fullest extent permitted by Laws and Regulations,
indemnify and hold harmless Owner, Engineer, the Construction Coordinator (if
applicable) and the officers, directors, members, partners, employees, agents, and
other consultants and subcontractors of each and any of them from and against all
Claims, costs, losses and damages (including, but not limited to, fees and charges of
engineers, architects, attorneys, and other professionals and court and arbitration
costs) arising directly, indirectly or consequentially out of any action, legal or
equitble, brought by any other contractor against Owner, Engineer, their officers,
directors, members, partners, employees, agents, and other consultants and
subcontractors, or the Construction Coordinator (if applicable) to the extent said
Claim is based on or arises out of Contractor’s performance of the Work. Should
another contractor cause damage to the Work or property of Contractor or should the
performance of work by any other contractor at the Site give rise to any other Claim,
Contractor shall not institute any action, legal or equitable, against Owner, Engineer,
or the Construction Coordinator (if applicable) or permit any action against any of
them to be maintained and continued in its name or for its benefit in any court or
before any arbiter which seeks to impose liability on or to recover damages from
Owner, Engineer, or the Construction Coordinator (if applicable) on account of any
such damage or Claim.
8.04.C. If Contractor is delayed at any time in performing or furnishing the Work by any act or neglect of another contractor, and Owner and Contractor are unable to agree as to the extent of any adjustment in Contract Times attributable thereto, Contractor may make a Claim for an extension of times in accordance with Article 11. An extension of the Contract Times shall be Contractor’s exclusive remedy with respect to Owner, Engineer, and Construction Coordinator (if applicable) for any delay, disruption, interference, or hindrance caused by any other contractor. This paragraph does not prevent recovery from Owner, Engineer, or Construction Coordinator (if applicable) for activities that are their respective responsibilities.

SC-9.11. Add the following new paragraph immediately after Paragraph 9.11.A:

9.11.B. On request of Contractor, prior to the execution of any Change Order involving a significant increase in the Contract Price, Owner will furnish to Contractor reasonable evidence that adequate financial arrangements have been made by Owner to enable Owner to fulfill the increased financial obligations to be undertaken by Owner as a result of such Change Order.

SC-9.13. Add the following new paragraph(s) immediately following Paragraph 9.12:

9.13. Owner As Resident Project Representative

9.13.A. In addition to the Resident Project Representative furnished by Engineer, Owner will furnish an Owner’s Site representative to assist Engineer. The responsibilities, authorities, and limitations of authority of Owner’s Site representative will be as specified for Engineer’s Resident Project Representative.

SC-10.03. Add the following new paragraphs immediately after Paragraph 10.03.A:

10.03.B. Resident Project Representative (RPR) will be furnished by Engineer. The responsibilities, authority, and limitations of the RPR are limited to those of Engineer in accordance with Paragraph 10.08 and as set forth elsewhere in the Contract Documents and are further limited and described below.

10.03.C. Responsibilities and Authority:

10.03.C.1. Schedules: Review and monitor Progress Schedule, Schedule of Submittals, and Schedule of Values prepared by Contractor and consult with Engineer concerning acceptability.

10.03.C.2. Conferences and Meetings: Conduct or attend meetings with Contractor, such as preconstruction conferences, progress meetings, Work conferences and other Project related meetings.
10.03.C.3. Liaison: (i) Serve as Engineer’s liaison with Contractor, working principally through Contractor’s authorized representative, and assist in understanding the intent of the Contract Documents; (ii) assist Engineer in serving as Owner’s liaison with Contractor when Contractor’s operations affect Owner’s onsite operations; (iii) assist in obtaining from Owner additional details or information when required for proper execution of the Work.

10.03.C.4. Interpretation of Contract Documents: Inform Engineer when clarifications and interpretations of the Contract Documents are needed and transmit to Contractor clarifications and interpretations as issued by Engineer.

10.03.C.5. Submittals: Receive submittals that are furnished at the Site by Contractor, and notify Engineer of availability for examination. Advise Engineer and Contractor of the commencement of any Work or arrival of materials and equipment at Site, when recognized, requiring a Shop Drawing or Sample if the submittal has not been approved by Engineer.

10.03.C.6. Modifications: Consider and evaluate Contractor’s suggestions for modifications in Drawings or Specifications and provide recommendations to Engineer; transmit to Contractor, in writing decisions as issued by Engineer.

10.03.C.7. Review of Work and Rejection of Defective Work: (i) Conduct onsite observations of the Work in progress to assist Engineer in determining if the Work is, in general, proceeding in accordance with the Contract Documents; (ii) inform Engineer and Contractor whenever RPR believes that any Work is defective; (iii) advise Engineer whenever RPR believes that any Work will not produce a completed Project that conforms generally to the Contract Documents or will imperil the integrity of the design concept of the completed Project as a functioning whole as indicated in the Contract Documents, or has been damaged or does not meet the requirements of any inspection test, or approval required to be made; and advise Engineer of that part of the Work in progress that RPR believes should be corrected or rejected or uncovered for observation, or requires special testing, inspection, or approval.

10.03.C.8. Inspections, Tests, and System Startups: (i) Verify tests, equipment and systems startups and operating and maintenance training are conducted in the presence of appropriate personnel, and that Contractor maintains adequate records thereof; (ii) observe, record, and report to Engineer appropriate details relative to the test procedures and system startups; and (iii) accompany visiting inspectors representing public or other agencies having jurisdiction over the Project, record the results of these inspections, and report to Engineer.
10.03.C.9. Records: (i) Maintain records for use in preparing Project documentation; (ii) keep a diary or log book recording pertinent Site conditions, activities, decisions and events; (iii) record names, addresses, fax numbers, e-mail addresses, web site locations, and telephone numbers of Contractors, Subcontractors, and major Suppliers of materials and equipment.

10.03.C.10. Reports: (i) Furnish Engineer periodic reports of progress of the Work and of Contractor’s compliance with the Progress Schedule and Schedule of Submittals; (ii) immediately notify Engineer of the occurrence of Site accidents, emergencies, acts of God endangering the Work, damage to property by fire or other causes, or the discovery of any Hazardous Environmental Condition; and (iii) assist Engineer in drafting proposed Change Orders, Work Change Directives, and Field Orders; obtain backup material from Contractor as appropriate.

10.03.C.11. Payment Requests: Review Applications for Payment with Contractor for compliance with the established procedure for their submission and forward with recommendations to Engineer, noting particularly the relationship of the payment requested to the Schedule of Values, Work completed, and materials and equipment delivered at the Site but not incorporated in the Work.

10.03.C.12. Certificates, Operation and Maintenance Manuals: During the course of the Work, verify materials and equipment certificates and operation and maintenance manuals and other data required by Specifications to be assembled and furnished by Contractor are applicable to the items actually installed and in accordance with the Contract Documents, and have these documents been delivered to Engineer for review and forwarding to Owner prior to payment for that part of the Work.

10.03.C.13. Completion: (i) Participate in a Substantial Completion inspection; assist in determination of Substantial Completion and the preparation of lists of items to be completed or corrected; (ii) Participate in a final inspection in the company of Engineer, Owner, and Contractor and prepare a final list of items to be completed and deficiencies to be remedied; and (iii) observe whether items on final list have been completed or corrected, and make recommendations to Engineer concerning acceptance.

10.03.D. Limitations of Authority: Resident Project Representative will not:

10.03.D.1. have authority to authorize a deviation from Contract Documents or substitution of materials or equipment, unless authorized by Engineer; or

10.03.D.2. exceed the limitations of Engineer’s authority as set forth in Contract Documents; or
10.03.D.3. undertake any of the responsibilities of Contractor, Subcontractors, Suppliers, or Contractor’s authorized representative; or

10.03.D.4. advise on, issue directions relative to, or assume control over an aspect of the means, methods, techniques, sequences, or procedures of Contractor’s work unless such advice or directions are specifically required by the Contract Documents; or

10.03.D.5. advise on, issue directions regarding, or assume control over safety practices, precautions, and programs in connection with the activities or operations of Owner or Contractor; or

10.03.D.6. participate in specialized field or laboratory tests or inspections conducted offsite by others, except as specifically authorized by Engineer; or

10.03.D.7. accept Shop Drawings or Samples from anyone other than Contractor; or

10.03.D.8. authorize Owner to occupy the Project in whole or in part.

SC-10.08. Add the following new paragraph immediately after Paragraph 10.08.E:

10.08.F. Contractors, Subcontractors, Suppliers, and others on the Project, or their sureties, shall maintain no direct action against Engineer, its officers, employees, affiliated corporations, and subcontractors, for any Claim arising out of, in connection with, or resulting from the engineering services performed. Only the Owner will be the beneficiary of any undertaking by Engineer.

SC-11.04. Add the following new paragraph immediately after Paragraph 11.04.C:

11.04.D. In the event Contractor submits request for additional compensation as a result of a change or differing Site conditions, or as a result of delays, acceleration, or loss of productivity, Owner reserves right, upon written request, to audit and inspect Contractor’s books and records relating to the Project. Upon written request for an audit, Contractor shall make its books and records available within 14 days of request. Owner shall specifically designate identity of auditor. As part of audit, Contractor shall make available its books and records relating to the Project, including but not limited to Bidding Documents, cost reports, payroll records, material invoices, subcontracts, purchase orders, daily timesheets, and daily diaries. Audit shall be limited to those cost items which are sought by Contractor in a change order or claim submission to Owner.
SC-13.01. Delete Paragraph 13.01.B.5.c in its entirety and insert the following in its place:

13.01.B.5.c. Construction Equipment and Machinery:

13.01.B.5.c.(1) Rentals of construction equipment and machinery, and the parts thereof in accordance with rental agreements approved by Owner with the advice of Engineer, and the costs of transportation, loading, unloading, assembly, dismantling, and removal thereof. Such costs shall be in accordance with the terms of said rental agreements. The rental of any such equipment, machinery, or parts shall cease when the use thereof is no longer necessary for the Work.

13.01.B.5.c.(2) Costs for equipment and machinery owned by Contractor will be paid at a rate shown for such equipment in the Rental Rate Blue Book published by Equipment Watch. An hourly rate will be computed by dividing the monthly rates by 176. These computed rates will include all operating costs. Costs will include the time the equipment or machinery is in use on the changed Work and the costs of transportation, loading, unloading, assembly, dismantling, and removal when directly attributable to the changed Work. The cost of such equipment or machinery, or parts thereof, shall cease to accrue when the use thereof is no longer necessary for the changed Work. Equipment or machinery with a value of less than $1,000 will be considered small tools.

SC-13.01. Add the following language to the end of Paragraph 13.01.B.5.h:

Express and courier services must be approved prior to use.

SC-13.03. Add the following language after Paragraph 13.03.E.3:

13.03.E.4. The unit price of an item of Unit Price Work shall be subject to re-evaluation and adjustment under the following conditions:

13.03.E.4.a. if the Bid price of a particular item of Unit Price Work amounts to 25 percent or more of the Contract Price and the variation in the quantity of that particular item of Unit Price Work performed by Contractor differs by more than 20 percent from the estimated quantity of such item indicated in the Agreement; and

13.03.E.4.b. if there is no corresponding adjustment with respect to any other item of Work; and
13.03.E.4.c. if Contractor believes that Contractor has incurred additional expense as a result thereof or if Owner believes the quantity variation entitles Owner to an adjustment in the unit price, either Owner or Contractor may make a Claim for an adjustment in the Contract Price in accordance with Article 10 if the parties are unable to agree as to the effect of any such variation in the quantity of Unit Price Work performed.

SC-14.02. Delete Paragraph 14.02.B in its entirety and insert the following in its place:

14.02.B. Contractor shall retain an independent testing laboratory or testing agency and shall be responsible for arranging and shall pay for specified tests, inspections, and approvals required for Owner’s and Engineer’s acceptance of the Work at the Site except:

14.02.B.1. costs incurred in connection with tests or inspections pursuant to Paragraph 14.02.C shall be paid for as provided in said paragraph; and

14.02.B.2. as otherwise specifically provided in the Contract Documents.

SC-14.02. Add the following language at the end of Paragraph 14.02.D:

Tests required by Contract Documents to be performed by Contractor that require test certificates be submitted to Owner or Engineer for acceptance shall be made by an independent testing laboratory or agency licensed or certified in accordance with Laws and Regulations and applicable state and local statutes. In the event state license or certification is not required, testing laboratories or agencies shall meet the following applicable requirements:


14.02.D.7. Calibrate testing equipment at reasonable intervals by devices of accuracy, traceable to the National Institute of Standards and Technology or accepted values of natural physical constants.

SC-15.01. Delete Paragraph 15.01.D.1 in its entirety and insert the following in its place:

15.01.D.1. Thirty days after presentation of the Application for Payment to Owner with Engineer’s recommendation, the amount recommended will (subject to the provisions of Paragraph 15.01.E.) become due and when due will be paid by Owner to Contractor.
SC-15.01.E Add the following new paragraph immediately after Paragraph 15.01.E.1.a.l:

15.01.E.1.m. Overtime worked by Contractor necessitating Engineer, and their officers, directors, members, partners, employees, agents, and other consultants and subcontractors of each, Resident Project Representative or Resident Project Representative’s Site staff, if any, to work extraordinary overtime in accordance with Paragraph 7.02.C. of these Supplementary Conditions.

SC-15.03.B. Add the following new subparagraph to Paragraph 15.03.B:

15.03.B.1. If some or all of the Work has been determined not to be at a point of Substantial Completion and will require re-inspection or re-testing by Engineer, the cost of such re-inspection or re-testing, including the cost of time, travel and living expenses, shall be paid by Contractor to Owner. If Contractor does not pay, or the parties are unable to agree as to the amount owed, then Owner may impose a reasonable set-off against payments due under Article 15.

SC-18.05. Add the following new paragraph immediately after Paragraph 18.05.A:

18.05.B. No waiver of any breach by either party of the terms of this Agreement shall be deemed a waiver of any subsequent breach of the Agreement.

END OF SECTION
PART 3

SPECIFICATIONS
PART 1 GENERAL

1.01 WORK COVERED BY CONTRACT DOCUMENTS

A. The completed Work will provide Owner with the Central Corridor landfill cell, which allows waste infill between the Original Landfill and East Landfill areas, as well as a new Commercial Entrance with platform scale for measuring incoming waste loads to the landfill. This new work consists of the following general construction elements:

1. Demolition of existing landfill gas and leachate utilities within the Central Corridor development area.
2. Removal of existing roadway materials within the Central Corridor and stockpiling those materials for County reuse.
3. Exposure of perimeter anchor trenches along the Original Cell and Cell E1 alignments for connection of Central Corridor bottom liner system.
4. Construction of the Central Corridor subgrade, bottom liner, and leachate collection systems.
5. Construction of perimeter road and drainage elements to support the Central Corridor.
7. Construction of new access roads at the Entrance Area.
8. Installation of a commercial scale and associated utilities at the Entrance Area.

B. The Work is broken down into the following items (in conjunction with Section 00 41 13, Bid Form (Stipulated Price Basis), and Section 01 29 00, Payment Procedures):

<table>
<thead>
<tr>
<th>Item No.</th>
<th>Description</th>
<th>Summary of Work</th>
</tr>
</thead>
<tbody>
<tr>
<td>LS-1</td>
<td>Bonds, Insurance, Mobilization, Demobilization, and Contract Closeout</td>
<td>Lump Sum – This Item overs mobilization of all equipment, personnel, and materials to the construction Site, including but not limited to, setup of storage and staging areas, decontamination of equipment, demobilization, and final clean-up. Also included as part of this Item are standard submittals to be provided by the Contractor, including, but not limited to, Bonds, Insurance, Execution Work Plans, and Project Schedules.</td>
</tr>
<tr>
<td>LS-2</td>
<td>Survey and Quality Control</td>
<td>Lump Sum – This Item covers all surveying and construction quality control (CQC) for Contractor and its subcontractors and suppliers that is not covered under UP items below.</td>
</tr>
<tr>
<td>Item No.</td>
<td>Description</td>
<td>Summary of Work</td>
</tr>
<tr>
<td>---------</td>
<td>-------------</td>
<td>-----------------</td>
</tr>
<tr>
<td>LS-3</td>
<td>Site Clearing and Preparation</td>
<td>Lump Sum – This Item covers general Site preparation, including but not limited to, Site clearing, removal of trees and shrubs, and all other labor, materials, and equipment needed to prepare the Site.</td>
</tr>
<tr>
<td>LS-4</td>
<td>Temporary Facilities and Controls, and Erosion &amp; Sediment Control Measures During Construction</td>
<td>Lump Sum – This Item covers development, management, and control of temporary facilities and utilities, development and implementation of a Site-wide Health and Safety Plan, and management, maintenance and control of stormwater and erosion control throughout the duration of the Project, necessary to complete the Work.</td>
</tr>
<tr>
<td>UP-1</td>
<td>Topsoil Removal and Stockpiling</td>
<td>Unit Price (CY) – This Item includes all layout staking and survey control, coordination with Engineer for topsoil removal depth, topsoil stripping to the limits shown on plan or required by specification, dewatering, material hauling, stockpile construction, coordination with Owner, progress and as-built surveys, and all other Work and materials included to complete this Bid Item.</td>
</tr>
<tr>
<td>UP-2</td>
<td>Demolition</td>
<td>Unit Price (Unit Sum) – This Item includes all demolition activities necessary to remove existing landfill gas and leachate systems designated for removal on drawings or required by specification. This includes all Work necessary to locate these systems, remove residual condensate, leachate, and sediment from the systems, protect remaining system components from damage during demolition processes, and excavate and remove pipes, backfill, valves, valve vaults, and other ancillary materials designated for demolition. This Item also includes the sizing and disposal of demolition materials and solids in the County’s landfill at a location designated by Owner, and the backfill of excavations to required subgrade for overlying liner and/or roadway facilities.</td>
</tr>
<tr>
<td>UP-3</td>
<td>General Excavation</td>
<td>Unit Price (CY) – This Item includes all layout staking and survey control, excavation, dewatering, progress and as-built surveys, protection of existing utilities and facilities to remain, and all other Work and materials included to complete general excavation Work on Site. General Excavation inside the Central Corridor cell limits means to the subgrade layer (top of foundation layer). Any damage to existing utilities, landfill systems, or liner systems to remain shall be repaired as an incidental to this Bid Item.</td>
</tr>
<tr>
<td>UP-4</td>
<td>Embankment Fill</td>
<td>Unit Price (CY) - This Item includes all layout staking and survey control, embankment fill construction, QA/QC testing, progress and as-built surveys, and all other Work and materials included to complete this Bid Item. Embankment fill required for construction will be obtained from onsite excavations or borrow sources as necessary to complete the Work. All Work and materials needed to develop onsite borrow source is included in this Bid Item.</td>
</tr>
<tr>
<td>Item No.</td>
<td>Description</td>
<td>Summary of Work</td>
</tr>
<tr>
<td>---------</td>
<td>-------------------------</td>
<td>---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>UP-5</td>
<td>Subgrade Preparation</td>
<td>Unit Price (SY) - This Bid Item includes preparation of the subgrade, including scarifying and compaction of in-place native soil to satisfy the specifications, layout staking and survey control, dewatering, testing, moisture conditioning, and all other work and materials included to complete this Bid Item. Preparation of the subgrade over Unsuitable Subgrade areas are excluded and are covered under that Bid Item.</td>
</tr>
<tr>
<td>UP-6</td>
<td>Unsuitable Subgrade Areas</td>
<td>Unit Price (SY) - This Bid Item includes an allowance for unsuitable areas that might be encountered (that is granular, excessive moisture, organic materials, etc.) and cannot meet the subgrade preparation requirements for deployment of the landfill bottom liner system and entrance road facilities including subexcavating the unsuitable areas (assuming a max depth of 12 inches), layout staking and survey control, survey measurement, replacing with suitable onsite materials, dewatering, moisture conditioning, and all other work and materials included to complete this Bid Item.</td>
</tr>
<tr>
<td>UP-7</td>
<td>Bottom Liner System</td>
<td>Unit Price (SY) - This Bid Item includes installation of the bottom liner system (both GCL and HDPE geomembrane), including preparation of foundation layer, final dressing and rolling of the subgrade to ready for deployment of geosynthetics and approve (certify) subgrade, layout staking and control, measurement (as-built surveys), and all other work and materials included in installing the bottom liner system. The bottom liner materials within the anchor trench zone (from the control limit of the liner shown on the plans through the anchor trench) and extra armoring liner areas shown on the plans shall be included as an incidental to this Bid Item.</td>
</tr>
<tr>
<td>UP-8</td>
<td>Strip Drains</td>
<td>Unit Price (LF) - This Bid Item includes the installation of strip drains along the side slopes and cell floor as shown (and indicated) on the plans, survey control, and all other work and materials included to complete this Bid Item.</td>
</tr>
<tr>
<td>UP-9</td>
<td>Drain Sand</td>
<td>Unit Price (CY) - This Bid Item includes the installation of the Drain Sand, including drain sand placement, thickness verification, measurement (as-built) surveys, and all other work and materials included to complete this Bid Item.</td>
</tr>
<tr>
<td>UP-10</td>
<td>Anchor Trench Earthwork</td>
<td>Unit Price (LF) - This Bid Item includes the earthwork (excavation and fill) associated with the installation of the bottom liner anchor trench, layout staking and survey control, measurement (as-built) surveys, and all other work and materials included to install the anchor trench.</td>
</tr>
<tr>
<td>UP-11</td>
<td>Leachate Collector</td>
<td>Unit Price (LF) - This Bid Item covers the installation of the Leachate Central Collector and Clean Water Gravity Discharge Pipe including, survey control, HDPE pipe, pipe welding, pipe perforations, pipe fittings, clean outs, drain gravel, geotextile, and all other work and materials included to complete this Bid Item.</td>
</tr>
<tr>
<td>Item No.</td>
<td>Description</td>
<td>Summary of Work</td>
</tr>
<tr>
<td>---------</td>
<td>-------------</td>
<td>-----------------</td>
</tr>
<tr>
<td>UP-12</td>
<td>Leachate Collection Sump and Bottom Liner Penetration</td>
<td>Unit Price (SY) – This Bid Item covers the installation of the Leachate Collection Sump including survey control, drain gravel, geotextile, perforated and solid HDPE pipe, pipe welding, bottom liner penetration detail, concrete backfill, and all other work and materials included to complete this Bid Item.</td>
</tr>
<tr>
<td>UP-13</td>
<td>Leachate/Clean Water Gravity Discharge Pipe System</td>
<td>Unit Price (Unit Sum) – This Bid Item covers the installation of the Leachate Sump Discharge Pipe and Clean Water Discharge Pipe, including HDPE pipe, pipe welding, valve and valve vaults, connection to MH#6 (Leachate Pipe, including MH#6 coring and sealing at the penetration) and Original Cell Stormwater Ditch (including riprap removal and replacement, geomembrane liner penetration and repair, leak testing of welds), trench excavation and backfill, road surface repairs, and all other work and materials included to complete this Bid Item.</td>
</tr>
<tr>
<td>UP-14</td>
<td>Riprap Ditches</td>
<td>Unit Price (LF) – This Bid Item includes the installation of lined roadside ditches, including layout staking and survey controls, measurement (as-built) survey, ditch earthwork, subgrade preparation, ditch HDPE lining, geotextile, riprap, and all other work and materials included for this Bid Item.</td>
</tr>
<tr>
<td>UP-15</td>
<td>Lined Stormwater Berm</td>
<td>Unit Price (LF) – This Bid Item includes the installation of the liner stormwater berm located above the Central Corridor on the Original Cell, including layout and survey controls, measurement (as-built survey), berm earthwork, subgrade preparation, HDPE liner, connection to the County’s existing downslope drain at the discharge of the berm, and all other work and materials included to complete this Bid Item.</td>
</tr>
<tr>
<td>UP-16</td>
<td>Perimeter Access Roads and Landfill Access Road</td>
<td>Unit Price (SY) - This Bid Items covers the construction of permanent roads on the North and South ends of the central corridor, including layout staking and survey control, measurement (as-built survey), subgrade preparation, reinforcing geotextile, ballast, road surfacing, and all other work and materials to complete this Bid Item.</td>
</tr>
<tr>
<td>UP-17</td>
<td>Commercial Scale Access Roads</td>
<td>Unit Price (SY) - This Bid Items covers the construction of permanent roads, including layout staking and survey control, measurement (as-built) survey, subgrade preparation, reinforcing geotextile, ballast, road surfacing, ditch construction, armoring, and all other work and materials to complete this Bid Item.</td>
</tr>
<tr>
<td>UP-18</td>
<td>Commercial Scale</td>
<td>Unit Price (Unit Sum) - This Bid Item covers all Work, materials, and equipment related to the installation of the commercial truck scale, including, but not limited to, structural systems, coordination with the scale manufacturer/supplier, scale and scale system ancillaries, card-reader system, power and communication systems and connections, startup/commissioning, training, Scale certification, and all other work, materials, and equipment included to complete this Bid Item.</td>
</tr>
<tr>
<td>UP-19</td>
<td>Culverts</td>
<td>Unit Price (LF) – This Bid Item includes all culverts, including pipes, end treatments, and all other Work and materials included to complete this Bid Item.</td>
</tr>
</tbody>
</table>
### Item No. Description Summary of Work

<table>
<thead>
<tr>
<th>Item No.</th>
<th>Description</th>
<th>Summary of Work</th>
</tr>
</thead>
<tbody>
<tr>
<td>UP-20</td>
<td>Permanent Soil Stabilization (Hydroseed and Mat)</td>
<td>Unit Price (AC) – This Bid Item includes the addition of hydroseed and a mat for permanent soil stabilization, including tack, mulch, hydroseed, matting, and all other Work and materials included to complete this Bid Item.</td>
</tr>
<tr>
<td>UP-21</td>
<td>12-Inch Buried Solid Wall HDPE LFG Pipe</td>
<td>Unit Price (LF) – This Bid Item covers the installation of the 12-inch landfill gas pipe, including HDPE pipe, pipe welding, trenching and backfilling, shoring, dewatering, sloping, testing, connection to existing landfill gas system piping, pipe fittings including flanges, blinds, tees, reducers, stainless steel fasteners, electro-fusion couplings, and all other work and materials included to install the 12-inch landfill gas pipe. Incidental to this Bid Item is valve installation including valve, flanges, stainless steel backup rings and fasteners, trenching and backfilling, testing, valve box, bollard, and all other work and materials included to install the valve.</td>
</tr>
</tbody>
</table>

C. All Work requiring quality control/quality assurance testing is the responsibility of the Contractor. Testing shall include all coordination, testing costs, reporting, and all other incidentals to complete quality control/quality assurance testing and shall be included in Bid Items for which testing shall occur.

**PART 2**  
PRODUCTS (NOT USED)

**PART 3**  
EXECUTION (NOT USED)

END OF SECTION
SECTION 01 26 00
CONTRACT MODIFICATION PROCEDURES

PART 1 GENERAL

1.01 PROPOSAL REQUESTS

A. Owner may, in anticipation of ordering an addition, deletion, or revision to the Work, request Contractor to prepare a detailed proposal of cost and times to perform contemplated change. Proposals shall also be provided for Work changes authorized by Work Change Directives and Field Order (where applicable) for incorporation into Change Order(s).

B. Proposal request will include reference number for tracking purposes and detailed description of and reason for proposed change, and such additional information as appropriate and as may be required for Contractor to accurately estimate cost and time impact on Project.

C. Proposal request is for information only; Contractor is neither authorized to execute proposed change nor to stop Work in progress as result of such request.

D. Contractor’s written proposal shall be transmitted to Engineer promptly, but not later than 7 days after Contractor’s receipt of Owner’s written request. Proposal shall remain firm for a maximum period of 45 days after receipt by Engineer.

E. Owner’s request for proposal or Contractor’s failure to submit such proposal within the required time period will not justify a Claim for an adjustment in Contract Price or Contract Times (or Milestones).

1.02 CLAIMS

A. Include, at a minimum:

1. Specific references including (i) Drawing numbers, (ii) Specification section and article/paragraph number, and (iii) Submittal type, Submittal number, date reviewed, Engineer’s comment, as applicable, with appropriate attachments.

2. Stipulated facts and pertinent documents, including photographs and statements.

3. Interpretations relied upon.
4. Description of (i) nature and extent of Claim, (ii) who or what caused the situation, (iii) impact to the Work and Work of others, and (iv) discussion of claimant’s justification for requesting a change to price or times or both.

5. Estimated adjustment in price claimant believes it is entitled to with full documentation and justification.

6. Requested Change in Contract Times: Include at least (i) Progress Schedule documentation showing logic diagram for request, (ii) documentation that float times available for Work have been used, and (iii) revised activity logic with durations including sub-network logic revisions, duration changes, and other interrelated schedule impacts, as appropriate.

7. Documentation as may be necessary as set forth below for Work Change Directive, and as Engineer may otherwise require.

1.03 WORK CHANGE DIRECTIVES

A. Procedures:

1. Engineer will:
   b. Initiate, including a description of the Work involved and any attachments.
   c. Affix signature, demonstrating Engineer’s recommendation.
   d. Transmit copies to Owner for authorization.

2. Owner will:
   a. Affix signature, demonstrating approval of the changes involved.
   b. Return copies to Engineer, who will retain one copy, send one copy to the Resident Project Representative or other field representative, and forward copies to Contractor.

3. Contractor will:
   a. Affix signature in a timely manner, demonstrating Contractor’s understanding of Work change.
   b. Return copies to Engineer who will retain one copy, send one copy to the Resident Project Representative, and send one executed copy to Owner.

4. Upon completion of Work covered by the Work Change Directive or when final Contract Times and Contract Price are determined, Contractor shall submit documentation for inclusion in a Change Order.

5. Contractor’s documentation shall include but not be limited to:
   a. Appropriately detailed records of Work performed to enable determination of value of the Work.
b. Full information required to substantiate resulting change in Contract Times and Contract Price for Work. On request of Engineer, provide additional data necessary to support documentation.

c. Support data for Work performed on a unit price or Cost of the Work basis with additional information such as:
   1) Dates Work was performed, and by whom.
   2) Time records, wage rates paid, and equipment rental rates.
   3) Invoices and receipts for materials, equipment, and subcontracts, all similarly documented.

B. Effective Date of Work Change Directive: Date of signature by Owner.

1.04 CHANGE ORDERS

A. Procedure:

1. Engineer will prepare copies of proposed Change Order and transmit such with Engineer’s written recommendation and request to Contractor for signature.

2. Contractor shall, upon receipt, either: (i) promptly sign copies, retaining one for its file, and return remaining copies to Engineer for Owner’s signature, or (ii) return unsigned copies with written justification for not executing Change Order.

3. Engineer will, upon receipt of Contractor signed copies, promptly forward Engineer’s written recommendation and partially executed copies for Owner’s signature, or if Contractor fails to execute the Change Order, Engineer will promptly so notify Owner and transmit Contractor’s justification to Owner.

4. Upon receipt of Contractor-executed Change Order, Owner will promptly either:
   a. Execute Change Order, retaining copy for its file and returning copies to Engineer; or
   b. Return to Engineer unsigned copies with written justification for not executing Change Order.

5. Upon receipt of Owner-executed Change Order, Engineer will transmit copies to Contractor, one copy to Resident Project Representative or other field representative, and retain one copy, or if Owner fails to execute the Change Order, Engineer will promptly so notify Contractor and transmit Owner’s justification to Contractor.

6. Upon receipt of Owner-executed Change Order, Contractor shall:
   a. Perform Work covered by Change Order.
   b. Revise Schedule of Values to adjust Contract Price and submit with next Application for Payment.
c. Revise Progress Schedule to reflect changes in Contract Times, if any, and to adjust times for other items of Work affected by change.
d. Enter changes in Project record documents after completion of change related Work.

B. In signing a Change Order, Owner and Contractor acknowledge and agree that:

1. Stipulated compensation (Contract Price or Contract Times, or both) set forth includes payment for (i) the Cost of the Work covered by the Change Order, (ii) Contractor’s fee for overhead and profit, (iii) interruption of Progress Schedule, (iv) delay and impact, including cumulative impact, on other Work under the Contract Documents, and (v) extended overheads.
2. Change Order constitutes full mutual accord and satisfaction for the change to the Work.
3. Unless otherwise stated in the Change Order, all requirements of the original Contract Documents apply to the Work covered by the Change Order.

1.05 COST OF THE WORK

A. In determining the supplemental costs allowed in Paragraph 13.01.B.5 of the General Conditions for rental equipment and machinery, the following will apply.

B. Rental of construction equipment and machinery and the parts thereof having a replacement value in excess of $1,000, whether owned by Contractor or rented or leased from others, shall meet the following requirements:

1. Full rental costs for leased equipment shall not exceed rates listed in the Rental Rate Blue Book published by Equipment Watch, San Jose, California, as adjusted to the regional area of the Project. Owned equipment costs shall not exceed the single shift rates established in the Cost Reference Guide (CRG) also published by Equipment Watch. The most recent published edition in effect at commencement of actual equipment use shall be used.
2. Rates shall apply to equipment in good working condition. Equipment not in good condition, or larger than required, may be rejected by Engineer or accepted at reduced rates.
3. Leased Equipment:
   a. For equipment leased or rented in arm’s length transactions from outside vendors, maximum rates shall be determined by the following actual usage/Blue Book Payment Category:
      1) Less than 8 hours: Hourly Rate.
      2) 8 or more hours but less than 7 days: Daily Rate.
      3) 7 or more days but less than 30 days: Weekly Rate.
      4) 30 days or more: Monthly Rate.

4. Arm’s length rental and lease transactions are those in which the firm involved in the rental or lease of equipment is not associated with, owned by, have common management, directorship, facilities and/or stockholders with the firm renting the equipment.

5. Leased Equipment in Use: Actual equipment use time documented by Engineer shall be the basis that equipment was on and utilized at the Project Site. In addition to the leasing rate above, equipment operational costs shall be paid at the estimated hourly operating cost rate set forth in the Blue Book if not already included in the lease rate. Hours of operation shall be based upon actual equipment usage to the nearest quarter hour, as recorded by Engineer.

6. Leased Equipment, When Idle (Standby): Idle or standby equipment is equipment onsite or in transit to and from the Work Site and necessary to perform the Work under the modification, but not in actual use. Idle equipment time, as documented by Engineer, shall be paid at the leasing rate determined above, excluding operational costs.

7. Owned and Other Equipment in Use: Equipment rates for owned equipment or equipment provided in other than arm’s length transaction shall not exceed the single shift total hourly costs rate developed in accordance with the CRG and as modified herein for multiple shifts. This total hourly rate will be paid for each hour the equipment actually performs work. Hours of operation shall be based upon actual equipment usage as recorded by Engineer. This rate shall represent payment in full for Contractor’s direct costs.

8. Owned and Other Equipment, When Idle (Standby): Equipment necessary to be onsite to perform the Work on single shift operations, but not utilized, shall be paid for at the ownership hourly expense rate developed in accordance with the CRG, provided its presence and necessity onsite has been documented by Engineer. Payment for idle time of portions of a normal workday, in conjunction with original contract Work, will not be allowed. In no event shall idle time claimed in a day for a particular piece of equipment exceed the normal Work or shift schedule established for the Project. It is agreed that this rate shall represent payment in full for Contractor’s direct costs. When Engineer determines that the equipment is not needed to continuously remain at the Work Site, payment will be limited to actual hours in use.
9. Owned and Other Equipment, Multiple Shifts: For multiple shift operations, the CRG single shift total hourly costs rate shall apply to the operating equipment during the first shift. For subsequent shifts, up to two in a 24-hour day, operating rate shall be the sum of the total hourly CRG operating cost and 60 percent of the CRG ownership and overhaul expense. Payment for idle or standby time for second and third shifts shall be 20 percent of the CRG ownership and overhaul expense.

10. When necessary to obtain owned equipment from sources beyond the Project limits, the actual cost to transfer equipment to the Work Site and return it to its original location will be allowed as an additional item of expense. Move-in and move-out allowances will not be made for equipment brought to the Project if the equipment is also used on original Contract or related Work.

11. If the move-out destination is not to the original location, payment for move-out will not exceed payment for move-in.

12. If move is made by common carrier, the allowance will be the amount paid for the freight. If equipment is hauled with Contractor’s own forces, rental will be allowed for the hauling unit plus the hauling unit operator’s wage. If equipment is transferred under its own power, the rental will be 75 percent of the appropriate total hourly costs for the equipment, without attachments, plus the equipment operator’s wage.

13. Charges for time utilized in servicing equipment to ready it for use prior to moving and similar charges will not be allowed.

14. When a breakdown occurs on any piece of owned equipment, payment shall cease for that equipment and any other owned equipment idled by the breakdown.

15. If any part of the Work is shut down by Owner, standby time will be paid during non-operating hours if diversion of equipment to other Work is not practicable. Engineer reserves the right to cease standby time payment when an extended shutdown is anticipated.

16. If a rate has not been established in the CRG for owned equipment, Contractor may:
   a. If approved by Engineer, use the rate of the most similar model found, considering such characteristics as manufacturer, capacity, horsepower, age, and fuel type, or
   b. Request Equipment Watch to furnish a written response for a rate on the equipment, which shall be presented to Engineer for approval; or
   c. Request Engineer to establish a rate.
1.06 FIELD ORDER

A. Engineer will issue Field Orders to Contractor.

B. Effective date of the Field Order shall be the date of signature by Engineer, unless otherwise indicated thereon.

C. Contractor shall acknowledge receipt by signing and returning a copy to Engineer.

D. Field Orders will be incorporated into subsequent Change Orders, as a no-cost change to the Contract (or an agreed to cost change through cost proposal process).

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF SECTION
SECTION 01 29 00
PAYMENT PROCEDURES

PART 1    GENERAL

1.01    SUBMITTALS

A. Informational Submittals:

   1. Schedule of Values: Submit on Contractor’s standard form as approved by Engineer.
   2. Application for Payment.
   3. Final Application for Payment.

1.02    SCHEDULE OF VALUES

A. Prepare Schedule of Values to further break down the Work as priced in the conformed Bid Form. Refer to Section 01 11 00, Summary of Work, for a description of Work.

B. Upon request of Engineer, provide documentation to support the accuracy of the Schedule of Values.

C. Unit Price Work: Reflect unit price quantity and price breakdown from conformed Bid Form.

D. Lump Sum Work:

   1. List bonds and insurance premiums, mobilization, demobilization, preliminary and detailed progress schedule preparation, temporary facilities and control, temporary erosion and sediment control, Engineer’s overtime, Contractor quality control, and Contract closeout separately.
   2. Break down by Division 02 through Division 49 with appropriate subdivision of each specification.

E. An unbalanced or front-end loaded schedule will not be acceptable.

F. Summation of the complete Schedule of Values representing all the Work shall equal the Contract Price.
1.03 APPLICATION FOR PAYMENT

A. Transmittal Summary Form: Attach one Summary Form with each detailed Application for Payment for each schedule and include Request for Payment of Materials and Equipment on Hand as applicable. Execute certification by authorized officer of Contractor.

B. Use detailed Application for Payment Form suitable to Engineer.

C. Provide separate form for each schedule as applicable.

D. Include accepted Schedule of Values for each schedule or portion of lump sum Work and the unit price breakdown for the Work to be paid on a unit priced basis.

E. Include separate line item for each Change Order and Work Change Directive executed prior to date of submission. Provide further breakdown of such as requested by Engineer.

F. Preparation:

1. Round values to nearest dollar.
2. Submit Application for Payment, including a Transmittal Summary Form and detailed Application for Payment Form(s) for each schedule as applicable, a listing of materials on hand for each schedule as applicable, and such supporting data as may be requested by Engineer.

1.04 MEASUREMENT—GENERAL

A. Weighing, measuring, and metering devices used to measure quantity of materials for Work shall be suitable for purpose intended and conform to tolerances and specifications as specified in National Institute of Standards and Technology, Handbook 44.

B. Whenever pay quantities of material are determined by weight, material shall be weighed on scales furnished by Contractor (or hauler) and certified accurate by state agency responsible. Weight or load slip shall be obtained from weigher and delivered to Owner’s representative at point of delivery of material.

C. Location and elevation of established control points are shown on Drawings.
D. Contractor’s Responsibilities:

1. Retain professional land surveyor registered in Idaho who shall perform or supervise engineering surveying necessary for as-built surveys for quantity measurement. Surveyor shall produce electronic submittals of the finished triangulated surfaces in:
   a. MicroStation and InRoads software platforms, or
   b. AutoCAD software platforms. If AutoCAD format is used, then the surface model’s triangles must be displayed in 3D format in the AutoCAD file. Softdesk or Land development *.tin files will not be accepted.
   c. In addition, all survey data points shall be submitted in an Excel spreadsheet or delimited text file formatted with point number, northing, easting, elevation, and description.
   d. Cross-sections will not be accepted.
   e. All submitted survey information shall include the ties to the construction survey control points.

2. Provide competent survey employee(s), tools, software, computers, stakes, and other equipment and materials as required to perform the survey work specified.

3. Provide additional construction control points as needed to as-built survey the Work. Some established control points might be destroyed during construction. Contractor’s licensed surveyor shall be responsible for replacing destroyed construction control points with like control points.

4. For any additional control points established by the Contractor for the Work, the Contractor shall provide Engineer with an electronic file of the newly added control points and identification markings.

5. Maintain complete accurate log of survey Work as it progresses as a Record Document.

6. On request of Engineer, submit documentation.

7. Provide surveys for:
   a. Entire Project area within areas of Work, prior to start of Work, for purposes of quantity measure and as-built survey.
   b. Stripped Topsoil Surface: Measurement for payment for topsoil stripping will be the difference between the before survey and the stripped surface as-built survey.
   c. General Excavation: Measurement for payment is for the difference between the before survey and as-built excavated surface.
   d. Unsuitable Subgrade: Measurement for payment will be of the area of unsuitable subgrade removed and replaced per Specifications.
e. Finished Subgrade Surfaces: Includes as-built Bottom Liner subgrade inside of Central Corridor lined area (including backfilled demolition areas) and embankment fill subgrade surfaces.

f. Embankment Fill: Payment is for the difference between before survey and as-built embankment full subgrade surface.

g. Bottom Liner System: Payment for Bottom Liner System is to the liner limits established in the field based on the exposed existing landfill liner system anchor trenches. Measurement will be based on the intersection of the new Bottom Liner System to existing liner; overlaps will be measured and paid as Anchor Trench. Where new Anchor Trench is installed (on North and South ends of Central Corridor), Bottom Liner System measurement and payment in these areas will be to the measurement point shown on Drawings.

h. Top of Finish Drain Sand Layer: Payment will be the as-built surface area times the minimum depth shown on Drawings.

i. Top of road surfacing layers (ballast and crushed rock surfacing) to verify thickness.

j. Permanent soil stabilization areas.

k. Liner anchor trenches.

8. The Contractor shall submit, at a minimum, the following for survey. Submit for review, acceptance, and payment prior to proceeding with subsequent work that will alter the as-built graded surfaces:

a. Survey grid points at 20-foot intervals in the north borrow areas.

b. Perimeter Access Road: Survey points at 20-foot intervals and 0.25 foot cord height intervals on horizontal curves unless otherwise indicated. Survey superelevation application stations, horizontal and vertical alignment points of curvature, and points of tangent locations.

c. Other Areas: Survey grid points at 25-foot intervals and breaklines on 25-foot intervals.

9. Final as-built mapping capturing all Work areas and major features not already provided for earlier payment.

E. Lump Sum (LS): Unit is one; no measurement will be made.

F. Units of measure for unit price items shown on Bid Form shall be as follows, unless specified otherwise.

<table>
<thead>
<tr>
<th>Item</th>
<th>Method of Measurement</th>
</tr>
</thead>
<tbody>
<tr>
<td>CY</td>
<td>Cubic Yard— Cubic Yard (to nearest CY)</td>
</tr>
<tr>
<td>EA</td>
<td>Each—Field Count by Engineer</td>
</tr>
</tbody>
</table>
1.05 PAYMENT

A. Payment for all Lump Sum Work shown or specified in Contract Documents is included in the Contract Price. Payment will be based on a percentage complete basis for each line item of the accepted Schedule of Values.

B. Payment for unit price items covers all the labor, materials, taxes, and services necessary to furnish and install unit price items.

C. Payment Schedule:

1. Project Lump Sum Bid Items:

<table>
<thead>
<tr>
<th>Item ID</th>
<th>Item</th>
<th>Unit</th>
<th>Measurement of Payment</th>
</tr>
</thead>
<tbody>
<tr>
<td>LS-2</td>
<td>Survey and Quality Control</td>
<td>LS</td>
<td>Paragraph 1.04.E</td>
</tr>
<tr>
<td>LS-3</td>
<td>Site Clearing and Preparation</td>
<td>LS</td>
<td>Paragraph 1.04.E</td>
</tr>
<tr>
<td>LS-4</td>
<td>Temporary Facilities and Controls, and Erosion and Sediment Control Measures During Construction</td>
<td>LS</td>
<td>Paragraph 1.04.E</td>
</tr>
</tbody>
</table>

2. Unit Price Items:

<table>
<thead>
<tr>
<th>Item ID</th>
<th>Item</th>
<th>Unit</th>
<th>Measurement of Payment</th>
</tr>
</thead>
<tbody>
<tr>
<td>UP-1</td>
<td>Topsoil Removal and Stockpiling</td>
<td>CY</td>
<td>Paragraph 1.04.D&amp;F</td>
</tr>
<tr>
<td>UP-2</td>
<td>Demolition</td>
<td>US</td>
<td>Paragraph 1.04.D&amp;F</td>
</tr>
<tr>
<td>UP-3</td>
<td>General Excavation</td>
<td>CY</td>
<td>Paragraph 1.04.D&amp;F</td>
</tr>
<tr>
<td>Item ID</td>
<td>Item</td>
<td>Unit</td>
<td>Measurement of Payment</td>
</tr>
<tr>
<td>--------</td>
<td>-------------------------------------------</td>
<td>------</td>
<td>------------------------</td>
</tr>
<tr>
<td>UP-4</td>
<td>Embankment Fill</td>
<td>CY</td>
<td>Paragraph 1.04.D&amp;F</td>
</tr>
<tr>
<td>UP-5</td>
<td>Subgrade Preparation</td>
<td>SY</td>
<td>Paragraph 1.04.D&amp;F</td>
</tr>
<tr>
<td>UP-6</td>
<td>Unsuitable Subgrade Areas</td>
<td>SY</td>
<td>Paragraph 1.04.D&amp;F</td>
</tr>
<tr>
<td>UP-7</td>
<td>Bottom Liner System</td>
<td>SY</td>
<td>Paragraph 1.04.D&amp;F</td>
</tr>
<tr>
<td>UP-8</td>
<td>Strip Drains</td>
<td>LF</td>
<td>Paragraph 1.04.D&amp;F</td>
</tr>
<tr>
<td>UP-9</td>
<td>Drain Sand</td>
<td>CY</td>
<td>Paragraph 1.04.D&amp;F</td>
</tr>
<tr>
<td>UP-10</td>
<td>Anchor Trench Earthwork</td>
<td>LF</td>
<td>Paragraph 1.04.D&amp;F</td>
</tr>
<tr>
<td>UP-11</td>
<td>Leachate Collector</td>
<td>LF</td>
<td>Paragraph 1.04.D&amp;F</td>
</tr>
<tr>
<td>UP-12</td>
<td>Leachate Collection Sump and Bottom Liner Penetration</td>
<td>SY</td>
<td>Paragraph 1.04.D&amp;F</td>
</tr>
<tr>
<td>UP-13</td>
<td>Leachate/Clean Water Gravity Discharge Pipe System</td>
<td>US</td>
<td>Paragraph 1.04.D&amp;F</td>
</tr>
<tr>
<td>UP-14</td>
<td>Riprap Ditches</td>
<td>LF</td>
<td>Paragraph 1.04.D&amp;F</td>
</tr>
<tr>
<td>UP-15</td>
<td>Lined Stormwater Berm</td>
<td>LF</td>
<td>Paragraph 1.04.D&amp;F</td>
</tr>
<tr>
<td>UP-16</td>
<td>Perimeter Access Roads and Landfill Access Road</td>
<td>SY</td>
<td>Paragraph 1.04.D&amp;F</td>
</tr>
<tr>
<td>UP-17</td>
<td>Commercial Scale Access Roads</td>
<td>SY</td>
<td>Paragraph 1.04.D&amp;F</td>
</tr>
<tr>
<td>UP-18</td>
<td>Commercial Scale</td>
<td>US</td>
<td>Paragraph 1.04.D&amp;F</td>
</tr>
<tr>
<td>UP-19</td>
<td>Culverts</td>
<td>LF</td>
<td>Paragraph 1.04.D&amp;F</td>
</tr>
<tr>
<td>UP-20</td>
<td>Permanent Soil Stabilization (Hydroseed and Mat)</td>
<td>AC</td>
<td>Paragraph 1.04.D&amp;F</td>
</tr>
<tr>
<td>UP-21</td>
<td>12-Inch Buried Solid Wall HDPE LFG Pipe</td>
<td>LF</td>
<td>Paragraph 1.04.D&amp;F</td>
</tr>
</tbody>
</table>

1.06 NONPAYMENT FOR REJECTED OR UNUSED PRODUCTS

A. Payment will not be made for following:

1. Loading, hauling, and disposing of rejected material.
2. Quantities of material wasted or disposed of in manner not called for under Contract Documents.
3. Rejected loads of material, including material rejected after it has been placed by reason of failure of Contractor to conform to provisions of Contract Documents.
4. Material not unloaded from transporting vehicle.
5. Defective Work not accepted by Owner.
6. Material remaining on hand after completion of Work.

1.07 PARTIAL PAYMENT FOR STORED MATERIALS AND EQUIPMENT

A. Partial Payment: No partial payments will be made for materials and equipment delivered or stored unless Shop Drawings and preliminary operation and maintenance data is acceptable to Engineer.

B. Final Payment: Will be made only for products incorporated in Work; remaining products, for which partial payments have been made, shall revert to Contractor unless otherwise agreed, and partial payments made for those items will be deducted from final payment.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF SECTION
SECTION 01 31 13
PROJECT COORDINATION

PART 1 GENERAL

1.01 SUBMITTALS

A. Informational:
   1. Statement of Qualification (SOQ) for land surveyor.
   2. Photographs:
      a. Digital Images: Submit on USB memory stick or compact disc within 5 calendar days of being taken.

1.02 RELATED WORK AT SITE

A. General: Include sequencing constraints specified herein as a part of Progress Schedule.

1.03 UTILITY NOTIFICATION AND COORDINATION

A. Coordinate the Work with various utilities within Project limits. Notify applicable utilities prior to commencing Work, if damage occurs, or if conflicts or emergencies arise during Work.

   1. Electricity Company: Kootenai Electricity Company.
      a. Telephone: (208) 765-1200.
      a. Telephone: (800) 789-5756.
   3. Call Before You Dig:
      a. Telephone: (800) 424-5555.

1.04 WORK SEQUENCING/CONSTRAINTS

A. Include the following sequences/constraints in the Progress Schedule:

   1. General:
      a. The Kootenai County Farm Landfill (KCFL) is a regional solid waste landfill facility for the County. As such, the landfill needs to be able to operate in full-time mode whereby the Owner will occupy the premises during the entire construction period to conduct normal business. (Facility hours of operation are Monday through Saturday, 6:30 a.m. to 5:00 p.m., except for holidays). Contractor’s normal work days are as specified in the Supplementary Conditions. Contractor shall schedule and conduct
activities around facility operations to enable existing facilities to operate continuously without interruption, unless otherwise noted.

b. All stormwater and erosion control systems and permits shall be in-place and functional before starting work, and shall be maintained routinely throughout the work period.

c. The County is operating under a stringent stormwater permit for the facility (NPDES Multi-Sector General Permit along with stormwater and sediment control monitoring requirements in accordance with the facility’s Operating Plan). Furthermore, the County has a Site Disturbance Permit in which they have to adhere to for this Project. As such, it is of critical importance that temporary erosion control measures are in-place and functional in advance of any Site disturbance activities. The Contractor shall provide full and complete coordination with the Owner for Owner’s testing of downstream monitoring points (activated by certain storm events) and reporting. Contractor shall maintain protection of all streams and wetland areas. Any fines that are administered by the Department of Environmental Quality (and/or EPA) as a result of the Contractor’s negligence to sequence and stage construction work and having proper stormwater and erosion control elements in place are to be paid for by Contractor at no additional cost to the County.

d. Any interface Work with landfill facilities and systems shall be scheduled in advance with the Owner/Engineer.

1.05 FACILITY OPERATIONS

A. Continuous operation of Owner’s facilities is of critical importance. Schedule and conduct activities to enable existing facilities to operate continuously, unless otherwise specified.

B. Perform Work continuously during critical connections and changeovers, and as required to prevent interruption of Owner’s operations.

C. When necessary, plan, design, and provide various temporary services, utilities, connections, temporary piping and heating, access, and similar items to maintain continuous operations of Owner’s facility.

D. Do not disturb any existing trees or shrubs without prior approval by the Owner regardless if they are shown on Drawings to require removal.
E. Do not close lines, open or close valves, or take other action which would affect the operation of existing systems, except as specifically required by the Contract Documents and after authorization by Owner and Engineer. Such authorization will be considered within 48 hours after receipt of Contractor’s written request.

F. Refer to Paragraph Work Sequences/Constraints. Construct Work in stages to facilitate the specified sequences and constraints.

G. Process or System Shutdown:

1. General: Provide 5 days advance written request for approval of need to shut down a process or facility to Owner and Engineer.
2. Power outages will be considered upon 48 hours written request to Owner and Engineer. Describe the reason, anticipated length of time, and areas affected by the outage. Provide temporary provisions for continuous power supply to critical facility components.

H. Do not proceed with Work affecting a facility’s operation without obtaining Owner’s and Engineer’s advance approval of the need for and duration of such Work.

I. Relocation of Existing Facilities:

1. During construction, it is expected that minor relocations of Work will be necessary.
2. Provide complete relocation of any existing structures and Underground Facilities, including piping, utilities, equipment, structures, electrical conduit wiring, electrical duct bank, and other necessary items.
3. Use only new materials for relocated facility. Match materials of existing facility, unless otherwise shown or specified.
4. Perform relocations to minimize downtime of existing facilities.
5. Install new portions of existing facilities in their relocated position prior to removal of existing facilities, unless otherwise accepted by Engineer.

1.06 ADJACENT FACILITIES AND PROPERTIES

A. Examination:

1. After Effective Date of the Agreement and before Work at Site is started, Contractor, Engineer, and affected property owners and utility owners shall make a thorough examination of pre-existing conditions including existing buildings, structures, and other improvements in vicinity of Work, as applicable, which could be damaged by construction operations.
2. Periodic reexamination shall be jointly performed to include, but not limited to, cracks in structures, settlement, leakage, and similar conditions.

B. Documentation:

1. Record and submit documentation of observations made on examination inspections in accordance with paragraph Construction Photographs.
2. Upon receipt, Engineer will review, sign, and return one record copy of documentation to Contractor to be kept on file in field office.
3. Such documentation shall be used as indisputable evidence in ascertaining whether and to what extent damage occurred as a result of Contractor’s operations, and is for the protection of adjacent property owners, Contractor, and Owner.

1.07 CONSTRUCTION PHOTOGRAPHS

A. Photographically document all phases of the project including preconstruction, construction progress, and post-construction.

B. Engineer shall have the right to select the subject matter and vantage point from which photographs are to be taken.

C. Preconstruction and Post-Construction:

1. After Effective Date of the Agreement and before Work at Site is started, and again upon issuance of Substantial Completion, take a minimum of 30 exposures of Construction Site and property adjacent to perimeter of Construction Site.
2. Format: Digital, minimum resolution of 1152 pixels by 864 pixels and 24-bit, millions of color.

D. Construction Progress Photos:

1. Photographically demonstrate progress of construction, showing every aspect of Site and adjacent properties as well as interior and exterior of new or impacted structures.
2. Weekly: Take 40 exposures using Digital, minimum resolution of 1152 pixels by 864 pixels and 24-bit, millions of color.

E. Digital Images:

1. Archive using a commercially available photo management system.
2. Label each disk with Project and Owner’s name, and week and year images were produced.
1.08 REFERENCE POINTS AND SURVEYS

A. Owner’s Responsibilities: Provide horizontal reference points or coordinate system with bench marks and reference points for Contractor’s use as necessary to lay out Work.

B. Location and elevation of bench marks are shown on Drawings.

C. Contractor’s Responsibilities:
   1. Provide additional survey and control to layout the Work.
   2. Check and establish exact location of existing facilities prior to construction of new facilities and any connections thereto.
   3. In event of discrepancy in data provided by Owner, request clarification before proceeding with Work.
   4. Retain professional land surveyor registered in Idaho who shall perform or supervise engineering surveying necessary for additional construction staking and control.
   5. Maintain complete accurate log of survey Work as it progresses as a Record Document.
   6. On request of Engineer, submit documentation.
   7. Provide competent employee(s), tools, stakes, and other equipment and materials as Engineer may require to:
      a. Establish control points, lines, and easement boundaries.
      b. Check layout, survey, and measurement Work performed by others.
      c. Measure quantities for payment and as-built (record) purposes.
   8. Refer to Section 01 29 00, Payment Procedures, for payment-related and as-built required surveys.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION

3.01 CUTTING, FITTING, AND PATCHING

A. Cut, fit, adjust, or patch Work and work of others, including excavation and backfill as required, to make Work complete.

B. Obtain prior written authorization of Engineer before commencing Work to cut or otherwise alter:
   1. Structural or reinforcing steel, structural column or beam, elevated slab, trusses, or other structural member.
   2. Weather-resistant or moisture-resistant elements.
3. Efficiency, maintenance, or safety of element.
4. Work of others.

C. Refinish surfaces to provide an even finish.
   1. Refinish continuous surfaces to nearest intersection.
   2. Refinish entire assemblies.
   3. Finish restored surfaces to such planes, shapes, textures, and surfaces that no transition between existing work and Work is evident in finished surfaces.
   4. Restore roadways in Work areas (and storage and staging areas) to conditions as good, or better than, preconstruction conditions. If gravel surfacing in roadways becomes contaminated with dirt, remove and replace section with clean road surfacing material.

D. Restore existing work, Underground Facilities, and surfaces that are to remain in completed Work including concrete-embedded piping, conduit, and other utilities as specified and as shown.

E. Make restorations with new materials and appropriate methods as specified for new Work of similar nature; if not specified, use recommended practice of manufacturer or appropriate trade association.

F. Fit Work airtight and leak-proof to pipes, sleeves, ducts, conduit, and other penetrations through surfaces and fill voids.

G. Remove specimens of installed Work for testing when requested by Engineer.

END OF SECTION
SECTION 01 31 19
PROJECT MEETINGS

PART 1 GENERAL

1.01 GENERAL

A. Engineer will schedule physical arrangements for meetings throughout progress of the Work, prepare meeting agenda with regular participant input and distribute with written notice of each meeting, preside at meetings, record minutes to include significant proceedings and decisions, and reproduce and distribute copies of minutes within 7 days after each meeting to participants and parties affected by meeting decisions.

1.02 PRELIMINARY SCHEDULES REVIEW MEETING

A. As set forth in General Conditions and Section 01 32 00, Construction Progress Documentation.

1.03 PROGRESS MEETINGS

A. Engineer will schedule regular progress meetings at Site, conducted weekly to review the Work progress, Progress Schedule, Schedule of Submittals, Application for Payment, contract modifications, and other matters needing discussion and resolution.

B. Attendees will include:

1. Owner’s representative(s), as appropriate.
2. Contractor, Subcontractors, and Suppliers, as appropriate.
3. Engineer’s representative(s).
4. Others as appropriate.

1.04 QUALITY CONTROL MEETINGS

A. In accordance with Section 01 45 16.13, Contractor Quality Control.

B. Scheduled by Engineer on regular basis and as necessary to review test and inspection reports, and other matters relating to quality control of the Work and work of other Contractors.

C. Attendees will include:

1. Contractor.
2. Contractor’s designated quality control representative.
3. Subcontractors and Suppliers, as necessary.
4. Engineer’s representatives.

1.05 PREINSTALLATION MEETINGS

A. When required in individual specification sections, convene at Site prior to commencing the Work of that section.

B. Require attendance of entities directly affecting, or affected by, the Work of that section.

C. Notify Engineer 2 days in advance of meeting date.

D. Provide suggested agenda to Engineer to include reviewing conditions of installation, preparation and installation or application procedures, and coordination with related Work and Work of others.

1.06 FACILITY STARTUP MEETINGS

A. Schedule and attend facility startup meetings. The first of such meetings shall be held prior to submitting Facility Startup Plan and shall include preliminary discussions regarding such plan.

B. Agenda items shall include, but not be limited to, content of Facility Startup Plan, coordination needed between various parties in attendance, and potential problems associated with startup.

C. Attendees will include:

1. Contractor.
2. Contractor’s designated quality control representative.
3. Subcontractors and equipment manufacturer’s representatives whom Contractor deems to be directly involved in facility startup.
4. Engineer’s representatives.
5. Owner’s operations personnel.
6. Others as required by Contract Documents or as deemed necessary by Contractor.
1.07 OTHER MEETINGS

A. In accordance with Contract Documents and as may be required by Owner and Engineer.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF SECTION
PART 1   GENERAL

1.01 SUBMITTALS

A. Informational Submittals:

1. Preliminary Progress Schedule: Submit within time specified in Paragraph 2.05 of the General Conditions.
2. Detailed Progress Schedule:
   a. Submit initial Detailed Progress Schedule within 14 calendar days after Effective Date of the Agreement.
   b. Submit an Updated Progress Schedule at each update, in accordance with Article Detailed Progress Schedule.
3. Submit with Each Progress Schedule Submission:
   a. Contractor’s certification that Progress Schedule submission is actual schedule being utilized for execution of the Work.
   b. Progress Schedule: Two legible copies.
   c. Narrative Progress Report: Same number of copies as specified for Progress Schedule.
4. Prior to final payment, submit a final Updated Progress Schedule.

1.02 PRELIMINARY PROGRESS SCHEDULE

A. In addition to basic requirements outlined in General Conditions, show a detailed schedule, beginning with Notice to Proceed, for minimum duration of 60 days, and a summary of balance of Project through Final Completion.

B. Show activities including, but not limited to the following:

1. Notice to Proceed.
2. Permits.
3. Submittals, with review time. Contractor may use Schedule of Submittals specified in Section 01 33 00, Submittal Procedures.
5. Site Preparation.
7. Bottom Liner Installation.
8. Leachate Collection System Installation.
15. Demobilization summary.

C. Update Preliminary Progress Schedule monthly as part of progress payment process. Failure to do so may result in the Owner withholding all or part of the monthly progress payment until the Preliminary Progress Schedule is updated in a manner acceptable to Engineer.

D. Format: In accordance with Article Progress Schedule—Bar Chart.

1.03 PROJECT MILESTONES

A. Incorporate the following Project Milestones into sequence of Work and associated delivery Progress Schedules:

1. New entrance area road through wetlands area shall be completed by September 1, including all permanent soil stabilization elements shown on Drawings.

1.04 DETAILED PROGRESS SCHEDULE

A. In addition to requirements of General Conditions, submit Detailed Progress Schedule beginning with Notice to Proceed and continuing through Final Completion.

B. Show the duration and sequences of activities required for complete performance of the Work reflecting means and methods chosen by Contractor.

C. When accepted by Engineer, Detailed Progress Schedule will replace Preliminary Progress Schedule and become Baseline Schedule. Subsequent revisions will be considered as Updated Progress Schedules.

D. Format: In accordance with Article Progress Schedule—Bar Chart.

E. Update monthly to reflect actual progress and occurrences to date, including weather delays.

1.05 PROGRESS SCHEDULE—BAR CHART

A. General: Comprehensive bar chart schedule, generally as outlined in Associated General Contractors of America (AGC) 580, “Construction Project Planning and Scheduling Guidelines.” If a conflict occurs between the AGC publication and this specification, this specification shall govern.
B. Format:

1. Unless otherwise approved, white paper, 11-inch by 17-inch sheet size.
2. Title Block: Show name of project and Owner, date submitted, revision or update number, and name of scheduler.
3. Identify horizontally, across the top of the schedule, the time frame by year, month, and day.
4. Identify each activity with a unique number and a brief description of the Work associated with that activity.
5. Legend: Describe standard and special symbols used.

C. Contents:

1. Identify, in chronological order, those activities reasonably required to complete the Work, building on the approved preliminary scheduled through the entire duration of the Project. Include, as applicable, the following work elements:
   b. Mobilization and other preliminary activities.
   c. Site preparation activities.
   d. Demolition of existing systems.
   e. Excavation and subgrade preparation activities.
   f. Utility relocations and installations.
   g. Landfill gas collection system relocation (by component).
   h. Subgrade preparation.
   i. Bottom liner installation (by component).
   j. Leachate Collection system installation (including connection to MH#6).
   k. Drain sand delivery and installation.
   l. Embankment construction.
   m. Commercial scale system procurement, delivery, and installation.
   n. Finished roadway construction.
   o. Site lighting construction.
   p. Equipment and system startup and testing activities.
   q. Project closeout and site cleanup.
   r. Demobilization.

1.06 PROGRESS OF THE WORK

A. Updated Progress Schedule shall reflect:

1. Progress of Work to within 5 working days prior to submission.
2. Approved changes in Work scope and activities modified since submission.
3. Delays in Submittals or resubmittals, deliveries, or Work.
4. Adjusted or modified sequences of Work.
5. Other identifiable changes.
6. Revised projections of progress and completion.

B. Produce detailed subschedules during Project, upon request of Owner or Engineer, to further define critical portions of the Work such as facility shutdowns.

C. If Contractor fails to complete activity by its latest scheduled completion date and this Failure is anticipated to extend Contract Times (or Milestones), Contractor shall, within 7 days of such failure, submit a written statement as to how Contractor intends to correct nonperformance and return to acceptable current Progress Schedule. Actions by Contractor to complete the Work within Contract Times (or Milestones) will not be justification for adjustment to Contract Price or Contract Times.

D. Owner may order Contractor to increase plant, equipment, labor force or working hours if Contractor fails to:
   1. Complete a Milestone activity by its completion date.
   2. Satisfactorily execute Work as necessary to prevent delay to overall completion of Project, at no additional cost to Owner.

1.07 NARRATIVE PROGRESS REPORT

A. Format:
   1. Organize same as Progress Schedule.
   2. Identify, on a cover letter, reporting period, date submitted, and name of author of report.

B. Contents:
   1. Number of days worked over the period, work force on hand, construction equipment on hand (including utility vehicles such as pickup trucks, maintenance vehicles, stake trucks).
   2. General progress of Work, including a listing of activities started and completed over the reporting period, mobilization/demobilization of subcontractors, and major milestones achieved.
   3. Contractor’s plan for management of Site (such as, lay down and staging areas, construction traffic), utilization of construction equipment, buildup of trade labor, and identification of potential Contract changes.
4. Identification of new activities and sequences as a result of executed Contract changes.
5. Documentation of weather conditions over the reporting period, and any resulting impacts to the work.
6. Description of actual or potential delays, including related causes, and the steps taken or anticipated to mitigate their impact.
7. Changes to activity logic.
8. Changes to the critical path.
9. Identification of, and accompanying reason for, any activities added or deleted since the last report.
10. Steps taken to recover the schedule from Contractor-caused delays.

1.08 SCHEDULE ACCEPTANCE

A. Engineer’s acceptance will demonstrate agreement that:

1. Proposed schedule is accepted with respect to:
   a. Contract Times, including Final Completion and all intermediate Milestones are within the specified times.
   b. Specified Work sequences and constraints are shown as specified.
   c. Specified Owner-furnished equipment or material arrival dates, or range of dates, are included.
   d. Access restrictions are accurately reflected.
   e. Startup and testing times are as specified.
   f. Submittal review times are as specified.
   g. Startup testing duration is as specified and timing is acceptable.

2. In all other respects, Engineer’s acceptance of Contractor’s schedule indicates that, in Engineer’s judgment, schedule represents reasonable plan for constructing Project in accordance with the Contract Documents. Engineer’s review will not make any change in Contract requirements. Lack of comment on any aspect of schedule that is not in accordance with the Contract Documents will not thereby indicate acceptance of that change, unless Contractor has explicitly called the nonconformance to Engineer’s attention in submittal. Schedule remains Contractor’s responsibility and Contractor retains responsibility for performing all activities, for activity durations, and for activity sequences required to construct Project in accordance with the Contract Documents.

B. Unacceptable Preliminary Progress Schedule:

1. Make requested corrections; resubmit within 10 days.
2. Until acceptable to Engineer as Baseline Progress Schedule, continue review and revision process, during which time Contractor shall update
schedule on a monthly basis to reflect actual progress and occurrences to date.

C. Unacceptable Detailed Progress Schedule:

1. Make requested corrections; resubmit within 10 days.
2. Until acceptable to Engineer as Baseline Progress Schedule, continue review and revision process.

D. Narrative Report: All changes to activity duration and sequences, including addition or deletion of activities subsequent to Engineer’s acceptance of Baseline Progress Schedule, shall be delineated in Narrative Report current with proposed Updated Progress Schedule.

1.09 ADJUSTMENT OF CONTRACT TIMES

A. Reference General Conditions and Section 01 26 00, Contract Modification Procedures.

B. Evaluation and reconciliation of Adjustments of Contract Times shall be based on the Updated Progress Schedule at the time of proposed adjustment or claimed delay.

C. Schedule Contingency:

1. Contingency, when used in the context of the Progress Schedule, is time between Contractor’s proposed Completion Time and Contract Completion Time.
2. Contingency included in Progress Schedule is a Project resource available to both Contractor and Owner to meet Contract Milestones and Contract Times. Use of Schedule contingency shall be shared to the proportionate benefit of both parties.
3. Use of schedule contingency suppression techniques such as preferential sequencing and extended activity times is prohibited.
4. Pursuant to Contingency sharing provisions of this specification, no time extensions will be granted, nor will delay damages be paid until a delay occurs which (i) consumes all available contingency time, and (ii) extends Work beyond the Contract Completion date.

D. Claims Based on Contract Times:

1. Where Engineer has not yet rendered formal decision on Contractor’s Claim for adjustment of Contract Times, and parties are unable to agree as to amount of adjustment to be reflected in Progress Schedule, Contractor shall reflect an interim adjustment in the Progress Schedule as acceptable to Engineer.
2. It is understood and agreed that such interim acceptance will not be binding on either Contractor or Owner, and will be made only for the purpose of continuing to schedule Work until such time as formal decision has been rendered as to an adjustment, if any, of the Contract Times.

3. Contractor shall revise Progress Schedule prepared thereafter in accordance with Engineer’s formal decision.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF SECTION
SECTION 01 33 00  
SUBMITTAL PROCEDURES

PART 1 GENERAL

1.01 DEFINITIONS
   A. Action Submittal: Written and graphic information submitted to Engineer by Contractor that requires Engineer’s approval.
   B. Informational Submittal: Information submitted to Engineer by Contractor that requires Engineer’s approval for conformance with the conditions of the Contract.

1.02 PROCEDURES
   A. Direct submittals to Engineer in the following manner, unless specified otherwise, in order of preference.
   1. Jacobs:  
      Attn: Elizabeth Butterfield  
      999 West Main Street, Suite 1200  
      Boise, ID 83702  
      Elizabeth.Butterfield@jacobs.com
   B. Transmittal of Submittal:
      1. Contractor shall: Review each submittal and check for compliance with Contract Documents. Submittals not reviewed by Contractor will be rejected.
      2. Complete, sign, and transmit with each submittal package, one Transmittal of Contractor's Submittal form attached at end of this section.
      3. Identify each submittal with the following:
         a. Numbering and Tracking System:
            1) Sequentially number each submittal by specification section in the following format: [specification section number]-[sequential number].
            2) Resubmission of submittal shall have original number with sequential alphabetic suffix.
         b. Specification section and paragraph to which submittal applies.
         c. Project title and Engineer’s project number.
         d. Date of transmittal.
         e. Names of Contractor, Subcontractor or Supplier, and manufacturer as appropriate.
4. Identify and describe each deviation or variation from Contract Documents.

C. Format:
1. Do not base Shop Drawings on reproductions of Contract Documents.
2. Package submittal information by individual specification section. Do not combine different specification sections together in submittal package, unless otherwise directed in specification.
3. Present in a clear and thorough manner and in sufficient detail to show kind, size, arrangement, and function of components, materials, and devices, and compliance with Contract Documents.
4. Transmit via e-mail or fax when possible. If submittal cannot be transmitted electronically, mail to Engineer’s office.

D. Timeliness: Schedule and submit in accordance Schedule of Submittals, and requirements of individual specification sections.

E. Processing Time:
1. Time for review shall commence on Engineer’s receipt of submittal.
2. Engineer will act upon Contractor’s submittal and transmit response to Contractor not later than 10 working days after receipt, unless otherwise specified.
3. Resubmittals will be subject to same review time.
4. No adjustment of Contract Times or Price will be allowed due to delays in progress of Work caused by rejection and subsequent resubmittals.

F. Resubmittals: Clearly identify each correction or change made.

G. Incomplete Submittals:
1. Engineer will return entire submittal for Contractor’s revision if preliminary review deems it incomplete.
2. When any of the following are missing, submittal will be deemed incomplete:
   a. Contractor’s review signature.
   b. Transmittal of Contractor’s Submittal, completed and signed.
   c. Insufficient number of copies (for hard copies transmitted by mail).

H. Submittals not required by Contract Documents:
1. Will not be reviewed.
2. Submittals not meeting conditions of the contract will not be reviewed.
1.03 ACTION SUBMITTALS

A. General: Any and all items called-out or shown on the Drawings that are specifically referenced in the specifications shall be issued to the Engineer for review and approval as Action Submittals.

B. Prepare and submit Action Submittals required by individual specification sections.

C. Shop Drawings:
   1. Copies:
      a. Submit one if transmitted electronically.
      b. Submit five if hard copy and mailed.
      c. Submit one if copyrighted material.
   2. Identify and Indicate:
      a. Applicable Contract Drawing and Detail number, products, units and assemblies, and system or equipment identification or tag numbers.
      b. Equipment and Component Title: Identical to title shown on Drawings.
      c. Critical field dimensions and relationships to other critical features of Work. Note dimensions established by field measurement.
      d. Project-specific information drawn accurately to scale.
   3. Manufacturer’s standard schematic drawings and diagrams as follows:
      a. Modify to delete information that is not applicable to the Work.
      b. Supplement standard information to provide information specifically applicable to the Work.
   4. Product Data: Provide as specified in individual specifications.
   5. Foreign Manufacturers: When proposed, include following additional information:
      a. Names and addresses of at least two companies that maintain technical service representatives close to Project.
      b. Complete list of spare parts and accessories for each piece of equipment.

D. Samples:
   1. Copies: Two, unless otherwise specified in individual specifications.
   2. Preparation: Mount, display, or package Samples in manner specified to facilitate review of quality. Attach label on unexposed side that includes the following:
      a. Manufacturer name.
      b. Model number.
c. Material.
d. Sample source.

3. Manufacturer’s Color Chart: Units or sections of units showing full range of colors, textures, and patterns available.

4. Full-size Samples:
   a. Size as indicated in individual specification section.
   b. Prepared from same materials to be used for the Work.
   c. Cured and finished in manner specified.
   d. Physically identical with product proposed for use.

E. Action Submittal Dispositions: Engineer will review, mark, and stamp as appropriate, and distribute marked-up copies as noted:

1. Approved:
   a. Contractor may incorporate product(s) or implement Work covered by submittal.
   b. Distribution via email to Contractor, Resident Project Engineer, and Engineer.
   c. If hard copy:
      1) One copy to Owner.
      2) One copy furnished Resident Project Representative.
      3) One copy retained in Engineer’s file.
      4) Remaining copies returned to Contractor appropriately annotated.

2. Approved as Noted:
   a. Contractor may incorporate product(s) or implement Work covered by submittal, in accordance with Engineer’s notations.
   b. Distribution via e-mail to Contractor, Resident Project Engineer, and Engineer.
   c. If hard copy:
      1) One copy to Owner.
      2) One copy furnished Resident Project Representative.
      3) One copy retained in Engineer’s file.
      4) Remaining copies returned to Contractor appropriately annotated.

3. Partial Approval, Resubmit as Noted:
   a. Make corrections or obtain missing portions, and resubmit.
   b. Except for portions indicated, Contractor may begin to incorporate product(s) or implement Work covered by submittal, in accordance with Engineer’s notations.
      1) Distribution via email to Contractor, Resident Project Engineer, and Engineer.
4. Revise and Resubmit:
   a. Contractor may not incorporate product(s) or implement Work covered by submittal.
   b. Distribution via email to Contractor, Resident Project Engineer, and Engineer.

1.04 INFORMATIONAL SUBMITTALS

A. General:

1. Submit copies, unless otherwise indicated in individual specification section:
   a. One if transmitted electronically.
   b. Three if hard copy and mailed.
   c. One if copyrighted material.
2. Refer to individual specification sections for specific submittal requirements.
3. Engineer will review each submittal. If submittal meets conditions of the Contract, Engineer will approve and forward copies to appropriate parties. If Engineer determines submittal does not meet conditions of the Contract and is therefore considered unacceptable, Engineer will retain one copy and return remaining copies with review comments to Contractor, and require that submittal be corrected and resubmitted.

B. Application for Payment: In accordance with Section 01 29 00, Payment Procedures.

C. Certificates:

1. General:
   a. Provide notarized statement that includes signature of entity responsible for preparing certification.
   b. Signed by officer or other individual authorized to sign documents on behalf of that entity.
2. Welding: In accordance with individual specification sections.
3. Installer: Prepare written statements on manufacturer’s letterhead certifying that installer complies with requirements as specified in individual specification sections.
4. Material Test: Prepared by qualified testing agency, on testing agency’s standard form, indicating and interpreting test results of material for compliance with requirements.
5. Certificates of Successful Testing or Inspection: Submit when testing or inspection is required by Laws and Regulations or governing agency or specified in individual specification sections.
D. Construction photographs in accordance with Section 01 31 13, Project Coordination, and as may otherwise be required in Contract Documents.

E. Contract Closeout Submittals: In accordance with Section 01 77 00, Closeout Procedures.

F. Manufacturer’s Instructions: Written or published information that documents manufacturer’s recommendations, guidelines, and procedures in accordance with individual specification sections.

G. Schedules:
   1. Schedule of Submittals: Prepare separately or in combination with Progress Schedule as specified in Section 01 32 00, Construction Progress Documentation.
      a. Show for each, at a minimum, the following:
         1) Specification section number.
         2) Identification by numbering and tracking system as specified under Paragraph Transmittal of Submittal.
         3) Estimated date of submission to Engineer, including reviewing and processing time.
      b. On a monthly basis, submit updated schedule to Engineer if changes have occurred or resubmittals are required.
   2. Schedule of Values: In accordance with Section 01 29 00, Payment Procedures.
   3. Progress Schedules: In accordance with Section 01 32 00, Construction Progress Documentation.

H. Special Guarantee: Supplier’s written guarantee as required in individual specification sections.

I. Statement of Qualification: Evidence of qualification, certification, or registration as required in Contract Documents to verify qualifications of professional land surveyor, engineer, materials testing laboratory, specialty Subcontractor, trade, Specialist, consultant, installer, and other professionals. Reference Paragraph 1.01.A.38.b of Supplementary Conditions for definition of Specialist.

J. Submittals Required by Laws, Regulations, and Governing Agencies:
   1. Submit promptly notifications, reports, certifications, payrolls, and otherwise as may be required, directly to the applicable federal, state, or local governing agency or their representative.
   2. Transmit to Engineer for Owner’s records one copy of correspondence and transmittals (to include enclosures and attachments) between Contractor and governing agency.
K. Test and Inspection Reports:

1. General: Shall contain signature of person responsible for test or report.

2. Factory:
   a. Identification of product and Specification section, type of inspection or test with referenced standard or code.
   b. Date of test, Project title and number, and name and signature of authorized person.
   c. Test results.
   d. If test or inspection deems material or equipment not in compliance with Contract Documents, identify corrective action necessary to bring into compliance.
   e. Provide interpretation of test results, when requested by Engineer.
   f. Other items as identified in individual specification sections.

3. Field:
   a. As a minimum, include the following:
      1) Project title and number.
      2) Date and time.
      3) Record of temperature and weather conditions.
      4) Identification of product and specification section.
      5) Type and location of test, Sample, or inspection, including referenced standard or code.
      6) Date issued, testing laboratory name, address, and telephone number, and name and signature of laboratory inspector.
      7) If test or inspection deems material or equipment not in compliance with Contract Documents, identify corrective action necessary to bring into compliance.
      8) Provide interpretation of test results, when requested by Engineer.
      9) Other items as identified in individual Specification sections.

1.05 SUPPLEMENT

A. The supplement listed below, following “End of Section,” is part of this Specification.

1. Transmittal of Contractor’s Submittal.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF SECTION
TRANSMITTAL OF CONTRACTOR’S SUBMITTAL
(ATTACH TO EACH SUBMITTAL)

DATE: ____________________________

TO: ________________________________
    ________________________________
    ________________________________

Submittal No.: ___________________
□ New Submittal        □ Resubmittal

Project: ___________________________

Project No.: _______________________

Specification Section No.:__________
(Cover only one section with each transmittal)

FROM: _____________________________
    Contractor

Schedule Date of Submittal: ____________

SUBMITTAL TYPE:  □ Shop Drawing  □ Sample  □ Informational

The following items are hereby submitted:

<table>
<thead>
<tr>
<th>Number of Copies</th>
<th>Description of Item Submitted (Type, Size, Model Number, Etc.)</th>
<th>Spec. and Para. No.</th>
<th>Drawing or Brochure Number</th>
<th>Contains Variation to Contract</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>No</td>
</tr>
</tbody>
</table>

Contractor hereby certifies that (i) Contractor has complied with the requirements of Contract Documents in preparation, review, and submission of designated Submittal and (ii) the Submittal is complete and in accordance with the Contract Documents and requirements of laws and regulations and governing agencies.

By: ____________________________________________
    Contractor (Authorized Signature)
SECTION 01 43 33
MANUFACTURERS’ FIELD SERVICES

PART 1 GENERAL

1.01 DEFINITIONS
   A. Person-Day: One person for 8 hours within regular Contractor working hours.

1.02 SUBMITTALS
   A. Informational Submittals:
      1. Training Schedule: Submit, in accordance with requirements of this Specification, not less than 21 days prior to start of equipment installation and revise as necessary for acceptance.

1.03 QUALIFICATION OF MANUFACTURER’S REPRESENTATIVE
   A. Authorized representative of the manufacturer, factory trained, and experienced in the technical applications, installation, operation, and maintenance of respective equipment, subsystem, or system, with full authority by the equipment manufacturer to issue the certifications required of the manufacturer. Additional qualifications may be specified in the individual specification section.
   B. Representative subject to acceptance by Owner. No substitute representatives will be allowed unless prior written approval by such has been given.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION

3.01 FULFILLMENT OF SPECIFIED MINIMUM SERVICES
   A. Furnish manufacturers’ services, when required by an individual specification section, to meet the requirements of this section.
   B. Where time is necessary in excess of that stated in the Specifications for manufacturers’ services, or when a minimum time is not specified, time required to perform specified services shall be considered incidental.
   C. Schedule manufacturer’ services to avoid conflict with other onsite testing or other manufacturers’ onsite services.
D. Determine, before scheduling services, that conditions necessary to allow successful testing have been met.

E. Only those days of service approved by Engineer will be credited to fulfill specified minimum services.

F. When specified in individual specification sections, manufacturer’s onsite services shall include:

1. Assistance during product (system, subsystem, or component) installation to include observation, guidance, instruction of Contractor’s assembly, erection, installation or application procedures.
2. Inspection, checking, and adjustment as required for product (system, subsystem, or component) to function as warranted by manufacturer and necessary to furnish Manufacturer’s Certificate of Proper Installation.
3. Providing, on a daily basis, copies of manufacturers’ representatives field notes and data to Engineer.
4. Revisiting the Site as required to correct problems and until installation and operation are acceptable to Engineer.
5. Resolution of assembly or installation problems attributable to or associated with respective manufacturer’s products and systems.
6. Assistance during functional and performance testing, and facility startup and evaluation.
7. Training of Owner’s personnel in the operation and maintenance of respective product as required.

3.02 MANUFACTURER’S CERTIFICATE OF PROPER INSTALLATION

A. When so specified, a Manufacturer’s Certificate of Proper Installation form, a copy of which is attached to this section, shall be completed and signed by equipment manufacturer’s representative.

B. Such form shall certify signing party is a duly authorized representative of manufacturer, is empowered by manufacturer to inspect, approve, and operate their equipment and is authorized to make recommendations required to ensure equipment is complete and operational.

3.03 TRAINING

A. General:

1. Furnish manufacturers’ representatives for detailed classroom and hands-on training to Owner’s personnel on operation and maintenance of specified product (system, subsystem, component) and as may be required in applicable Specifications.
2. Furnish trained, articulate personnel to coordinate and expedite training, to be present during training coordination meetings with Owner, and familiar with operation and maintenance manual information specified in Section 01 78 23, Operation and Maintenance Data.

3. Manufacturer’s representative shall be familiar with facility operation and maintenance requirements as well as with specified equipment.

4. Furnish complete training materials, to include operation and maintenance data, to be retained by each trainee.

B. Training Schedule:

1. List specified equipment and systems that require training services and show:
   a. Respective manufacturer.
   b. Estimated dates for installation completion.
   c. Estimated training dates.

2. Allow for multiple sessions when several shifts are involved.

3. Adjust schedule to ensure training of appropriate personnel as deemed necessary by Owner, and to allow full participation by manufacturers’ representatives. Adjust schedule for interruptions in operability of equipment.

4. Coordinate with Section 01 32 00, Construction Progress Documentation, and Section 01 91 14, Equipment Testing and Facility Startup.

C. Lesson Plan:

1. When manufacturer or vendor training of Owner personnel is specified, prepare a lesson plan for each required course containing the following minimum information:
   a. Title and objectives.
   b. Recommended attendees (such as, managers, engineers, operators, maintenance).
   c. Course description, outline of course content, and estimated class duration.
   d. Format (such as, lecture, self-study, demonstration, hands-on).
   e. Instruction materials and equipment requirements.
   f. Resumes of instructors providing training.

D. Prestartup Training:

1. Coordinate training sessions with Owner’s operating personnel and manufacturers’ representatives, and with submission of operation and maintenance manuals in accordance with Section 01 78 23, Operation and Maintenance Data.
2. Complete at least 14 days prior to beginning of facility startup.

E. Post-startup Training: If required in Specifications, furnish and coordinate training of Owner’s operating personnel by respective manufacturer’s representatives.

3.04 SUPPLEMENT

A. The supplement listed below, following “End of Section,” is part of this specification.

1. Manufacturer’s Certificate of Proper Installation.

END OF SECTION
MANUFACTURER’S CERTIFICATE OF PROPER INSTALLATION

OWNER ___________________________ EQPT SERIAL NO: ___________________________
EQPT TAG NO: ______________________ EQPT/SYSTEM: ___________________________
PROJECT NO: ______________________ SPEC. SECTION: ___________________________

I hereby certify that the above-referenced equipment/system has been:

(Check Applicable)

☐ Installed in accordance with Manufacturer’s recommendations.
☐ Inspected, checked, and adjusted.
☐ Serviced with proper initial lubricants.
☐ Electrical and mechanical connections meet quality and safety standards.
☐ All applicable safety equipment has been properly installed.
☐ Functional tests.
☐ System has been performance tested, and meets or exceeds specified performance requirements. (When complete system of one manufacturer)

Note: Attach any performance test documentation from manufacturer.

Comments: _____________________________________________________________

______________________________________________________________________

______________________________________________________________________

______________________________________________________________________

I, the undersigned Manufacturer’s Representative, hereby certify that I am (i) a duly authorized representative of the manufacturer, (ii) empowered by the manufacturer to inspect, approve, and operate their equipment and (iii) authorized to make recommendations required to ensure equipment furnished by the manufacturer is complete and operational, except as may be otherwise indicated herein. I further certify that all information contained herein is true and accurate.

Date: _________________________________, 20____
Manufacturer: __________________________________________________________

By Manufacturer’s Authorized Representative: _________________________________
(Authorized Signature)
PART 1 GENERAL

1.01 REFERENCES

A. The following is a list of standards which may be referenced in this section:

1. ASTM International (ASTM):

1.02 DEFINITIONS

A. Contractor Quality Control (CQC): The means by which Contractor ensures that the construction, to include that performed by subcontractors and suppliers, complies with the requirements of the Contract.

1.03 SUBMITTALS

A. Informational Submittals:

1. CQC Plan: Submit, not later than 10 calendar days after receipt of Notice to Proceed, but BEFORE any Work is conducted on the Site.
2. CQC Weekly Report: Submit, weekly, an original and one copy in report form.

1.04 OWNER’S QUALITY ASSURANCE

A. All Work is subject to Owner’s quality assurance inspection and testing at all locations and at all reasonable times before acceptance to ensure strict compliance with the terms of the Contract Documents.

B. Owner’s quality assurance inspections and tests are for the sole benefit of Owner and do not:

1. Relieve Contractor of responsibility for providing adequate quality control measures, including testing to be provided by Contractor as specified.
2. Relieve Contractor of responsibility for damage to or loss of the material before acceptance.
3. Constitute or imply acceptance.
4. Affect the continuing rights of Owner after acceptance of the completed Work.

C. The presence or absence of a quality assurance inspector does not relieve Contractor from any Contract requirement.

D. Promptly furnish all facilities, labor, and material reasonably needed for performing such safe and convenient inspections and tests as may be required by Engineer.

E. Owner may charge Contractor for any additional cost of inspection or test when Work is not ready at the time specified by Contractor for inspection or test, or when prior rejection makes re-inspection or retest necessary. Quality assurance inspections and tests will be performed in a manner that will not unnecessarily delay the Work.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION

3.01 GENERAL

A. Maintain an adequate inspection system and perform such inspections as will ensure that the Work conforms to the Contract Documents.

B. Maintain complete inspection records and make them available at all times to Owner and Engineer.

C. The quality control system shall consist of plans, procedures, and organization necessary to produce an end product that complies with the Contract Documents. The system shall cover all construction and demolition operations, both onsite and offsite, including Work by subcontractors, fabricators, suppliers and purchasing agents, and shall be keyed to the proposed construction sequence.

3.02 COORDINATION MEETING

A. Before start of construction, and prior to acceptance of the CQC Plan, schedule a meeting with Engineer and Owner to discuss the quality control system.

B. Develop a mutual understanding of the system details, including the forms for recording the CQC operations, control activities, testing, administration of the system for both onsite and offsite Work, and the interrelationship of Contractor’s management and control with the Owner’s Quality Assurance.
C. There may be occasions when subsequent conferences may be called by either party to reconfirm mutual understandings and/or address deficiencies in the CQC system or procedures that may require corrective action by Contractor.

3.03 QUALITY CONTROL ORGANIZATION

A. CQC System Manager:

1. Designate an individual within Contractor’s organization who will be responsible for overall management of CQC and have the authority to act in CQC matters for the Contractor.
2. CQC System Manager may perform other duties on the Project.
3. CQC System Manager shall be an experienced construction person, with a minimum of 3 years construction experience on similar type Work.
4. CQC System Manager shall report to the Contractor’s project manager or someone higher in the organization. Project manager in this context shall mean the individual with responsibility for the overall quality and production management of the Project.
5. CQC System Manager shall be onsite during construction; periods of absence may not exceed 2 weeks at any one time.
6. Identify an alternate for CQC System Manager to serve with full authority during the System Manager’s absence. The requirements for the alternate will be the same as for designated CQC System Manager.

B. CQC Staff:

1. Designate a CQC staff, available at the Site at all times during progress, with complete authority to take any action necessary to ensure compliance with the Contract. CQC staff members shall be subject to acceptance by Engineer.
2. CQC staff shall take direction from CQC System Manager in matters pertaining to QC.
3. CQC staff must be of sufficient size to ensure adequate QC coverage of Work phases, work shifts, and work crews involved in the construction. These personnel may perform other duties, but must be fully qualified by experience and technical training to perform their assigned QC responsibilities and must be allowed sufficient time to carry out these responsibilities.
4. The actual strength of the CQC staff may vary during any specific Work period to cover the needs of the Project. Add additional staff when necessary for a proper CQC organization.

C. Organizational Changes: Obtain Engineer’s acceptance before replacing any member of the CQC staff. Requests for changes shall include name, qualifications, duties, and responsibilities of the proposed replacement.
3.04 QUALITY CONTROL PHASING

A. CQC shall include at least three phases of control to be conducted by CQC System Manager for all definable features of Work, as follows:

1. Preparatory Phase:
   a. Notify Engineer at least 48 hours in advance of beginning any of the required action of the preparatory phase.
   b. This phase shall include a meeting conducted by the CQC System Manager and attended by the superintendent, other CQC personnel (as applicable), and the foreman responsible for the definable feature. The CQC System Manager shall instruct applicable CQC staff as to the acceptable level of workmanship required in order to meet Contract requirements.
   c. Document the results of the preparatory phase meeting by separate minutes prepared by the CQC System Manager and attached to the QC report.
   d. Perform prior to beginning Work on each definable feature of Work:
      1) Review applicable Contract Specifications.
      2) Review applicable Contract Drawings.
      3) Verify that all materials and/or equipment have been tested, submitted, and approved.
      4) Verify that provisions have been made to provide required control inspection and testing.
      5) Examine the Work area to verify that all required preliminary Work has been completed and is in compliance with the Contract.
      6) Perform a physical examination of required materials, equipment, and sample Work to verify that they are on hand, conform to approved Shop Drawing or submitted data, and are properly stored.
      7) Review the appropriate activity hazard analysis to verify safety requirements are met.
      8) Review procedures for constructing the Work, including repetitive deficiencies.
      9) Document construction tolerances and workmanship standards for that phase of the Work.
     10) Check to verify that the plan for the Work to be performed, if so required, has been accepted by Engineer.
2. Initial Phase:
   a. Accomplish at the beginning of a definable feature of Work:
      1) Notify Engineer at least 48 hours in advance of beginning the initial phase.
      2) Perform prior to beginning Work on each definable feature of Work:
         a) Review minutes of the preparatory meeting.
         b) Check preliminary Work to verify compliance with Contract requirements.
         c) Verify required control inspection and testing.
         d) Establish level of workmanship and verify that it meets minimum acceptable workmanship standards. Comparison with sample panels is appropriate.
         e) Resolve all differences.
         f) Check safety to include compliance with and upgrading of the safety plan and activity hazard analysis. Review the activity analysis with each worker.
   3) Separate minutes of this phase shall be prepared by the CQC System Manager and attached to the QC report. Exact location of initial phase shall be indicated for future reference and comparison with follow-up phases.
   4) The initial phase should be repeated for each new crew to work onsite, or any time acceptable specified quality standards are not being met.

3. Follow-up Phase:
   a. Perform daily checks to verify continuing compliance with Contract requirements, including control testing, until completion of the particular feature of Work.
   b. Daily checks shall be made a matter of record in the CQC documentation and shall document specific results of inspections for all features of Work for the day or shift.
   c. Conduct final follow-up checks and correct all deficiencies prior to the start of additional features of Work that will be affected by the deficient Work. Constructing upon or concealing nonconforming Work will not be allowed.

4. Additional Preparatory and Initial Phases: Additional preparatory and initial phases may be conducted on the same definable features of Work as determined by Owner if the quality of ongoing Work is unacceptable; or if there are changes in the applicable QC staff or in the onsite production supervision or work crew; or if work on a definable feature is resumed after a substantial period of inactivity, or if other problems develop.
3.05 CONTRACTOR QUALITY CONTROL (CQC) PLAN

A. General:

1. Plan shall identify personnel, procedures, control, instructions, test, records, and forms to be used.
2. An interim plan for the first 30 days of operation will be considered.
3. Construction will be permitted to begin only after acceptance of the CQC Plan or acceptance of an interim plan applicable to the particular feature of Work to be started.
4. Work outside of the features of Work included in an accepted interim plan will not be permitted to begin until acceptance of a CQC Plan or another interim plan containing the additional features of Work to be started.

B. Content:

1. Plan shall cover the intended CQC organization for the entire Contract and shall include the following, as a minimum:
   a. Organization: Description of the quality control organization, including a chart showing lines of authority and acknowledgment that the CQC staff will implement the three-phase control system (see Paragraph QC Phasing) for all aspects of the Work specified.
   b. CQC Staff: The name, qualifications (in resume format), duties, responsibilities, and authorities of each person assigned a QC function.
   c. Letters of Authority: A copy of a letter to the CQC System Manager signed by an authorized official of the firm, describing the responsibilities and delegating sufficient authorities to adequately perform the functions of the CQC System Manager, including authority to stop Work which is not in compliance with the Contract. The CQC System Manager shall issue letters of direction to all other various quality control representatives outlining duties, authorities and responsibilities. Copies of these letters will also be furnished to Owner.
   d. Submittals: Procedures for scheduling, reviewing, certifying, and managing submittals, including those of subcontractors, offsite fabricators, suppliers and purchasing agents.
   e. Testing: Control, verification and acceptance testing procedures for each specific test to include the test name, frequency, specification paragraph containing the test requirements, the personnel and laboratory responsible for each type of test, and an estimate of the number of tests required.
f. Procedures for tracking preparatory, initial, and follow-up control phases and control, verification, and acceptance tests, including documentation.
g. Procedures for tracking deficiencies from identification through acceptable corrective action. These procedures will establish verification that identified deficiencies have been corrected.
h. Reporting procedures, including proposed reporting formats; include a copy of the CQC report form.

C. Acceptance of Plans: Acceptance of the Contractor’s basic and addendum CQC plans is required prior to the start of construction. Acceptance is conditional and will be predicated on satisfactory performance during the construction. Owner reserves the right to require Contractor to make changes in the CQC plan and operations including removal of personnel, as necessary, to obtain the quality specified.

D. Notification of Changes: After acceptance of the CQC plan, Contractor shall notify Engineer, in writing, a minimum of 7 calendar days prior to any proposed change. Proposed changes are subject to acceptance by Engineer.

3.06 CONTRACTOR QUALITY CONTROL (CQC) REPORT

A. As a minimum, prepare a CQC report for every 7 calendar days. Account for all days throughout the life of the Contract. Reports shall be signed and dated by CQC System Manager. Include copies of test reports and copies of reports prepared by QC staff.

B. Maintain current records of quality control operations, activities, and tests performed, including the Work of subcontractors and suppliers.

C. Records shall be on an acceptable form and shall be a complete description of inspections, the results of inspections, daily activities, tests, and other items, including but not limited to the following:

1. Contractor/subcontractor and their areas of responsibility.
2. Operating plant/equipment with hours worked, idle, or down for repair.
3. Work performed today, giving location, description, and by whom. When a network schedule is used, identify each phase of Work performed each day by activity number.
4. Test and/or control activities performed with results and references to specifications/plan requirements. The control phase should be identified (Preparatory, Initial, Follow-up). List deficiencies noted along with corrective action.
5. Material received with statement as to its acceptability and storage.
6. Identify submittals reviewed, with Contract reference, by whom, and action taken.
7. Offsite surveillance activities, including actions taken.
8. Job safety evaluations stating what was checked, results, and instructions or corrective actions.
9. List instructions given/received and conflicts in Drawings and/or Specifications.
10. Contractor’s verification statement.
11. Indicate a description of trades working on the Project; the number of personnel working; weather conditions encountered; and any delays encountered.
12. These records shall cover both conforming and deficient features and shall include a statement that equipment and materials incorporated in file work and workmanship comply with the Contract.

3.07 SUBMITTAL QUALITY CONTROL

A. Submittals shall be as specified in Section 01 33 00, Submittal Procedures. The CQC organization shall be responsible for certifying that all submittals are in compliance with the Contract requirements. Contractor shall use forms as approved by Engineer.

3.08 TESTING QUALITY CONTROL (AND SYSTEM START-UP)

A. Testing Procedure:

1. Perform tests specified or required to verify that control measures are adequate to provide a product which conforms to Contract requirements. Perform the following activities and record the following data:
   a. Verify testing procedures comply with contract requirements.
   b. Verify facilities and testing equipment are available and comply with testing standards.
   c. Check test instrument calibration data against certified standards.
   d. Verify recording forms and test identification control number system, including all of the test documentation requirements, have been prepared.
   e. Documentation:
      1) Record results of all tests taken, both passing and failing, on the CQC report for the date taken.
      2) Include specification paragraph reference, location where tests were taken, and the sequential control number identifying the test.
      3) Actual test reports may be submitted later, if approved by Engineer, with a reference to the test number and date taken.
4) Provide directly to Engineer an information copy of tests performed by an offsite or commercial test facility. Test results shall be signed by an engineer registered in the state where the tests are performed.

5) Failure to submit timely test reports, as stated, may result in nonpayment for related Work performed and disapproval of the test facility for this Contract.

B. Testing Laboratories: Laboratory facilities, including personnel and equipment, utilized for testing soils, concrete, asphalt and steel shall meet criteria detailed in ASTM D3740 and ASTM E329, and be accredited by the American Association of Laboratory Accreditation (AALA), National Institute of Standards and Technology (NIST), National Voluntary Laboratory Accreditation Program (NVLAP), the American Association of State Highway and Transportation Officials (AASHTO), or other approved national accreditation authority. Personnel performing concrete testing shall be certified by the American Concrete Institute (ACI).

3.09 COMPLETION INSPECTION

A. CQC System Manager shall conduct an inspection of the Work at the completion of all Work or any milestone established by a completion time stated in the Contract.

B. Punchlist:

1. CQC System Manager shall develop a punchlist of items which do not conform to the Contract requirements.
2. Include punchlist in the CQC report, indicating the estimated date by which the deficiencies will be corrected.
3. CQC System Manager or staff shall make a second inspection to ascertain that all deficiencies have been corrected and so notify the Owner.
4. These inspections and any deficiency corrections required will be accomplished within the time stated for completion of the entire Work or any particular increment thereof if the Project is divided into increments by separate completion dates.

END OF SECTION
SECTION 01 50 00
TEMPORARY FACILITIES AND CONTROLS

PART 1  GENERAL

1.01  REFERENCES

A.  The following is a list of standards which may be referenced in this section:

4.  Telecommunications Industry Association (TIA); Electronic Industries Alliance (EIA): 568B, Commercial Building Telecommunications Cabling Standard.

1.02  SUBMITTALS

A.  Action Submittals:

1.  Copies of permits and approvals for construction as required by Laws and Regulations and governing agencies.
2.  Temporary Utility Submittals: Electric power supply and distribution plans.
4.  Roads and Staging Areas:
   a.  Access and Haul Roads: Routes, cross-sections, and drainage facilities.
   b.  Layout plan for the construction trailers, vehicle parking, and material storage.

1.03  MOBILIZATION

A.  Mobilization shall include, but not be limited to, these principal items:

1.  Obtaining required permits.
2. Establishing GPS electronic grade control for the project. All primary earth moving equipment used for the project shall have electronic grade control automatics mounted on the blades of the equipment. The local control system shall be setup by, or verified by, the approved professional surveyor for the project. The Contractor shall have a competent grade checker on staff that can check grade real-time as the Work progresses using a GPS rover and Automatic level. The grade checker shall coordinate also with the Engineer for spot checks to confirm layout and staking. Progress surveys and as-built record surveys shall be done independently by the approved professional surveyor.

3. Moving Contractor’s field office and equipment required for operations onto Site.

4. Installing temporary construction power, wiring, and lighting facilities.

5. Providing onsite communication facilities, including telephones and internet service as necessary for Contractor to perform Work.

6. Providing onsite sanitary facilities and potable water facilities as specified and as required by Laws and Regulations, and governing agencies.

7. Arranging for and erection of Contractor’s work and storage yard, as and where needed.

8. Posting OSHA required notices and establishing safety programs and procedures.

9. Having Contractor’s superintendent at Site full time along with safety and CQC monitoring also on a full time basis.

B. Use area designated for Contractor’s temporary facilities as shown on Drawings.

1.04 PROTECTION OF WORK AND PROPERTY

A. Comply with Owner’s safety rules while on Owner’s property.

B. Keep Owner informed of serious onsite accidents and related claims.

C. Use of Explosives or Burning: No blasting or use of explosives or burning will be allowed onsite.

1.05 VEHICULAR TRAFFIC

A. Traffic Control Plan: Adhere to traffic control routing included in Contract Documents and as required by the Owner. Changes to this plan shall be made only by written approval of Engineer. Secure approvals for necessary changes so as not to delay progress of the Work.
PART 2 PRODUCTS

PART 3 EXECUTION

3.01 TEMPORARY UTILITIES

A. Power:

1. Electric power will be available at or near Site. Determine type and amount available and make arrangements for obtaining temporary electric power service, metering equipment, and pay all costs for electric power used during contract period, except for portions of the Work designated in writing by Engineer as substantially complete.

2. Cost of electric power will be borne by Contractor.

B. Lighting: Provide temporary lighting to meet applicable safety requirements to allow erection, application, or installation of materials and equipment, and observation or inspection of the Work.

C. Heating, Cooling, and Ventilating:

1. Provide as required to maintain adequate environmental conditions to facilitate progress of the Work, to meet specified minimum conditions for installation of materials, and to protect materials, equipment, and finishes from damage due to temperature or humidity. Costs for temporary heat shall be borne by Contractor responsible for constructing structure or building as specified in Section 01 11 00, Summary of Work.

2. Provide adequate forced air ventilation of enclosed areas to cure installed materials, to dispense humidity, and to prevent hazardous accumulations of dust, fumes, vapors, or gases.

3. Pay all costs of installation, maintenance, operation, removal, and fuel consumed.

4. Provide portable unit heaters, complete with controls, oil- or gas-fired, and suitably vented to outside as required for protection of health and property.

5. If permanent natural gas piping is used for temporary heating units, do not modify or reroute gas piping without approval of utility company. Provide separate gas metering as required by utility.

D. Water:

1. No potable water is available at Site. Make arrangements for and bear costs of providing water required for construction purposes and for drinking by construction personnel during construction.
2. Construction water may be available in the stormwater pond(s) at the Site. Contractor shall coordinate with Owner the use of such water and provide a place of temporary connection for construction water at Site. Provide temporary facilities and piping required to bring water to point of use and remove when no longer needed. Contractor shall make backup arrangements and bear costs for supplemental construction water if it is not available at the Site.

E. Sanitary and Personnel Facilities:

1. Provide and maintain facilities for Contractor’s employees, Subcontractors, and all other onsite employers’ employees. Service, clean, and maintain facilities and enclosures.
2. Use of Owner’s existing sanitary facilities by construction personnel will not be allowed.

F. Telephone Service:

1. Contractor: Arrange and provide onsite telephone service for use during construction. Pay costs of installation and monthly bills.
2. No incoming calls allowed to Owner’s plant telephone system.

G. Fire Protection: Furnish and maintain on Site adequate firefighting equipment capable of extinguishing incipient fires. Comply with applicable parts of NFPA 241.

3.02 SAFETY AND PROTECTION

A. General Description:

1. Refuse, landfill gas, and leachate may be encountered during construction operations. The submission of a bid shall constitute that the Contractor certifies that he is experienced and qualified to anticipate and meet the safety and health requirements of this Project.
2. If hazardous materials are encountered during the work, the Contractor shall also meet the requirements of 29 CFR 1910.134, and all other applicable federal, state, and local regulations.
3. Contractor shall show proof of certification training upon request for all employees of the Contractor and Subcontractors involved in construction activities in accordance with 40 CFR Part 300.38, worker health and safety, and 29 CFR Part 1910.120, Hazardous Waste Operations and Emergency Response. The level of training provided shall be consistent with the worker’s job function and responsibilities and with the degree of anticipated hazards.
B. Construction Safety Program:

1. The Contractor shall develop and maintain for the duration of this Contract, a safety program that will effectively incorporate and implement county, state, and federal safety requirements. Submit a written safety plan for the construction prepared by a licensed industrial hygienist by the American Board of Industrial Hygiene (ABIH) and at least one copy shall be maintained at the Work Site.

2. Preparation of the written safety plan is the Contractor’s responsibility and no statement made in these Special Provisions shall relieve the Contractor and its subcontractors of responsibility for information included and implementation of the safety plan.

3. The Contractor’s safety plan should include, but not be limited to:
   a. A list of chemical and physical hazards (such as methane exposure and electrical shock), allowable OSHA exposure levels, threshold limit values, other regulatory exposure levels, and the emergency response should an exposure or injury occur.
   b. An emergency evacuation plan for immediate removal to a hospital or a doctor’s care any person who may be injured on the jobsite. The emergency evacuation plan shall include routes to medical treatment, and emergency telephone numbers including hospital, ambulance, fire, sheriff/police, poison control, and others as deemed necessary.
   c. A list of safety and monitoring equipment at the jobsite and locations where equipment is stored or expected to be maintained.
   d. Monitoring equipment action levels and recommended responses.
   e. Confined space entry procedures.

4. The Contractor should provide equipment necessary to protect others at the landfill site from hazards, including, but not limited to, surface irregularities, trenches or excavations. Barricades, lanterns, and proper signs shall be furnished in sufficient amount to safeguard the public and the work.

C. Safety and Monitoring Equipment:

1. As part of the safety program, maintain at a well-known place at the jobsite, safety equipment applicable to the work as prescribed by the governing safety authorities and all articles necessary for giving first-aid to the injured. Personnel should be adequately trained in the use of safety and monitoring equipment used at the Job Site.

2. On similar projects, the Contractor’s safety equipment has included, for example, half or full face respirators, face shields, chemically resistant gloves, chemically resistant clothing (such as, Tyvek or PVC splash suits), 5-minute emergency air packs, emergency eyewash equipment, and self-contained breathing apparatus.
3. On similar projects, the Contractor’s monitoring equipment has included:
   a. Oxygen level indicator (such as the MSA Model 245R).
   b. Explosive gas (LEL) monitor.
   c. Hydrogen sulfide indicator.
4. On similar projects, monitoring equipment often includes a MultiRae or similar photoionizing detector for monitoring volatile organic constituents.

D. Landfill Gas Safety: Protect employees and others on the project from fire, explosion, or asphyxiation caused by gases emitted from the existing solid waste landfill and construction operations.

E. Leachate Safety: Protect employees and others on the project from exposure to landfill leachate.

F. Safe Access by Federal, State, and Local Government Officials: Provide proper facilities for safe access to the Work by authorized government officials.

G. Accident Reports:
   1. If death or serious injuries or serious damages are caused, the accident shall be reported immediately by telephone or messenger to both the Engineer and the Owner. In addition, the Contractor shall promptly report in writing to the Engineer and the Owner all accidents whatsoever arising out of, or in connection with, the performance of the work whether on, or adjacent to, the site, giving full details and statements of witnesses.
   2. If a claim is made by anyone against the Contractor or any subcontractor on account of any accident, the Contractor shall promptly report the facts in writing to the Owner, giving full details of the claim.

H. Additional Requirements:
   1. Site-Specific Safety Requirements:
      a. In addition to complying with health and safety rules, regulations, and ordinances promulgated by the local, state, and federal government, the various construction permits, and other sections of the Contract Documents, the Contractor shall be responsible for safety and protection and conform to the provisions herein.
      b. The Contractor shall be responsible for informing his employees and subcontractors and their employees of the potential danger in working on and near landfills.
c. The Contractor shall be familiar with the Safety Guidelines as prepared by the Landfill Gas Division of Solid Waste Association of North America (SWANA).

d. The Contractor is advised that the construction of this project is being performed on or adjacent to buried wastes and refuse. As these buried materials decompose anaerobically they will generate landfill gas, which typically consists of carbon dioxide (CO₂), methane (CH₄), occasionally hydrogen sulfide (H₂S), and other gases dependent on the composition of the buried materials.

2. Potential for Hazard:

a. Landfill gases have the potential to create hazardous conditions if not controlled or recognized. Some of the hazards include:
   1) Fires that may start spontaneously from exposed and/or decomposing refuse.
   2) Fires and explosions that may occur from the presence of methane gas.
   3) Landfill gases and other trace gases that may cause an oxygen deficiency in trenches, vaults, manholes, and structures.
   4) Hydrogen sulfide, a highly toxic and flammable gas, which may be present.
   5) Possible caving of trenches and excavations when working over or in refuse fills.

3. Typical Safety Guidelines:

a. Generally accepted procedures to protect workers from the effects of dangers from hazardous gases is through the use of safeguard measures (such as):
   1) Test the atmosphere.
   2) Ventilate confined spaces.
   3) Use appropriate safety equipment.
   4) Provide backup safety personnel.
   5) Test the Atmosphere:
      a) Before entering a trench, manhole, or any other underground vault or excavation, the atmosphere should be tested to detect any adverse environmental conditions. At a minimum, excavation interior should be tested for oxygen deficiency, toxic gases, and combustible gases with gas detector instrument(s). Test instruments should be properly maintained and calibrated. The test should be conducted from top to bottom of the excavation.
      b) When testing an excavation or confined space, the presence of explosive gases should be checked first. If this test indicates nonexplosive conditions, asphyxiating (toxic) gases and oxygen deficiency
conditions should then be determined. An oxygen deficiency condition indicates that gases or vapors undetected in the toxic gas test are probably present. Because carbon monoxide, carbon dioxide, hydrogen sulfide, or other vapors may have accumulated in the lower levels of the excavation, their presence would not have been detected in the upper portions of the excavation.

6) Ventilate Confined Spaces:
   a) To mitigate against toxic and combustible gases or oxygen deficiency, an excavation or other confined space should be thoroughly ventilated before entry and during the entire time workers are in the confined space. Forced ventilation is the generally accepted procedure. Start by blowing air in the excavation until the atmosphere is suitable for entry.
   b) Blower equipment should be placed upwind from the excavation so that emerging gases will not be ignited by the blower equipment or recycled to the excavation. Blower equipment should also be located away from the exhaust of nearby motor vehicles so that the exhaust fumes are not introduced into the work area. Gas engine blowers, if used, should also be situated so that their exhaust is not introduced into the excavation. The hose from the blower unit should be set and inspected periodically to ensure that it is not bent or kinked, to guarantee that air flow to the excavation will not be reduced or restricted.

7) Use Appropriate Safety Equipment: All personnel should be trained to operate the appropriate safety equipment that would be utilized during the course of their work. It is the responsibility of the Safety Monitor, or person(s) in authority, to ascertain that all safety equipment is being used when appropriate.

8) Provide Backup Safety Personnel: Prior to any personnel entering an excavation or a confined space, a separate individual should be positioned outside the space, but always within eyesight of the personnel within the space, to assist should the workers become overcome by loss of oxygen or exposed to other vapors. A minimum of one emergency escape oxygen pack should be readily available to the observing individual.
4. Safety Monitor: Contractor shall provide a person who will be designated as the Safety Monitor. Safety Monitor shall be thoroughly trained with respect to safety related regulations and in rescue procedures and the use of safety equipment and gas detectors. This person should be present at all times during construction.

5. Safety Program: Supplemental to the Contractor’s regular safety program, the Contractor should develop and institute procedures to inform all workers at the site of the potential for the presence of methane and other landfill gases emanating from the natural decomposition of refuse buried at or near the jobsite, and the importance of safety precautions to ensure the safety of workers and the public.

6. No smoking onsite.

3.03 PROTECTION OF WORK AND PROPERTY

A. General:

1. Maintain in continuous service all existing landfill process equipment, gas pipelines, underground power, telephone or communication cable, water mains, irrigation lines, sewers, poles and overhead power, and all other utilities encountered along line of the Work, unless other arrangements satisfactory to owners of said utilities have been made.

2. Where completion of the Work requires temporary or permanent removal or relocation of existing utility, coordinate all activities with owner of said utility and perform all work to their satisfaction.

3. Protect, shore, brace, support, and maintain underground pipes, conduits, drains, and other underground utility construction uncovered or otherwise affected by construction operations.

4. Keep fire hydrants and water control valves free from obstruction and available for use at all times.

5. In areas where Contractor’s operations are adjacent to or near a utility, such as gas, telephone, television, electric power, water, sewer, or irrigation system, and such operations may cause damage or inconvenience, suspend operations until arrangements necessary for protection have been made by Contractor.

6. Notify property owners and utility offices that may be affected by construction operation at least 2 days in advance. Before exposing a utility, obtain utility Owner’s permission. Should service of utility be interrupted due to Contractor’s operation, notify proper authority immediately. Cooperate with said authority in restoring service as promptly as possible and bear costs incurred.

7. Do not impair operation of existing sewer system. Prevent construction material, pavement, concrete, earth, volatile and corrosive wastes, and other debris from entering sewers, pump stations, or other sewer structures.
8. Maintain original Site drainage wherever possible.

B. Site Security:

1. Site has existing fencing. If additional security is deemed warranted by Contractor to protect equipment and supplies, provide at their discretion and in coordination with Engineer.
2. Provide and maintain additional temporary security fences as necessary to protect the Work and Contractor-furnished products not yet installed.

C. Trees and Plantings:

1. Protect from damage and preserve trees, shrubs, and other plants outside limits of the Work and within limits of the Work to the extent possible.
   a. Where practical, tunnel beneath trees when on or near line of trench.
   b. Employ hand excavation as necessary to prevent tree injury.
   c. Do not stockpile materials or permit traffic within drip lines of trees.
   d. Provide and maintain temporary barricades around trees.
   e. Water vegetation as necessary to maintain health.
   f. Cover temporarily exposed roots with wet burlap, and keep burlap moist until soil is replaced around roots.
   g. No trees, except those specifically shown on Drawings to be removed, shall be removed without written approval of Engineer.
   h. Dispose of removed trees in a legal manner off the Site.
2. Balling and burlapping of trees indicated for replacement shall conform to recommended specifications set forth in the American Standards for Nursery Stock, published by American Association of Nurserymen. All balls shall be firm and intact and made-balls will not be accepted. Handle ball and burlap trees by ball and not by top.
3. In event of damage to bark, trunks, limbs, or roots of plants that are not designated for removal, treat damage by corrective pruning, bark tracing, application of a heavy coating of tree paint, and other accepted horticultural and tree surgery practices.
4. Replace each plant that dies as a result of construction activities.

D. Existing Structures:

1. Where Contractor contemplates removal of small structures such as mailboxes, signposts, and culverts that interfere with Contractor’s operations, obtain approval of property owner and Engineer.
2. Move mailboxes to temporary locations accessible to postal service.
3. Replace items removed in their original location and a condition equal to or better than original.
E. Waterways:

1. Keep ditches, culverts, and natural drainages continuously free of construction materials and debris.
2. Provide and maintain temporary and permanent erosion and sediment controls (such as, stormwater ditches) in accordance with Stormwater Pollution Prevention Plan (in accordance with NPDES GCP) and provisions of the Owner’s Site Disturbance Permit.

F. Dewatering: Construct, maintain, and operate cofferdams, channels, flume drains, sumps, pumps, or other temporary diversion and protection works to facilitate Work. Furnish materials required, install, maintain, and operate necessary pumping and other equipment for the environmentally safe removal and disposal of water from the various parts of the Work. Maintain foundations and parts of the Work free from water.

3.04 TEMPORARY CONTROLS

A. Air Pollution Control:

1. Minimize air pollution from construction operations.
2. Burning: Of waste materials, rubbish, or other debris will not be permitted on or adjacent to Site.
3. Conduct operations of dumping rock and of carrying rock away in trucks to cause a minimum of dust. Give unpaved streets, roads, detours, or haul roads used in construction area a dust-preventive treatment or periodically water to prevent dust. Strictly adhere to applicable environmental regulations for dust prevention.

B. Noise Control: Maintain equipment in proper working order with operating mufflers to control noise during construction.

C. Water Pollution Control:

1. Contain all sanitary sewage and nonstorm waste flows. Do not cause or permit action to occur which would cause flow of these materials to waterways.
2. Prior to commencing excavation and construction, obtain Engineer’s agreement with detailed plans showing procedures intended to handle and dispose of groundwater and stormwater flow, including dewatering pump discharges.
4. Do not dispose of volatile wastes such as mineral spirits, oil, chemicals, or paint thinner in storm or sanitary drains. Disposal of wastes into streams or waterways is prohibited. Provide acceptable containers for collection and disposal of waste materials, debris, and rubbish.

D. Erosion, Sediment, and Stormwater Control: Refer to Section 01 57 13, Erosion and Sediment Control During Construction.

3.05 STORAGE YARDS

A. Temporary Storage Yards: Construct temporary storage yards for storage of products that are not subject to damage by weather conditions in designated areas. Store combustible materials (paints, solvents, fuels) in a well-ventilated areas meeting safety standards.

3.06 ACCESS ROADS

A. Use access roads as shown and within easements, rights-of-way, or Project limits.

B. Maintain drainage ways. Install and maintain culverts to allow water to flow beneath access roads. Provide corrosion-resistant culvert pipe of adequate strength to resist construction loads.

C. Provide gravel, crushed rock, or other stabilization material to permit access by all motor vehicles at all times.

D. Maintain road grade and crown to eliminate potholes, rutting, and other irregularities that restrict access.

E. Coordinate with Engineer detours and other operations affecting traffic and access. Provide at least 72 hours’ notice to Engineer of operations that will alter access to the Site.

F. Upon completion of construction of any additional access roads (as coordinated with Owner), restore ground surface disturbed by access road construction to original grade. Replace damaged or broken culverts with new culvert pipe of same diameter and material.

3.07 PARKING AREAS

A. Control vehicular parking to preclude interference with access by emergency vehicles, Owner’s operations, or construction operations.
B. Use staging area(s) designated on Drawings for parking of Contractor’s vehicles. Employee’s vehicles shall be parked outside of the facility. Coordinate with Owner.

### 3.08 VEHICULAR TRAFFIC

A. Coordinate with Owner as referenced in Section 01 31 13, Project Coordination.

B. Conduct the Work to interfere as little as possible with operations traffic.

### 3.09 CLEANING DURING CONSTRUCTION

A. In accordance with General Conditions, as may be specified in other specification sections, and as required herein.

B. Provide approved containers for collection and disposal of waste materials, debris, and rubbish. At least at weekly intervals, dispose of such waste materials, debris, and rubbish offsite.

**END OF SECTION**
SECTION 01 57 13
EROSION AND SEDIMENT CONTROL DURING CONSTRUCTION

PART 1 GENERAL

1.01 WORK OF THIS SECTION

A. This section covers Work necessary for managing stormwater and stabilization of soil to prevent erosion during construction. The Work shall include the furnishing of all labor, materials, tools, and equipment to perform such Work and services necessary as herein specified and as indicated on Drawings. Contractor is responsible installing new measures and removing control measures at completion of Work (at Owner’s discretion).

B. Minimum areas requiring soil erosion and sediment control measures are indicated on Drawings. Additional measures and features shall be implemented by the Contractor as necessary whereby implementing best management practices for management of stormwater and erosion during construction. The right is reserved to modify the use, location, and quantities of soil erosion and sediment control measures based on activities of the Contractor and as the Engineer considers to be in the best interest of the Owner.

1.02 SUBMITTALS

A. Action Submittals:

1. Contractor’s Stormwater Pollution Prevention Plan (SWPPP) providing a detailed narrative of the staging of Work sequences and sediment/erosion control measures that will be planned and implemented at the Site in conformance with Drawings and all applicable permits. SWPPP shall include a section on Spill Prevention, Control and Countermeasures (SPCC). SWPPP plan shall follow current guidance under USEPA NPDES Construction General Permit (CGP) requirements.

2. Product/vendor data for commercial products.

B. Informational Submittals: Copy of Contractor’s Certified CGP by filing a Notice of Intent (NOI) with USEPA at the start of the Project (but before Work can commence), and a Notice of Termination (NOT) at the completion of the Project.
1.03 GENERAL

A. The Kootenai County Farm Landfill is under stringent stormwater and sediment load monitoring and reporting requirements in accordance with the Facility’s Operations Plan required by Idaho DEQ (and the Health Department) and NPDES Multi-Sector General Permit as required by USEPA. Refer to Section 01 31 13, Project Coordination, for additional information.

B. See Conditions of the Contract and Division 01, General Requirements, and stormwater and erosion control Drawings, which contain information and requirements that apply to the Work specified herein and are mandatory for this Project.

C. Contractor is required to prepare a Stormwater Pollution Prevention Plan (SWPPP) in accordance with the requirements and standard guidelines of USEPA’s NPDES Construction General Permit, and file the notice of intent (NOI). The Contractor shall specify themselves and applicable subcontractors as the Operator(s) of the permit. At the completion of the Work, the Contractor will be required to file a Notice of Termination (NOT). The Contractor shall also work collaboratively with the Owner in order for the Owner to secure a County Site Disturbance Permit, which will require all approved temporary stormwater and erosion control measures to be in-place and approved before Work may commence at the Site. The Engineer will inspect such measures in order to issue an Initial Inspection Letter to Kootenai County Planning to allow construction to proceed.

D. All activities shall conform to the County Site Disturbance Permit; Stormwater Pollution Prevention Plans (SWPPP), NPDES CGP requirements, and Drawings. In the event of a conflict, the more stringent requirement shall apply.

E. Standard erosion and sediment control features required can be found in the details in Drawings as follows:

<table>
<thead>
<tr>
<th>Detail No.</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>1/C-9</td>
<td>Slope Armoring</td>
</tr>
<tr>
<td>2/C-9</td>
<td>Roadside Ditch</td>
</tr>
<tr>
<td>3/C-9</td>
<td>Typical Culvert Trench</td>
</tr>
<tr>
<td>4/C-9</td>
<td>Interceptor Swales and Dikes</td>
</tr>
<tr>
<td>5/C-9</td>
<td>Culvert inlet/outlet protection</td>
</tr>
<tr>
<td>6/C-9</td>
<td>Check Dams</td>
</tr>
<tr>
<td>7/C-9</td>
<td>ESC Blanket on Slope</td>
</tr>
</tbody>
</table>
F. Temporary soil erosion stabilization and sedimentation control consist of the following elements:

1. Maintenance of existing permanent or temporary storm drainage piping channel systems, and temporary erosion control already established by Owner, as necessary.
2. Construction of new permanent and temporary storm drainage piping and channel systems, as necessary.
3. Construction of temporary erosion control facilities such as sediment fences and check dams.

G. Contractor shall be responsible for phasing Work in areas allocated for Contractor’s use during this Project, including any proposed stockpile areas, to restrict sediment transport. This will include installation of any temporary erosion control devices, ditches, or other facilities.

H. Areas set aside for the Contractor’s use during the Project may be temporarily developed to provide satisfactory working, staging, and administrative areas for Contractor’s use. Preparation of these areas shall be in accordance with other requirements contained within these Specifications and shall be done in a manner to both control all sediment transport away from the area.

I. Sediment transport and erosion from working stockpiles shall be controlled and restricted from moving beyond the immediate stockpile area by construction of temporary toe-of-slope ditches and accompanying sediment fences, as necessary. The Contractor shall keep these temporary facilities in operational condition by regular cleaning, regrading, and maintenance. Stockpiles remaining in place longer than 10 calendar days shall be considered permanent stockpiles for purposes of erosion and sediment control.

J. Contractor shall maintain all elements of the Soil Erosion Stabilization and Sedimentation Control systems and facilities to be constructed during this Project for the duration of his activities on this Project. All accesses to these features shall also have BMPs to control erosion and sediment transport. Systems shall be turned over to Owner until permanent soil stabilization systems are in-place. Formal inspections made jointly by the Contractor and the Engineer shall be conducted every 2 weeks or after a significant storm event to evaluate the Contractor’s conformance to the requirements of these Specifications.
K. All silt traps shall be cleaned of collected sediment after every storm or as determined from the biweekly inspections. Cleaning shall be done in a manner that will not direct the sediment into the storm drain piping system. Removed sediment shall be taken to an area selected by the Engineer where it can be cleaned of sticks and debris, then allowed to dry. Final sediment and debris disposal shall be onsite as designated by Engineer.

L. Replacement or repair of failed or overloaded sediment fences, rock check dams, or other temporary erosion control devices shall be accomplished by the Contractor within 2 days after receiving written notice from the Engineer.

M. Unpaved earth drainage ditches shall be regraded as needed to maintain original grade and remove sediment buildup. If a ditch becomes difficult to maintain, the Contractor shall cooperate with the Engineer and install additional erosion control devices such as check dams, temporary paving, or sediment fences as directed by the Engineer.

N. If the Contractor has not complied with any of the above maintenance efforts to the satisfaction of the Engineer within 2 working days after receiving written notification from the Engineer, the Owner shall have the prerogative of engaging others to perform any needed maintenance or cleanup, including removal of accumulated sediment at constructed erosion control facilities, and deduct from the Contractor’s monthly partial payment the costs for such efforts plus a $500 administration fee.

O. Design erosion and sediment controls to handle peak runoff resulting from the 25-year, 24-hour storm event of 2.8 inches based on the “Master Development Plan for the Kootenai County Farm Landfill Expansion” (September 1999).


PART 2 PRODUCTS

2.01 SEDIMENT FENCE

A. Sediment Fence Geotextile (Filter Fabric):

1. Pervious Sheet: Polyester, polypropylene, or nylon filaments, woven into a uniform pattern distinct and measurable openings.
   a. Filaments: Resistant to damage from exposure to ultraviolet rays and heat.
   b. Material Edges: Finish so that filaments retain their relative positions under stress.
c. Manufacturer and Product: Propex Geosynthetics, Chattanooga, TN; Geotex® 2127.

2. In accordance with the following requirements:

<table>
<thead>
<tr>
<th>Physical Property</th>
<th>Required Value</th>
<th>Test Method</th>
</tr>
</thead>
<tbody>
<tr>
<td>Apparent Opening Size (AOS)</td>
<td>20 MaxARV</td>
<td>U.S. Standard Sieve Size</td>
</tr>
<tr>
<td>Grab Tensile Strength, lb, min.</td>
<td>MinARV 95 MD x 80 XD*</td>
<td>ASTM D4632</td>
</tr>
<tr>
<td>Mullen Burst Strength, psi, min.</td>
<td>250 MinARV</td>
<td>ASTM D3786</td>
</tr>
<tr>
<td>Ultraviolet Radiation Resistance, % Strength Retention</td>
<td>80 MinARV</td>
<td>ASTM D4355</td>
</tr>
<tr>
<td>Water Flow Rate, gpm/ft²</td>
<td>5 MinARV</td>
<td>ASTM D4491</td>
</tr>
</tbody>
</table>

*MD indicates machine direction and XD indicates cross direction.

B. Support Fence:

1. Wire Mesh Material: As recommended by manufacturer of geotextile; strong enough to support applied loads.
2. Support Posts: 2-inch by 4-inch Douglas Fir or steel angle-iron fence posts.
3. Fasteners: Heavy-duty wire staples at least 1-inch long, tie wires, or hog rings, as recommended by manufacturer of geotextile.

PART 3 EXECUTION

3.01 GENERAL

A. Contractor shall install erosion and sediment control measures and maintain in accordance with Drawings.

B. Refer to Section 31 32 00, Permanent Soil Stabilization, for specification of products, installation, and maintenance requirements.

3.02 SEDIMENT FENCE

A. Install prior to starting earth disturbing activities upslope of fence as prescribed in Contractor’s Erosion Control Plan.

B. One-piece geotextile or continuously sewn to make one-piece geotextile for full height of the fence, including portion buried in the toe trench.

C. When joints are necessary, splice geotextile together only at a support post, with a minimum 6-inch overlap, and securely fasten both ends to support post.
D. Geotextile shall not extend more than 24 inches above the ground surface. Securely fasten to upslope side of each support post using ties. Geotextile shall not be stapled to existing trees.

E. Fasten wire mesh material support fence securely to upslope side of post fasteners. Extend wire into the trench a minimum of 4 inches, and not more than 36 inches above the ground surface.

F. Take precaution not to puncture geotextile during installation. Repair or replace damaged area.

G. Remove support fence for geotextile after upslope area has been permanently stabilized. Immediately dress sediment deposits remaining after the geotextile fence has been removed to conform to existing grade. Prepare and seed graded area.

END OF SECTION
SECTION 01 77 00
CLOSEOUT PROCEDURES

PART 1 GENERAL

1.01 SUBMITTALS

A. Informational Submittals:

1. Submit prior to application for final payment.
   a. Record Documents: As required in General Conditions.
   b. Approved Shop Drawings and Samples: As required in the General Conditions.
   c. Special bonds, Special Guarantees, and Service Agreements.
   d. Consent of Surety to Final Payment: As required in General Conditions.
   e. Releases or Waivers of Liens and Claims: As required in General Conditions.
   f. Releases from Agreements.
   g. Final Application for Payment: Submit in accordance with procedures and requirements stated in Section 01 29 00, Payment Procedures.
   h. Extra Materials: As required by individual Specification sections.

1.02 RECORD DOCUMENTS

A. Quality Assurance:

1. Furnish qualified and experienced person, whose duty and responsibility shall be to maintain record documents.
2. Accuracy of Records:
   a. Coordinate changes within record documents, making legible and accurate entries on each sheet of Drawings and other documents where such entry is required to show change.
   b. Purpose of Project record documents is to document factual information regarding aspects of the Work, both concealed and visible, to enable future modification of the Work to proceed without lengthy and expensive Site measurement, investigation, and examination.
3. Make entries within 24 hours after receipt of information that a change in the Work has occurred.
4. Prior to submitting each request for progress payment, request Engineer’s review and approval of current status of record documents. Failure to properly maintain, update, and submit record documents may result in a deferral by Engineer to recommend whole or any part of Contractor’s Application for Payment, either partial or final.

1.03 RELEASES FROM AGREEMENTS

A. Furnish Owner written releases from property owners or public agencies where side agreements or special easements have been made, or where Contractor’s operations have not been kept within the Owner’s construction right-of-way.

B. In the event Contractor is unable to secure written releases:

1. Inform Owner of the reasons.
2. Owner or its representatives will examine the Site, and Owner will direct Contractor to complete the Work that may be necessary to satisfy terms of the side agreement or special easement.
3. Should Contractor refuse to perform this Work, Owner reserves right to have it done by separate contract and deduct cost of same from Contract Price, or require Contractor to furnish a satisfactory bond in a sum to cover legal Claims for damages.
4. When Owner is satisfied that the Work has been completed in agreement with Contract Documents and terms of side agreement or special easement, right is reserved to waive requirement for written release if: (i) Contractor’s failure to obtain such statement is due to grantor’s refusal to sign, and this refusal is not based upon any legitimate Claims that Contractor has failed to fulfill terms of side agreement or special easement, or (ii) Contractor is unable to contact or has had undue hardship in contacting grantor.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION

3.01 MAINTENANCE OF RECORD DOCUMENTS

A. General:

1. Promptly following commencement of Contract Times, secure from Engineer at no cost to Contractor, one complete set of Contract Documents. Drawings will be full size.
2. Label or stamp each record document with title, “RECORD DOCUMENTS,” in neat large printed letters.
3. Record information concurrently with construction progress and within 24 hours after receipt of information that change has occurred. Do not cover or conceal Work until required information is recorded.

B. Preservation:

1. Maintain documents in a clean, dry, legible condition and in good order. Do not use record documents for construction purposes.
2. Make documents and Samples available at all times for observation by Engineer.

C. Making Entries on Drawings:

1. Using an erasable colored pencil (not ink or indelible pencil), clearly describe change by graphic line and note as required.
   a. Color Coding:
      1) Green when showing information deleted from Drawings.
      2) Red when showing information added to Drawings.
      3) Blue and circled in blue to show notes.
   2. Date entries.
   3. Call attention to entry by “cloud” drawn around area or areas affected.
   4. Legibly mark to record actual changes made during construction, including, but not limited to:
      a. Depths of various elements of foundation in relation to finished first floor data if not shown or where depth differs from that shown.
      b. Horizontal and vertical locations of existing and new Underground Facilities and appurtenances, and other underground structures, equipment, or Work. Reference to at least two measurements to permanent surface improvements.
      c. Location of internal utilities and appurtenances concealed in the construction referenced to visible and accessible features of the structure.
      d. Locate existing facilities, piping, equipment, and items critical to the interface between existing physical conditions or construction and new construction.
      e. Changes made by Addenda and Field Orders, Work Change Directive, Change Order, and Engineer’s written interpretation and clarification using consistent symbols for each and showing appropriate document tracking number.
   5. Dimensions on Schematic Layouts: Show on record drawings, by dimension, the centerline of each run of items such as are described in previous subparagraph above.
      a. Clearly identify the item by accurate note such as “cast iron drain,” “galv. water,” and the like.
b. Show, by symbol or note, vertical location of item (“under slab,” “in ceiling plenum,” “exposed,” and the like).

c. Make identification so descriptive that it may be related reliably to Specifications.

3.02 FINAL CLEANING

A. At completion of the Work or of a part thereof and immediately prior to Contractor’s request for certificate of Substantial Completion; or if no certificate is issued, immediately prior to Contractor’s notice of completion, clean entire Site or parts thereof, as applicable.

1. Leave the Work and adjacent areas affected in a cleaned condition satisfactory to Owner and Engineer.

2. Remove grease, dirt, dust, paint or plaster splatter, stains, labels, fingerprints, and other foreign materials from exposed surfaces.

3. Repair, patch, and touch up marred surfaces to specified finish and match adjacent surfaces.

4. Broom clean exterior paved driveways and parking areas.

5. Hose clean sidewalks, loading areas, and others contiguous with principal structures.

6. Rake clean all other surfaces.

7. Remove snow and ice from access areas.

8. Leave water courses, gutters, and ditches open and clean.

B. Use only cleaning materials recommended by manufacturer of surfaces to be cleaned.

END OF SECTION
PART 1 GENERAL

1.01 SECTION INCLUDES

A. Detailed information for the preparation, submission, and Engineer’s review of Operations and Maintenance (O&M) Data, as required by individual Specification sections.

1.02 DEFINITIONS

A. Preliminary Data: Initial and subsequent submissions for Engineer’s review.

B. Final Data: Engineer-accepted data, submitted as specified herein.

C. Maintenance Operation: As used on Maintenance Summary Form is defined to mean any routine operation required to ensure satisfactory performance and longevity of equipment. Examples of typical maintenance operations are systems cleaning, weather protection, lubrication, balancing and leveling, calibration checks, and routine adjustments.

1.03 SEQUENCING AND SCHEDULING

A. Equipment and System Data:

1. Preliminary Data:
   a. Do not submit until Shop Drawing for equipment or system has been reviewed and approved by Engineer.
   b. Submit prior to shipment date.

2. Final Data: Submit Instructional Manual Formatted data not less than 30 days prior to installation of equipment or system equipment or system field functional testing. Submit Compilation Formatted and Electronic Media Formatted data prior to Substantial Completion of Project.

1.04 DATA FORMAT

A. Prepare preliminary data in the form of an instructional manual. Prepare final data in data compilation format.

B. Instructional Manual Format:

1. Binder: Commercial quality, permanent, three-ring or three-post binders with durable plastic cover.
2. Size: 8-1/2 inches by 11 inches, minimum.
3. Cover:
   a. Identify manual with typed or printed title “OPERATION AND MAINTENANCE DATA” and list:
      1) Project title.
      2) Designate applicable system, equipment, material, or finish.
      3) Identity of separate structure as applicable.
      4) Identify volume number if more than one volume.
4. Spine:
   a. Project title.
   b. Identify volume number if more than one volume.
5. Title Page:
   a. Contractor name, address, and telephone number.
   b. Subcontractor, Supplier, installer, or maintenance contractor’s name, address, and telephone number, as appropriate.
      1) Identify area of responsibility of each.
      2) Provide name and telephone number of local source of supply for parts and replacement.
6. Table of Contents:
   a. Neatly typewritten and arranged in systematic order with consecutive page numbers.
   b. Identify each product by product name and other identifying numbers or symbols as set forth in Contract Documents.
8. Text: Manufacturer’s printed data, or neatly typewritten.
9. Three-hole punch data for binding and composition; arrange printing so that punched holes do not obliterate data.
10. Material shall be suitable for reproduction, with quality equal to original. Photocopying of material will be acceptable, except for material containing photographs.

C. Data Compilation Format:

1. Compile all Engineer-accepted preliminary O&M data into a hard-copy, hard-bound set.
2. Each set shall consist of the following:
   a. Binder: Commercial quality, permanent, three-ring or three-post binders with durable plastic cover.
   b. Cover: Identify each volume with typed or printed title “OPERATION AND MAINTENANCE DATA, VOLUME NO. ___ OF ___”, and list:
      1) Project title.
      2) Contractor’s name, address, and telephone number.
3) If entire volume covers equipment or system provided by one Supplier include the following:
   a) Identity of general subject matter covered in manual.
   b) Identity of equipment number and Specification section.

c. Provide each volume with title page and typed table of contents with consecutive page numbers. Place contents of entire set, identified by volume number, in each binder.

d. Table of contents neatly typewritten, arranged in a systematic order:
   1) Include list of each product, indexed to content of each volume.
   2) Designate system or equipment for which it is intended.
   3) Identify each product by product name and other identifying numbers or symbols as set forth in Contract Documents.

e. Section Dividers:
   1) Heavy, 80 pound cover weight, tabbed with numbered plastic index tabs.
   2) Fly-Leaf:
      a) For each separate product, or each piece of operating equipment, with typed description of product and major component parts of equipment.
      b) List with Each Product:
         (1) Name, address, and telephone number of Subcontractor, Supplier, installer, and maintenance contractor, as appropriate.
         (2) Identify area of responsibility of each.
         (3) Provide local source of supply for parts and replacement.
      c) Identity of separate structure as applicable.

f. Assemble and bind material, as much as possible, in same order as specified in the Contract Documents.

D. Electronic Media Format:

   1. Portable Document Format (PDF):
      a. After all preliminary data has been found to be acceptable to Engineer, submit Operation and Maintenance data in PDF format on CD.
      b. Files to be exact duplicates of Engineer-accepted preliminary data. Arrange by specification number and name.
      c. Files to be fully functional and viewable in most recent version of Adobe Acrobat.
1.05 SUBMITTALS

A. Informational:

1. Data Outline: Submit two copies of a detailed outline of proposed organization and contents of Final Data prior to preparation of Preliminary Data.

2. Preliminary Data:
   a. Submit two copies for Engineer’s review.
   b. If data meets conditions of the Contract:
      1) One copy will be returned to Contractor.
      2) One copy will be forwarded to Resident Project Representative.
      3) One copy will be retained in Engineer’s file.
   c. If data does not meet conditions of the Contract:
      1) All copies will be returned to Contractor with Engineer’s comments (on separate document) for revision.
      2) Engineer’s comments will be retained in Engineer’s file.
      3) Resubmit two copies revised in accordance with Engineer’s comments.

3. Final Data: Submit three copies in format specified herein.

1.06 DATA FOR EQUIPMENT AND SYSTEMS

A. Content For Each Unit (or Common Units) and System:

1. Product Data:
   a. Include only those sheets that are pertinent to specific product.
   b. Clearly annotate each sheet to:
      1) Identify specific product or part installed.
      2) Identify data applicable to installation.
      3) Delete references to inapplicable information.
   c. Function, normal operating characteristics, and limiting conditions.
   d. Performance curves, engineering data, nameplate data, and tests.
   e. Complete nomenclature and commercial number of replaceable parts.
   f. Original manufacturer’s parts list, illustrations, detailed assembly drawings showing each part with part numbers and sequentially numbered parts list, and diagrams required for maintenance.
   g. Spare parts ordering instructions.
   h. Where applicable, identify installed spares and other provisions for future work (e.g., reserved panel space, unused components, wiring, terminals).
2. Drawings:
   a. Supplement product data with Drawings as necessary to clearly illustrate:
      1) Format:
         a) Provide reinforced, punched, binder tab; bind in with text.
         b) Reduced to 8-1/2 inches by 11 inches, or 11 inches by 17 inches folded to 8-1/2 inches by 11 inches.
         c) Where reduction is impractical, fold and place in 8-1/2-inch by 11-inch envelopes bound in text.
         d) Identify Specification section and product on Drawings and envelopes.
      2) Relations of component parts of equipment and systems.
      3) Control diagrams.
      4) Coordinate drawings with Project record documents to assure correct illustration of completed installation.

3. Instructions and Procedures: Within text, as required to supplement product data.
   a. Format:
      1) Organize in consistent format under separate heading for each different procedure.
      2) Provide logical sequence of instructions for each procedure.
      3) Provide information sheet for Owner’s personnel, including:
         a) Proper procedures in event of failure.
         b) Instances that might affect validity of guarantee or Bond.
   b. Installation Instructions: Including alignment, adjusting, calibrating, and checking.
   c. Operating Procedures:
      1) Startup, break-in, routine, and normal operating instructions.
      2) Test procedures and results of factory tests where required.
      3) Regulation, control, stopping, and emergency instructions.
      4) Description of operation sequence by control manufacturer.
      5) Shutdown instructions for both short and extended duration.
      6) Summer and winter operating instructions, as applicable.
      7) Safety precautions.
      8) Special operating instructions.
   d. Maintenance and Overhaul Procedures:
      1) Routine maintenance.
      2) Guide to troubleshooting.
      3) Disassembly, removal, repair, reinstallation, and re-assembly.

4. Guarantee, Bond, and Service Agreement: In accordance with Section 01 77 00, Closeout Procedures.
B. Content for Each Electric or Electronic Item or System:

1. Description of Unit and Component Parts:
   a. Function, normal operating characteristics, and limiting conditions.
   b. Performance curves, engineering data, nameplate data, and tests.
   c. Complete nomenclature and commercial number of replaceable parts.
   d. Interconnection wiring diagrams, including control and lighting systems.
2. Circuit Directories of Panelboards.
3. Electrical service.
4. Control requirements and interfaces.
5. Communication requirements and interfaces.
6. List of electrical relay settings, and control and alarm contact settings.
7. Electrical interconnection wiring diagram, including as applicable, single-line, three-line, schematic and internal wiring, and external interconnection wiring.
8. As-installed control diagrams by control manufacturer.
9. Operating Procedures:
   a. Routine and normal operating instructions.
   b. Startup and shutdown sequences, normal and emergency.
   c. Safety precautions.
   d. Special operating instructions.
10. Maintenance Procedures:
    a. Routine maintenance.
    c. Adjustment and checking.
    d. List of relay settings, control and alarm contact settings.
11. Manufacturer’s printed operating and maintenance instructions.
12. List of original manufacturer’s spare parts, manufacturer’s current prices, and recommended quantities to be maintained in storage.

C. Maintenance Summary:

1. Compile individual Maintenance Summary for each applicable equipment item, respective unit or system, and for components or sub-units.
2. Format:
   a. Use Maintenance Summary Form bound with this section or electronic facsimile of such.
   b. Each Maintenance Summary may take as many pages as required.
   c. Use only 8-1/2-inch by 11-inch size paper.
   d. Complete using typewriter or electronic printing.
3. Include detailed lubrication instructions and diagrams showing points to be greased or oiled; recommend type, grade, and temperature range of lubricants and frequency of lubrication.

4. Recommended Spare Parts:
   a. Data to be consistent with manufacturer’s Bill of Materials/Parts List furnished in O&M manuals.
   b. “Unit” is the unit of measure for ordering the part.
   c. “Quantity” is the number of units recommended.
   d. “Unit Cost” is the current purchase price.

1.07 DATA FOR MATERIALS AND FINISHES

A. Content for Applied Materials, and Finishes:

1. Instructions for Care and Maintenance:
   a. Manufacturer’s recommendation for types of cleaning agents and methods.
   b. Cautions against cleaning agents and methods that are detrimental to product.
   c. Recommended schedule for cleaning and maintenance.

B. Content for Moisture Protection and Weather Exposed Products:

1. Manufacturer’s data, giving full information on products:
   a. Applicable standards.
   b. Chemical composition.
   c. Details of installation.

2. Instructions for inspection, maintenance, and repair.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF SECTION
SECTION 01 91 14
EQUIPMENT TESTING AND FACILITY STARTUP

PART 1    GENERAL

1.01    DEFINITIONS

A. Facility: Entire Project, or an agreed-upon portion, including all of its unit processes.

B. Functional Test: Test or tests in presence of Engineer and Owner to demonstrate that installed equipment meets manufacturer’s installation, calibration, and adjustment requirements and other requirements as specified.

C. Performance Test: Test or tests performed after any required functional test in presence of Engineer and Owner to demonstrate and confirm individual equipment meets performance requirements specified in individual sections.

D. Facility Performance Demonstration:
   1. A demonstration, conducted by Contractor, with assistance of Owner, to demonstrate and document the performance of the entire operating facility, both manually and automatically (if required), based on criteria developed in conjunction with Owner and as accepted by Engineer.
   2. Such demonstration is for the purposes of (i) verifying to Owner entire facility performs as a whole, and (ii) documenting performance characteristics of completed facility for Owner’s records. Neither the demonstration nor the evaluation is intended in any way to make performance of a unit process or entire facility the responsibility of Contractor, unless such performance is otherwise specified.

1.02    SUBMITTALS

A. Informational Submittals:
   1. Facility Startup and Performance Demonstration Plan.
   2. Functional and performance test results.
1.03 FACILITY STARTUP AND PERFORMANCE DEMONSTRATION PLAN

A. Develop a written plan, in conjunction with Owner’s operations personnel; to include the following:

1. Step-by-step instructions for startup of each unit process and the complete facility.
2. Facility Performance Demonstration/Certification Form (sample attached), to minimally include the following:
   a. Description of unit processes included in the facility startup.
   b. Sequence of unit process startup to achieve facility startup.
   c. Description of computerized operations, if any, included in the facility.
   d. Contractor certification facility is capable of performing its intended function(s), including fully automatic operation.
   e. Signature spaces for Contractor and Engineer.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION

3.01 GENERAL

A. Facility Startup Meetings: Schedule, in accordance with requirements of Section 01 31 19, Project Meetings, to discuss test schedule, test methods, materials, chemicals and liquids required, facilities operations interface, and Owner involvement.

B. Contractor’s Testing and Startup Representative:

1. Designate and furnish one or more personnel to coordinate and expedite testing and facility startup.
2. Representative(s) shall be present during startup meetings and shall be available at all times during testing and startup.

C. Provide Subcontractor and equipment manufacturers’ staff adequate to prevent delays. Schedule ongoing work so as not to interfere with or delay testing and startup.

D. Owner will:

1. Provide power, loaded vehicles, and other items as required for startup, unless otherwise indicated.
2. Operate process units and facility with support of Contractor.
3. Provide labor and materials as required for laboratory analyses.
3.02 EQUIPMENT TESTING

A. Preparation:

1. Complete installation before testing.
2. Furnish qualified manufacturers’ representatives, when required by individual Specification sections.
3. Obtain and submit from equipment manufacturer’s representative Manufacturer’s Certificate of Proper Installation Form, in accordance with Section 01 43 33, Manufacturers’ Field Services, when required by individual Specification sections.
4. Equipment Test Report Form:
   a. Provide written test report for each item of equipment to be tested, to include the minimum information:
      1) Owner/Project Name.
      2) Equipment or item tested.
      3) Date and time of test.
      4) Type of test performed (Functional or Performance).
      5) Test method.
      6) Test conditions.
      7) Test results.
      8) Signature spaces for Contractor and Engineer as witness.
5. Cleaning and Checking:
   a. Prior to beginning functional testing:
      1) Calibrate testing equipment in accordance with manufacturer’s instructions.
      2) Inspect and clean equipment, devices, connected piping, and structures to ensure they are free of foreign material.
      3) Lubricate equipment in accordance with manufacturer’s instructions.
      4) Turn rotating equipment by hand when possible to confirm that equipment is not bound.
      5) Open and close valves by hand and operate other devices to check for binding, interference, or improper functioning.
      6) Check power supply to electric-powered equipment for correct voltage.
      7) Adjust clearances and torque.
      8) Test piping for leaks.
6. Ready-to-test determination will be by Owner based at least on the following:
   a. Acceptable Operation and Maintenance Data.
   b. Notification by Contractor of equipment readiness for testing.
   c. Receipt of Manufacturer’s Certificate of Proper Installation, if so specified.
d. Adequate completion of work adjacent to, or interfacing with, equipment to be tested.

e. Availability and acceptability of manufacturer’s representative, when specified, to assist in testing of respective equipment.

f. Satisfactory fulfillment of other specified manufacturer’s responsibilities.

g. Equipment and electrical tagging complete.

B. Functional Testing:

1. Conduct as specified in individual Specification sections.
2. Notify Owner and Engineer in writing at least 10 days prior to scheduled date of testing.
4. When, in Engineer’s opinion, equipment meets functional requirements specified, such equipment will be accepted for purposes of advancing to performance testing phase, if so required by individual Specification sections. Such acceptance will be evidenced by Engineer/Owner’s signature as witness on Equipment Test Report.

C. Performance Testing:

1. Conduct as specified in individual Specification sections.
2. Notify Engineer and Owner in writing at least 10 days prior to scheduled date of test.
3. Performance testing shall not commence until equipment has been accepted by Engineer as having satisfied functional test requirements specified.
4. Type of fluid, gas, or solid for testing shall be as specified.
5. Unless otherwise indicated, furnish labor, materials, and supplies for conducting the test and taking samples and performance measurements.
7. When, in Engineer’s opinion, equipment meets performance requirements specified, such equipment will be accepted as to conforming to Contract requirements. Such acceptance will be evidenced by Engineer’s signature on Equipment Test Report.

3.03 FACILITY PERFORMANCE DEMONSTRATION

A. Certify, on the Facility Performance Demonstration/Certification Form, that facility is capable of performing its intended function(s), including fully automatic and computerized operation.
3.04 SUPPLEMENT

A. Supplement listed below, following “End of Section,” is a part of this Specification:

1. Facility Performance Demonstration/Certification Form.

END OF SECTION
FACILITY PERFORMANCE DEMONSTRATION/CERTIFICATION FORM

OWNER: _______________________________  PROJECT: _______________________________

Unit Processes Description (List unit processes involved in facility startup):

______________________________________________________________________________

______________________________________________________________________________

______________________________________________________________________________

Unit Processes Startup Sequence (Describe sequence for startup, including computerized operations, if any):

______________________________________________________________________________

______________________________________________________________________________

______________________________________________________________________________

Contractor Certification that Facility is capable of performing its intended function(s), including fully automatic operation:

Contractor: _______________________________  Date: ________________, 20____

Owner: _______________________________  Date: ________________, 20____

(Authorized Signature)
SECTION 02 41 00
DEMOLITION

PART 1  GENERAL

1.01  REFERENCES

A. The following is a list of standards which may be referenced in this Section:


1.02  DEFINITIONS

A. Demolition: Dismantling, razing, destroying, or wrecking of any fixed building or structure or any part thereof. Demolition also includes removal of pipes, manholes tanks, conduit, and other underground facilities, whether as a separate activity or in conjunction with construction of new facilities.

B. Modify: Provide all necessary material and labor to modify an existing item to the condition indicated or specified.

1.03  SUBMITTALS

A. Informational Submittals: Submit proposed Demolition/Renovation Plan, in accordance with requirements specified herein, for approval before such Work is started.

1.04  REGULATORY AND SAFETY REQUIREMENTS

A. Comply with Contractor’s Construction Health and Safety Plan at all times. Demolition activities may encounter residual leachate, landfill gas and landfill gas condensate, and solids, within pipes, valves, and backfill materials.

1.05  DEMOLITION PLAN

A. Demolition Plan shall provide for safe conduct of the Work and shall include:

1. Detailed description of methods and equipment to be used for each operation.
2. The Contractor’s planned sequence of operations, including coordination with other work in progress.
3. Procedures for removal and preparation of materials for disposal within Owner’s designated disposal area.
4. Testing of capped or flanged system components to remain after demolition is complete to ensure a proper seal is maintained.

1.06 SEQUENCING AND SCHEDULING

A. The Work of this Specification shall not commence until Contractor’s Demolition/Renovation Plan has been approved by Engineer.

B. Include the Work of this Specification in the progress schedule, as specified in Section 01 32 00, Construction Progress Documentation.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION

3.01 EXISTING FACILITIES TO BE DEMOLISHED OR RENOVATED

A. Owner Systems and Related Equipment:
   1. Notify Engineer and Owner to turn off affected services at least 48 hours before starting demolition activities.
   2. Remove existing system components as indicated and terminate in a manner that seals and protects existing systems to remain as approved by Owner.
   3. When utility lines are encountered that are not indicated on Drawings, notify Engineer and Owner prior to further work in that area.
   4. Remove valve vaults and related equipment and deliver to a location as determined by the Owner.

3.02 PROTECTION

A. Existing Work:
   1. Survey the site and examine Drawings and Specifications to determine the extent of the Work before beginning any demolition activities.
   2. Take necessary precautions to avoid damage to existing items scheduled to remain in place, to be reused, or to remain the property of Owner; any Contractor-damaged items shall be repaired or replaced as directed by Engineer.

B. Protection of Personnel: During demolition, continuously evaluate the condition of the pipes and excavation areas being demolished and take immediate action to protect operating systems and existing landfill components, including liner systems, in and around the demolition site.
3.03 BACKFILL

A. Do not use demolition debris as backfill material.

B. Fill excavations to required bottom liner system foundation grades for new construction in accordance with Section 31 23 23, Fill and Backfill.

3.04 DISPOSITION OF MATERIAL

A. Do not remove equipment and materials without approval of Contractor’s Demolition/Renovation Plan by Engineer.

B. Salvage designated equipment as identified on Drawings. Place salvages equipment in onsite areas designated by Owner.

C. Remove pipes, valves, and other system components, and trench backfill material that are specified to be removed by Contractor and dispose in active landfill disposal area as directed by Owner. Cut pipes into lengths no greater than 10 feet in length to facilitate disposal.

END OF SECTION
PART 1 GENERAL

1.01 REFERENCES

A. The following is a list of standards which may be referenced in this section:

1. American Association of State Highway Transportation Officials (AASHTO).
2. ASTM International (ASTM):
4. Federal Specifications (FS):
   b. W-S-896, Switch, Toggle (Toggle and Lock), Flush Mounted (General Specification).
5. Institute of Electrical and Electronics Engineers, Inc. (IEEE):
   d. 112, Standard Test Procedure for Polyphase Induction Motors and Generators.
8. National Electrical Manufacturers Association (NEMA):
   a. C80.1, Rigid Steel Conduit-Zinc Coated.
   b. C80.3, Electrical Metallic Tubing-Zinc Coated.
   c. ICS 1, Industrial Control and Systems: General Requirements.
   d. ICS 2, Industrial Control and Systems: Controllers, Contactors, and Overload Relays Rated Not More Than 2000 Volts AC or 750 Volts DC.
   e. MG 1, Motors and Generators.
   f. PB 1, Panelboards.
   g. RN 1, Polyvinyl Chloride (PVC) Externally Coated Galvanized Rigid Steel Conduit and Intermediate Metal Conduit.
   h. TC 2, Electrical Polyvinyl Chloride (PVC) Tubing and Conduit.
   i. TC 3, PVC Fittings for Use with Rigid PVC Conduit and Tubing.
   k. WD 1, General Color Requirements for Wiring Devices.
   l. 250, Enclosures for Electrical Equipment (1,000 Volts Maximum).
10. UL:
    a. 1, Flexible Metal Conduit.
    b. 6, Electrical Rigid Metal Conduit—Steel.
    c. 44, Thermoset Insulated Wires and Cables.
    d. 62, Flexible Cord and Fixture Wire.
    e. 67, Panelboards.
    f. 98, Enclosed and Dead-Front Switches.
    g. 198C, High Interrupting Capacity Fuses, Current Limiting Types.
    h. 198E, Class R Fuses.
    i. 360, Liquid-Tight Flexible Steel Conduit.
    j. 486A, Wire Connectors and Soldering Lugs for Use with Copper Conductors.
    k. 486C, Splicing Wire Connectors.
    l. 489, Molded-Case Circuit Breakers, Molded-Case Switches, and Circuit Breaker Enclosures.
    m. 508, Industrial Control Equipment.
    n. 510, Polyvinyl Chloride, Polyethylene and Rubber Insulating Tape.
    o. 514B, Fittings for Cable and Conduit.
    p. 651, Schedule 40 and 80 PVC Conduit.
q. 797, Electrical Metallic Tubing.
  r. 854, Service-Entrance Cables.
  s. 870, Wireways, Auxiliary Gutters, and Associated Fittings.
  t. 943, Ground-Fault Circuit Interrupters.
  u. 1059, Terminal Blocks.
  v. 1449, Surge Protective Devices.

1.02 DEFINITIONS

A. AHJ: Authority Having Jurisdiction.

B. MCOV: Maximum Allowable Continuous Operating Voltage.

C. SPD: Surge Protective Device.

1.03 SUBMITTALS

A. Action Submittals:

1. Service metering equipment.
2. Boxes and device plates.
4. Precast handholes.
5. Wiring devices.
6. Panelboards.
7. Circuit breakers and switches.
8. Control devices, terminal blocks, and relays.
10. Support and framing channels.
11. Nameplates and nameplate schedule.
13. Conduit, fittings, and accessories.
15. Conductors, cable, and accessories.
17. Local Control Panels: Arrangement drawings, schematic and wiring diagrams, bill of materials, nameplate schedule, manufacturer information on components.
18. Luminaires.
19. Lighting controls.

B. Informational Submittals:

1. Field test reports.
2. Signed permits indicating Work is acceptable to regulatory authorities having jurisdiction.
3. Operation and Maintenance Data:
   a. As specified in Section 01 78 23, Operation and Maintenance Data.
   b. Provide for all equipment, as well as each device having features that can require adjustment, configuration, or maintenance.
   c. Minimum information shall include manufacturer’s preprinted instruction manual, one copy of the approved submittal information for the item, tabulation of any settings, and copies of any test reports.

1.04 APPROVAL BY AUTHORITY HAVING JURISDICTION

A. Provide the Work in accordance with NFPA 70, National Electrical Code (NEC). Where required by the Authority Having Jurisdiction (AHJ), material and equipment shall be labeled or listed by a nationally recognized testing laboratory or other organization acceptable to the AHJ, in order to provide a basis for approval under the NEC.

B. Materials and equipment manufactured within the scope of standards published by UL shall conform to those standards and shall have an applied UL listing mark or label.

1.05 QUALIFICATIONS

A. PVC-Coated, Rigid Steel Conduit Installer: Must be certified by conduit manufacturer as having received minimum 2 hours of training on installation procedures.

B. Testing Firm Qualifications: Professionally independent of manufacturers, suppliers, and installers, or electrical equipment and systems being tested.

1.06 EXTRA MATERIALS

A. Furnish, tag, and box for shipment and storage the following spare parts and special tools:

   1. Fuses, 0 Volt to 600 Volts: Six of each type and each current rating installed.

PART 2 PRODUCTS

2.01 GENERAL

A. Products shall comply with all applicable provisions of NFPA 70.
B. Like Items of Equipment: End products of one manufacturer in order to achieve standardization for appearance, operation, maintenance, spare parts, and manufacturer’s service.

C. Equipment and Devices Installed Outdoors or in Unheated Enclosures: Capable of continuous operation within ambient temperature range of minus 20 degrees F to 120 degrees F.

D. Equipment Finish: Manufacturer’s standard finish color, except where specific color is indicated.

2.02 SERVICE ENTRANCE EQUIPMENT AND METERING

A. Equipment, installation arrangement, and scope of work shall be provided in accordance with requirements of the local electric utility.

2.03 OUTLET AND DEVICE BOXES

A. Sheet Steel: One-piece drawn type, zinc- or cadmium-plated.

B. Cast Metal:

1. Box: Cast ferrous metal.
2. Cover: Gasketed, weatherproof, and cast ferrous metal with stainless steel screws.
3. Hubs: Threaded.
4. Lugs: Cast mounting.
5. Manufacturers and Products, Nonhazardous Locations:
   a. Crouse-Hinds; Type FS or FD.
   b. Appleton; Type FS or FD.

2.04 JUNCTION AND PULL BOXES

A. Outlet Boxes Used as Junction or Pull Box: As specified under Article Outlet and Device Boxes.

B. Conduit Bodies Used as Junction Boxes: As specified under Article Conduit and Fittings.

C. Large Sheet Steel Box:

1. NEMA 250, Type 1.
3. Cover: Full access, screw type.
D. Large Cast Metal Box:

1. NEMA 250, Type 4.
2. Box: Cast ferrous metal, electrogalvanized finished, with drilled and tapped conduit entrances and exterior mounting lugs.
3. Cover: Hinged with clamps.
5. Hardware and Machine Screws: ASTM A167, Type 316 stainless steel.
6. Manufacturers and Products, Surface Mounted Nonhinged Type:
   a. Crouse-Hinds; Series W.
   b. O-Z/Gedney; Series Y.
7. Manufacturer and Product, Surface Mounted, Hinged Type:
   O-Z/Gedney; Series YW.
8. Manufacturers and Products, Recessed Type:
   a. Crouse-Hinds; Type WJBF.
   b. O-Z/Gedney; Series YR.

E. Concrete Box, Nontraffic Areas:

1. Box: Reinforced, cast concrete with extension.
2. Cover: Steel diamond plate with locking bolts.
3. Cover Marking: ELECTRICAL, TELEPHONE, or as shown.
4. Size: 10 inch by 17 inch (minimum).
5. Manufacturer and Product: Utility Vault Co.; Series 36-1017PB, with cover DP.

2.05 PRECAST HANDHOLES

A. Construction: Precast concrete.

B. Loading: AASHTO H-10 or H-20, as noted below, in accordance with ASTM C857.

C. Drainage:

1. Slope floors toward drain points leaving no pockets or other nondraining areas.
2. Provide drainage outlet at low point of floor.

D. Raceway Entrances: Provide knockout panels on all four sides.

E. Handhole Frames and Covers:

1. Material: Steel, hot-dipped galvanized.
2. Cover Type: Solid, bolt-on or hinged, of checkered design, as noted below.
3. Cover Loading: As noted below.
4. Cover Designation: Lettering minimum 2 inches in height, as shown.

F. Hardware: Steel, hot-dip galvanized.

G. Furnish knockout for ground rod in each handhole.

   1. Small: H-10 incidental traffic loading; Model 3030-B with 3030-DP cover.
   2. Large: H-20 off-street traffic loading; Model 444-LA with 44-332P cover.

2.06 WIRING DEVICES

A. Receptacle, Ground Fault Circuit Interrupter:
   1. Duplex, listed Class A to UL Standard 943, tripping at 5 mA.
   2. Color: Gray.
   4. Size: For 2-inch by 4-inch outlet boxes.
   5. Standard Model: NEMA WD 1, with screw terminals and provisions for testing.
   6. Feed-Through Model: NEMA WD 1, with feed-through screw terminals and provisions for testing.
   7. Impact resistant nylon face.
   8. Manufacturers:
      a. Bryant.
      b. Hubbell.
      c. Leviton.

B. Receptacle, Special-Purpose:
   1. Rating and number of poles as shown or as required for anticipated purpose.
   2. One matching plug with cord-grip features for each special-purpose receptacle.

2.07 DEVICE PLATES

A. General: Sectional type plates not permitted.
B. Weatherproof:

1. For Receptacles, Wet Locations:
   a. Impact-resistant, nonmetallic, single-gang, horizontal-mounting, providing, while in-use, NEMA 3R rating.
   b. Stainless steel mounting and hinge hardware.
   c. Lockable, paintable.
   d. Color: Gray.
   e. Manufacturers:
      1) Carlon.
      2) Leviton.

2.08 FREE-STANDING POWER DISTRIBUTION PANEL (PDP) ENCLOSURE

A. NEMA PB 1 and UL 67.

B. Two-door freestanding enclosure, with mounting panel, designed to protect electrical components in outdoor environments.

C. Cabinet:

1. NEMA 250, Type 4.
3. Doors: Removable pin hinge. Sealed with poured-in-place waterproof gasket. 3-point keylocking/padlocking combination handle.
4. Wiring Gutter: Minimum 4-inch square; both sides, top and bottom.
5. Mounting Panel: Same material and finish as enclosure.
6. Circuit Directory: Metal frame with transparent plastic face and enclosed card on interior of the panelboard access door.
7. Sized to enclosure lighting and power distribution panelboard, lighting control panel, surge protective device, wiring gutters, wire and miscellaneous hardware.

2.09 LIGHTING AND POWER DISTRIBUTION PANELBOARD

A. NEMA PB 1, NFPA 70, and UL 67.

B. Panelboards and Circuit Breakers: Suitable for use with 75 degrees C wire at full NFPA 70, 75 degrees C ampacity.

C. Short-Circuit Current Equipment Rating: Fully rated; series connected unacceptable.

D. Rating: Applicable to a system with available short-circuit current of the indicated value amperes rms symmetrical 120/240 volts.
E. Cabinet:

1. NEMA 250, Type I.
3. Wiring Gutter: Minimum 4-inch square; both sides, top and bottom.
   a. Trim Size: As required by mounting.
   b. Finish: Manufacturer’s standard.
5. Interior:
   a. Factory assembled; complete with circuit breakers.
   b. Spaces: Cover openings with easily removable metal cover.
6. Without door.

F. Bus Bar:

1. Material: Copper full sized throughout length.
2. Neutral: Insulated, rated same as phase bus bars with at least one terminal screw for each branch circuit.
3. Ground: Copper, installed on panelboard frame, bonded to box with at least one terminal screw for each circuit.
4. Lugs and Connection Points:
   a. Suitable for either copper or aluminum conductors.
   b. Solderless main lugs for main, neutral, and ground bus bars.
   c. Subfeed or through-feed lugs as shown.

G. Circuit Breakers:

1. UL 489.
2. Thermal-magnetic, quick-make, quick-break, molded case, of indicating type showing ON/OFF and TRIPPED positions of operating handle.
3. Type: Bolt-on circuit breakers in all panelboards.
4. Multipole circuit breakers designed to automatically open all poles when an overload occurs on one pole.
5. Do not use tandem or dual circuit breakers in normal single-pole spaces.

H. Manufacturers:

1. Eaton.
2. General Electric Co.
3. Schneider Electric Co.

2.10 FUSED SWITCH, INDIVIDUAL, 0 TO 600 VOLTS

A. UL 98 listed for use and location of installation.
B. NEMA KS 1 and UL 98 Listed for application to system with available short-circuit current as shown.

C. Quick-make, quick-break, motor rated, load-break, heavy-duty (HD) type with external markings clearly indicating ON/OFF positions.

D. Suitable for use with 75 degrees C wire at full NFPA 70, 75 degrees C ampacity.

E. Fuse mountings shall reject Class H fuses and accept only current-limiting fuses specified.

F. Enclosure: As specified under Execution.

G. Interlock: Enclosure and switch to prevent opening cover with switch in ON position.

H. Manufacturers:
   1. Eaton.
   2. General Electric Co.
   3. Schneider Electric Co.

2.11 NONFUSED SWITCH, INDIVIDUAL, 0 TO 600 VOLTS

A. NEMA KS 1.

B. Quick-make, quick-break, motor rated, load-break, heavy-duty (HD) type with external markings clearly indicating ON/OFF positions.

C. Suitable for use with 75 degrees C wire at full NFPA 70, 75 degrees C ampacity.

D. Enclosure: As specified under Execution.

E. Interlock: Enclosure and switch to prevent opening cover with switch in the ON position.

F. Manufacturers:
   1. Eaton.
   2. General Electric Co.
   3. Schneider Electric Co.
2.12 FUSE, 0 TO 600 VOLTS
A. Current-limiting, with 200,000 ampere rms interrupting rating.
B. Provide to fit mountings specified with switches and features to reject Class H fuses.
C. Feeder and Service Circuits, 0 Volt to 250 Volt:
   1. Amperage: 0 to 600.
   2. UL 198E, Class RK-1, dual element, with time delay.
   3. Manufacturers and Products:
      a. Bussmann; Type LPN-RK.
      b. Littelfuse, Inc.; Type LLN-RK.

2.13 TERMINAL BLOCKS
A. Type: UL 1059. Compression screw clamp, with current bar providing direct contact with wire and yoke, with individual rail mounted terminals. Marking system shall permit use of preprinted or field-marked tags.
B. Yokes and Clamping Screws: Zinc-plated, hardened steel.
C. Rating: 250V ac.
D. Manufacturers:
   1. Weidmuller, Inc.
   2. Ideal.

2.14 SUPPORT AND FRAMING CHANNELS
A. Carbon Steel Framing Channel:
   1. Material: Rolled, mild strip steel, 12 gauge, ASTM A1011/A1011M, Grade 33.
B. Stainless Steel Framing Channel: Rolled, ASTM A167, Type 316 stainless steel, 12-gauge.
C. Manufacturers:
   1. B-Line Systems, Inc.
   2. Unistrut Corp.
2.15 NAMEPLATES

A. Material: Laminated plastic.

B. Attachment: Adhesive.

C. Color: Black, engraved to a white core, or as shown.

D. Engraving:
   1. Devices and Equipment: Name or tag shown, or as required.
   2. Panelboards:
      a. Designation.
      b. Service voltage.
      c. Phases.

E. Letter Height:
   1. Pushbuttons, Selector Switches, and Other Devices: 1/8 inch.
   2. Equipment and Panelboards: 1/4 inch.

2.16 SURGE PROTECTIVE DEVICES

A. General:
   1. Unless indicated otherwise, provide direct bus-connected and factory-installed SPDs inside distribution equipment.
   2. SPD Operating Conditions: Capable of performing at ambient temperatures between minus 40 degrees C and 60 degrees C, at relative humidity ranging from 0 percent to 95 percent, and at altitudes ranging from sea level to 12,000 feet.
   3. Connect SPDs through a fused switch or circuit breaker as selected by manufacturer. Provide overcurrent protection to allow full surge handling capabilities and afford safety protection from thermal overloads and short circuits.
   4. SPD Short Circuit Current Rating (SCCR): No less than the SCCR of distribution equipment.
   5. Design SPD devices to protect all modes (L-L, L-N, L-G, N-G) of electrical system being used.
   6. Power Filter: Include a high-frequency extended range power filter for each SPD complimentary listed to UL 1283 as an electromagnetic interference filter.
   7. Provide SPDs with the following monitoring and diagnostics:
      a. LED-type indication lights to show normal and failed status of each protected phase.
b. Surge event counter.
c. Form C dry contact which operates when unit fails.

8. Provide UL Type 2 SPDs.
9. EMI/RFI Noise Suppression: Minus 50 dB attenuation at 100 kHz, tested per MIL-STD 220C.
10. Voltage Protection Rating (VPR):

<table>
<thead>
<tr>
<th>Voltage Rating</th>
<th>L-N</th>
<th>N-G</th>
<th>L-G</th>
<th>L-L</th>
</tr>
</thead>
<tbody>
<tr>
<td>240/120</td>
<td>800</td>
<td>800</td>
<td>800</td>
<td>1200</td>
</tr>
</tbody>
</table>

B. Service Entrance and Distribution SPD:

1. Provide SPD meeting IEEE C62.41.1 and IEEE C62.41.2 location in accordance with Category C.
2. Surge Current Capacity:
   a. 240 kA per phase.
   b. 120 kA per mode.
3. Maximum Continuous Operating Voltage (MCOV): Not less than 115 percent of nominal system voltage.
4. Nominal Discharge Current (Iₙ): 20 kA.
5. Manufacturer and product:
   a. Eaton, SPD Series.
   b. General Electric, Tranquell.
   c. Square D, Surelogic.
   d. Advanced Protection Technologies, Inc.
   e. CITEL, MDS Series.

2.17 CONDUIT AND FITTINGS

A. Rigid Galvanized Steel Conduit (RGS):

1. Meet requirements of NEMA C80.1 and UL 6.
2. Material: Hot-dip galvanized, with chromated protective layer.

B. Electrical Metallic Tubing (EMT):

1. Meet requirements of NEMA C80.3 and UL 797.
2. Material: Hot-dip galvanized, with chromated and lacquered protective layer.
C. PVC Schedule 40 Conduit:
   1. Meet requirements of NEMA TC 2 and UL 651.
   2. UL listed for concrete encasement, underground direct burial, concealed, or direct sunlight exposure, and 90 degrees C insulated conductors.

D. PVC-Coated Rigid Galvanized Steel Conduit:
   1. Meet requirements of NEMA RN 1.
   2. Material:
      a. Meet requirements of NEMA C80.1 and UL 6.
      b. Exterior Finish: PVC coating, 40 mils nominal thickness, bond to metal shall have tensile strength greater than PVC.
      c. Interior finish: Urethane coating, 2 mils nominal thickness.
   3. Threads: Hot-dipped galvanized and factory coated with urethane.
   4. Bendable without damage to either interior or exterior coating.

E. Flexible Metal, Liquid-Tight Conduit:
   1. UL 360 listed for 105 degrees C insulated conductors.

F. Fittings:
   1. Provide bushings, grounding bushings, conduit hubs, conduit bodies, couplings, unions, conduit sealing fittings, drain seals, drain/breather fittings, expansion fittings, and cable sealing fittings, as applicable.
   2. Rigid Galvanized Steel:
      a. Meet requirements of UL 514B.
      b. Type: Threaded, galvanized.
   3. Electrical Metallic Tubing:
      a. Meet requirements of UL 514B.
      b. Type: Steel body and locknuts with steel or malleable iron compression nuts. Setscrew and drive-on fittings not permitted.
      c. Electro zinc-plated inside and out.
      d. Raintight.
   4. PVC Conduit:
      a. Meet requirements of NEMA TC 3.
      b. Type: PVC, slip-on.
   5. PVC-Coated Rigid Galvanized Steel Conduit:
      a. Meet requirements of UL 514B.
      b. Fittings: Rigid galvanized steel type, PVC-coated by conduit manufacturer.
c. Conduit Bodies: Cast metal hot-dipped galvanized or urethane finish. Cover shall be of same material as conduit body. PVC-coated by conduit manufacturer.

d. Finish: 40-mil PVC exterior, 2-mil urethane interior.

e. Overlapping pressure sealing sleeves.


g. Manufacturers:
   1) Robroy Industries.
   2) Ocal.

h. Expansion Fitting Manufacturer and Product: Ocal; Ocal-Blue XJG.

6. Flexible Metal, Liquid-Tight Conduit:
   a. Metal insulated throat connectors with integral nylon or plastic bushing rated for 105 degrees C.
   b. Insulated throat and sealing O-rings.

2.18 METAL WIREWAYS

A. Meet requirements of UL 870.

B. Type: Steel-enclosed, with removable, hinged cover.

C. Rating: Outdoor raintight.

D. Finish: Gray, baked enamel.

E. Manufacturers:

   1. Copper B-Line.
   2. Hoffman.

2.19 CONDUIT ACCESSORIES

A. Duct Bank Spacers:

   1. Type: Nonmetallic, interlocking, for multiple conduit sizes.
   2. Suitable for all types of conduit.
   3. Manufacturers:
      a. Underground Device, Inc.
      b. Carlon.

B. Identification Devices:

   1. Warning Tape:
      a. Material: Polyethylene, 4-mil gauge with detectable strip.
      b. Color: Red.
c. Width: Minimum 3 inches.
d. Designation: Warning on tape that electric circuit is located below tape.
e. Identifying Letters: Minimum 1-inch high permanent black lettering imprinted continuously over entire length.

2.20 CONDUCTORS AND CABLES

A. Conductors 600 Volts and Below:
   1. Conform to applicable requirements of NEMA WC 70.
   2. Conductor Type: No. 10 AWG and Smaller: Solid copper.
   3. Insulation: Type XHHW-2.
   4. Flexible Cords and Cables:
      a. Type SOW-A/50 with ethylene propylene rubber insulation in accordance with UL 62.
      b. Conform to physical and minimum thickness requirements of NEMA WC 70.

B. 600-Volt Rated Cable:
   1. General:
      a. Type TC, meeting requirements of UL 1277, including Vertical Tray Flame Test at 20,000 Btu per hour, and NFPA 70, Article 340, or UL 13 meeting requirements of NFPA 70, Article 725.
      b. Permanently and legibly marked with manufacturer’s name, maximum working voltage for which cable was tested, type of cable, and UL listing mark.
      c. Suitable for installation in open air, in cable trays, or conduit.
      d. Minimum Temperature Rating: 90 degrees C dry locations, 75 degrees C wet locations.
      e. Overall Outer Jacket: PVC, flame-retardant, sunlight- and oil-resistant.

C. Accessories:
   1. Tape:
      a. General Purpose, Flame Retardant: 7 mils, vinyl plastic, Scotch Brand 33, rated for 90 degrees C minimum, meeting requirements of UL 510.
      b. Flame Retardant, Cold and Weather Resistant: 8.5 mils, vinyl plastic, Scotch Brand 88.
      c. Arc and Fireproofing:
         1) 30 mils, elastomer.
2) Manufacturers and Products:
   a) 3M; Scotch Brand 77, with Scotch Brand 69 glass
cloth tapebinder.
   b) Plymouth; Plyarc 53, with Plyglas 77 glass cloth
tapebinder.

2. Identification Devices:
   a. Sleeve-type, permanent, PVC, yellow or white, with legible
      machine-printed black markings.
   b. Manufacturer and Products: Raychem; Type D-SCE or ZH-SCE.

3. Connectors and Terminations:
   a. Nylon, Self-Insulated Crimp Connectors:
      1) Manufacturers and Products:
         a) Thomas & Betts; Sta-Kon.
         b) Burndy; Insulug.
         c) ILSCO.

4. Self-Insulated, Freespring Wire Connector (Wire Nuts):
   a. Plated steel, square wire springs.
   b. UL Standard 486C.
   c. Manufacturers and Products:
      1) Thomas & Betts.
      2) Ideal; Twister.

5. Cable Lugs:
   a. In accordance with NEMA CC 1.
   b. Rated 600 volts of same material as conductor metal.
   c. Uninsulated Crimp Connectors and Terminators:
      1) Suitable for use with 75 degrees C wire at full NFPA 70,
         75 degrees C ampacity.
      2) Manufacturers and Products:
         a) Thomas & Betts; Color-Keyed.
         b) Burndy; Hydent.
         c) ILSCO.
   d. Uninsulated, Bolted, Two-Way Connectors and Terminators:
      1) Manufacturers and Products:
         a) Thomas & Betts; Locktite.
         b) Burndy; Quiklug.
         c) ILSCO.

6. Cable Ties:
   a. Nylon, adjustable, self-locking, and reusable.
   b. Manufacturer and Product: Thomas & Betts; TY-RAP.

7. Heat Shrinkable Insulation:
   a. Thermally stabilized, crosslinked polyolefin.
   b. Manufacturer and Product: Thomas & Betts; SHRINK-KON.
2.21 GROUNDING

A. Ground Rods: Provide copper-clad galvanized steel with minimum diameter of 5/8 inch, and length of 8 feet.

B. Ground Conductors: As specified in Article Conductors and Cable.

C. Connectors:
   1. Exothermic Weld Type:
      a. Outdoor Weld: Suitable for exposure to elements or direct burial.
      b. Manufacturers:
         1) Erico Products, Inc.; Cadweld and Cadweld Exolon.
         2) Thermoweld.
   2. Compression Type:
      a. Compress-deforming type; wrought copper extrusion material.
      b. Single indentation for conductors 6 AWG and smaller.
      c. Double indentation with extended barrel for conductors 4 AWG and larger.
      d. Single barrels prefilled with oxide-inhibiting and antiseizing compound.
      e. Manufacturers:
         1) Burndy Corp.
         2) Thomas and Betts Co.
         3) ILSCO.
   3. Mechanical Type:
      a. Split-bolt, saddle, or cone screw type; copper alloy material.
      b. Manufacturers:
         1) Burndy Corp.
         2) Thomas and Betts Co.

2.22 LUMINAIRES AND ACCESSORIES

A. Specific requirements relating to fixture type are provided in the Luminaire Schedule on Drawings.

B. Poles:
   1. Rating (With Luminaire): 100 mph steady winds, without incurred damage.

2.23 LIGHTING CONTROL

A. Time Switch: Provide with a plain 24-hour dial and day omitting device, prewired, externally operated on/auto/off bypass switches for each circuit
shown, contact configuration and rating for circuits shown, NEMA 1 enclosure, spring-driven reserve power to operate time switch for 16 hours after power failure wired for use with photocell specified.

B. Photocell: Automatic on/off switching, completely self-contained in die-cast aluminum housing, not affected by moisture, vibration, or temperature changes; on at dusk and off at dawn; time-delay feature to prevent false switching; and field adjustable to control operating levels.

PART 3 EXECUTION

3.01 GENERAL

A. Install materials and equipment in accordance with manufacturer’s instructions and recommendations.

B. Work shall comply with all applicable provisions of NECA 1.

C. Electrical Drawings show general locations of equipment, devices, and raceway, unless specifically dimensioned.

3.02 DEMOLITION

A. General Demolition:
   1. Where shown, de-energize and disconnect nonelectrical equipment for removal by others.
   2. Where shown, de-energize, disconnect, and remove electrical equipment.
   3. Remove affected circuits and raceways back to serving panelboard or control panel. Where affected circuits are consolidated with others, remove raceways back to first shared conduit or box. Where underground or embedded raceways are to be abandoned, remove raceway to 1 inch below surface of structure or 12 inches below grade and restore existing surface.

3.03 PROTECTION FOLLOWING INSTALLATION

A. Protect materials and equipment from corrosion, physical damage, and effects of moisture on insulation.

B. Cap conduit runs during construction with manufactured seals.

C. Close openings in boxes or equipment during construction.

D. Energize space heaters furnished with equipment.
3.04 SERVICE ENTRANCE EQUIPMENT AND METERING

A. Unless otherwise specified or shown, schedule and coordinate work of serving utility as required to provide electric service to the Work.

3.05 OUTLET AND DEVICE BOXES

A. Install suitable for conditions encountered at each outlet or device in wiring or raceway system, sized to meet NFPA 70 requirements.

B. Size:

1. Depth: Minimum 2 inches, unless otherwise required by structural conditions. Box extensions not permitted.
   a. Hollow Masonry Construction: Install with sufficient depth such that conduit knockouts or hubs are in masonry void space.
2. Ceiling Outlet: Minimum 4-inch octagonal sheet steel device box, unless otherwise required for installed fixture.
3. Switch and Receptacle: Minimum 2-inch by 4-inch sheet steel device box.

C. Locations:

1. Drawing locations are approximate.
2. To avoid interference with structural features, relocate outlets as directed by Owner.

D. Mounting Height:

1. General:
   a. Dimensions given to centerline of box.
   b. Where specified heights do not suit construction or finish, mount as directed by Owner.
2. Receptacles:
   a. Outdoor: As shown.

E. Install plumb and level.

F. Support boxes independently of conduit by attachment to structural member.

G. Box Type (Steel Raceway System):

1. Outdoor Locations: Cast metal.
3.06 JUNCTION AND PULL BOXES

A. Install where shown and where necessary to terminate, tap-off, or redirect multiple conduit runs.

B. Install pull boxes where necessary in raceway system to facilitate conductor installation.

C. Install in conduit runs at least every 150 feet or after the equivalent of three right-angle bends.

D. Use outlet boxes as junction and pull boxes wherever possible and allowed by applicable codes.

E. Use conduit bodies as junction and pull boxes where no splices are required and their use is allowed by applicable codes.

F. Installed boxes shall be accessible.

G. Do not install on finished surfaces.

H. Install plumb and level.

I. Support boxes independently of conduit by attachment to building structure or structural member.

J. At or Belowgrade:
   1. Install boxes for belowgrade conduit flush with finished grade in locations outside of paved areas, roadways, or walkways.
   2. If adjacent structure is available, box may be mounted on structure surface just above finished grade in accessible but unobtrusive location.
   3. Obtain Owner’s written acceptance prior to installation in paved areas, roadways, or walkways.
   4. Use boxes and covers suitable to support anticipated weights.

K. Mounting Hardware:
   1. Outdoor or Noncorrosive Indoor Wet Areas: Stainless steel.

L. Location/Type:
   2. Underground Conduit: Concrete composite.
   3. Outdoor, Where Indicated Weatherproof (WP): NEMA 250, Type 3R.
3.07 PRECAST HANDHOLES

A. Excavate, shore, brace, backfill, and final grade in accordance with Section 31 23 16, Excavation, and Section 31 23 23.15, Trench Backfill.

B. Do not install until final raceway grading has been determined.

C. Install such that raceways enter at nearly right angles and as near as possible to one end of wall, unless otherwise shown.

3.08 WIRING DEVICES

A. Receptacles:
   1. Install with grounding slot down, except where horizontal mounting is shown, in which case install with neutral slot up.
   2. Weatherproof Receptacles:
      a. Install in cast metal box.
      b. Install such that hinge for protective cover is above receptacle opening.
   3. Ground Fault Interrupter: Install feed-through model at locations where ground fault protection is specified for “downstream” conventional receptacles.
   4. Special-Purpose Receptacles: Install in accordance with manufacturer’s instructions.

3.09 DEVICE PLATES

A. Securely fasten to wiring device; ensure a tight fit to box.

B. Surface Mounted: Plate shall not extend beyond sides of box, unless plates have no sharp corners or edges.

C. Install with alignment tolerance to box of 1/16 inch.

D. Types (Unless Otherwise Shown):

3.10 PANELBOARDS

A. Install securely, plumb, in-line and square with the horizontal plane.

B. Install with PDP as indicated.

C. Provide typewritten circuit directory.
3.11 TERMINAL BLOCKS
A. Install for termination of control circuits entering or leaving equipment and local control panels.

3.12 SUPPORT AND FRAMING CHANNELS
A. Install where required for mounting and supporting electrical equipment and raceway systems.
B. Channel Type:
C. Paint carbon steel channel cut ends prior to installation with zinc-rich primer.

3.13 NAMEPLATES
A. Provide identifying nameplate on all equipment.

3.14 SURGE PROTECTIVE DEVICES
A. Install in accordance with manufacturer’s instructions, including lead length, overcurrent protection, and grounding.

3.15 CONDUIT AND FITTINGS
A. General:
   1. Crushed or deformed raceways not permitted.
   2. Maintain raceway entirely free of obstructions and moisture.
   3. Immediately after installation, plug or cap raceway ends with watertight and dust-tight seals until time for pulling in conductors.
   4. Sealing Fittings: Provide drain seal in vertical raceways where condensate may collect above sealing fitting.
   5. Avoid moisture traps where possible. When unavoidable in exposed conduit runs, provide junction box and drain fitting at conduit low point.
   6. Group raceways installed in same area.
   7. Follow structural surface contours when installing exposed raceways. Avoid obstruction of passageways.
   8. Run exposed raceways parallel or perpendicular to walls, structural members, or intersections of vertical planes.
   9. Install watertight fittings in outdoor, underground, or wet locations.
   10. Paint threads and cut ends, before assembly of fittings, galvanized conduit, or PVC-coated galvanized conduit installed in exposed or damp locations with zinc-rich paint or liquid galvanizing compound.
11. Metal conduit to be reamed, burrs removed, and cleaned before installation of conductors, wires, or cables.
12. Do not install raceways in concrete equipment pads, foundations, or beams.
13. Horizontal raceways installed under floor slabs shall lie completely under slab, with no part embedded within slab.
14. Install concealed, embedded, and buried raceways so that they emerge at right angles to surface and have no curved portion exposed.
15. Install conduits for fiber optic cables, telephone cables, and Category 5 data cables in strict conformance with the requirements of EIA/TIA 569.

B. Installation in Cast-in-Place Structural Concrete:

1. Minimum cover 2 inches, including all fittings.
2. Conduit placement shall not require changes in reinforcing steel location or configuration.
3. Provide nonmetallic support during placement of concrete to ensure raceways remain in position.
4. Conduit larger than 1 inch shall not be embedded in concrete slabs, walls, foundations, columns or beams, unless approved by Engineer.
5. Slabs and Walls:
   a. Trade size of conduit not to exceed one-fourth of the slab or wall thickness.
   b. Install within middle two-fourths of slab or wall.
   c. Separate conduit less than 2-inch trade size by a minimum ten times conduit trade size, center-to-center, unless otherwise shown.
   d. Separate conduit 2 inches and greater trade size by a minimum eight times conduit trade size, center-to-center, unless otherwise shown.
   e. Cross conduit at an angle greater than 45 degrees, with minimum separation of 1 inch.
   f. Separate conduit by a minimum six times the outside dimension of expansion and deflection fittings at expansion joints.
   g. Conduit shall not be installed below the maximum water surface elevation in walls of water holding structures.
6. Columns and Beams:
   a. Trade size of conduit not to exceed one-fourth of beam thickness.
   b. Conduit cross-sectional area not to exceed 4 percent of beam or column cross section.

C. Conduit Application:

1. Diameter:
2. Outdoor, Exposed: Rigid galvanized steel.
4. Under Slabs-On-Grade:
   a. PVC Schedule 80.
   b. PVC-coated rigid galvanized steel elbows where conduit turns up through slab.

D. Connections:

1. For equipment where flexible connection is required to minimize vibration:
   a. General: Flexible metal, liquid-tight conduit.
   b. Wet Areas: Flexible metal liquid-tight.
   c. Length: 18 inches minimum, 60 inches maximum, sufficient to allow movement or adjustment of equipment.
2. Outdoor Areas: Flexible metal, liquid-tight conduit.
3. Transition from Underground or Concrete Embedded to Exposed: Rigid galvanized steel or PVC-coated rigid steel conduit.

E. Penetrations:

1. Make at right angles, unless otherwise shown.
2. Concrete Walls, Floors, or Ceilings (Aboveground): Provide nonshrink grout dry-pack.
3. Entering Structures:
   a. General: Seal raceway at the first box or outlet with oakum or expandable plastic compound to prevent the entrance of liquids from one area to another.
      1) Seal conduit entering equipment panelboards and field equipment.
   b. Existing or Precast Wall (Underground): Core drill wall and install watertight entrance seal device.
   c. Nonwaterproofed Wall or Floor (Underground, without Concrete Encasement):
      1) Provide Schedule 40 galvanized pipe sleeve or watertight entrance seal device.
      2) Fill space between raceway and sleeve with expandable plastic compound or oakum and lead joint on each side.
   d. Handholes:
      1) Metallic Raceways: Provide insulated grounding bushings.
      2) Nonmetallic Raceways: Provide bell ends flush with wall.
F. Support:

1. Support from structural members only, at intervals not exceeding NFPA 70 requirements, and in any case not exceeding 8 feet. Do not support from piping, pipe supports, or other raceways.

2. Application/Type of Conduit Strap:
   a. Steel Conduit: Zinc-coated steel, pregalvanized steel, or malleable iron.
   b. PVC-Coated Rigid Steel Conduit: PVC-coated metal.
   c. Nonmetallic Conduit: Nonmetallic or PVC-coated metal.

3. Provide and attach wall brackets, strap hangers, or ceiling trapeze as follows:
   a. Wood: Wood screws.
   b. Hollow Masonry Units: Toggle bolts.
   c. Concrete or Brick: Expansion shields, or threaded studs driven in by powder charge, with lock washers and nuts.
   e. Location/Type of Hardware:
      1) Wet, Noncorrosive Areas: Stainless steel.

G. Bends:

1. Install concealed raceways with a minimum of bends in the shortest practical distance.
2. Make bends and offsets of longest practical radius. Bends in conduits and ducts being installed for fiber optic cables shall be not less than 20 times cable diameter, 15 inches minimum.
3. Install with symmetrical bends or cast metal fittings.
4. Avoid field-made bends and offsets, but where necessary, make with acceptable hickey or bending machine. Do not heat metal raceways to facilitate bending.
5. Make bends in parallel or banked runs from same center or centerline with same radius so that bends are parallel.
6. Factory elbows may be installed in parallel or banked raceways if there is change in plane of run and raceways are same size.
7. PVC Conduit:
   b. 90-Degree Bends: Provide rigid steel elbows, PVC coated where direct buried.
   c. Use manufacturer’s recommended method for forming smaller bends.
8. Flexible Conduit: Do not make bends that exceed allowable conductor bending radius of cable to be installed or that significantly restricts conduit flexibility.
H. PVC Conduit:

1. Solvent Welding:
   a. Provide manufacturer recommended solvent; apply to all joints.
   b. Install such that joint is watertight.
2. Adapters:
   a. PVC to Metallic Fittings: PVC terminal type.
   b. PVC to Rigid Metal Conduit: PVC female adapter.
3. Belled-End Conduit: Bevel the unbelled end of the joint prior to joining.

I. PVC-Coated Rigid Steel Conduit:

1. Install in accordance with manufacturer’s instructions.
2. All tools and equipment used in the cutting, bending, threading, and installation of PVC-coated rigid steel conduit shall be designed to limit damage to the PVC coating.
3. Provide PVC boot to cover all exposed threading.

J. Termination at Enclosures:

2. Nonmetallic, Cabinets, and Enclosures: Terminate conduit in threaded conduit hubs, maintaining enclosure integrity.
3. Sheet Metal Boxes, Cabinets, and Enclosures:
   a. Rigid Galvanized Conduit:
      1) Provide one lock nut each on inside and outside of enclosure.
      2) Install grounding bushing.
      3) Provide bonding jumper from grounding bushing to equipment ground bus or ground pad; if neither ground bus nor pad exists, connect jumper to lag bolt attached to metal enclosure.
      4) Install insulated bushing on ends of conduit where grounding is not required.
      5) Provide insulated throat when conduit terminates in sheet metal boxes having threaded hubs.
      6) Utilize sealing locknuts or threaded hubs on outside of NEMA 3R enclosures.
      7) Terminate conduits with threaded conduit hubs at NEMA 4 boxes and enclosures.
   b. Flexible Metal Conduit: Provide two-screw type, insulated, malleable iron connectors.
   c. PVC-Coated Rigid Galvanized Steel Conduit: Provide PVC-coated, liquid-tight, metallic connector.
d. PVC Schedule 80 Conduit: Provide PVC terminal adapter with locknut.

4. Free-Standing Enclosures:
   a. Terminate metal conduit entering bottom with grounding bushing; provide a grounding jumper extending to equipment ground bus or grounding pad.
   b. Terminate PVC conduit entering bottom with bell end fittings.

K. Underground Raceways:
   1. Grade: Maintain minimum grade of 4 inches in 100 feet, either from one manhole, handhole, or pull box to the next, or from a high point between them, depending on surface contour.
   2. Cover: Maintain minimum 2-foot cover above conduit, unless otherwise shown.
   3. Make routing changes as necessary to avoid obstructions or conflicts.
   4. Couplings: In multiple conduit runs, stagger so couplings in adjacent runs are not in same transverse line.
   5. Union type fittings not permitted.
   6. Spacers:
      a. Provide preformed, nonmetallic spacers, designed for such purpose, to secure and separate parallel conduit runs in a trench.
      b. Install at intervals not greater than that specified in NFPA 70 for support of the type conduit used, but in no case greater than 10 feet.
   7. Support conduit so as to prevent bending or displacement during backfilling.
   8. Installation with Other Piping Systems:
      a. Crossings: Maintain minimum 12-inch vertical separation.
      b. Parallel Runs: Maintain minimum 12-inch separation.
      c. Installation over valves or couplings not permitted.

L. Empty Raceways:
   1. Provide permanent, removable cap over each end.
   2. Provide PVC plug with pull tab for underground raceways with end bells.
   3. Provide nylon pull cord.
   4. Identify, as specified in Article Identification Devices, with waterproof tags attached to pull cord at each end, and at intermediate pull point.
3.16 METAL WIREWAYS

A. Install in accordance with manufacturer’s instructions.

B. Locate with cover on accessible vertical face of wireway, unless otherwise shown.

3.17 CONDUCTORS AND CABLES

A. Conductor storage, handling, and installation shall be in accordance with manufacturer’s recommendations.

B. Do not exceed manufacturer’s recommendations for maximum pulling tensions and minimum bending radii.

C. Conduit system shall be complete prior to drawing conductors. Lubricate prior to pulling into conduit. Lubrication type shall be as approved by conductor manufacturer.

D. Terminate all conductors and cables, unless otherwise shown.

E. Do not splice conductors, unless specifically indicated or approved by Engineer.

F. Bundling: Where single conductors and cables in manholes, handholes, vaults, cable trays, and other indicated locations are not wrapped together by some other means, bundle conductors from each conduit throughout their exposed length with cable ties placed at intervals not exceeding 12 inches.

G. Wiring within Equipment and Local Control Panels: Remove surplus wire, dress, bundle, and secure.

H. Power Conductor Color Coding:

1. No. 6 AWG and Larger: Apply general purpose, flame retardant tape at each end, and at accessible locations wrapped at least six full overlapping turns, covering an area 1-1/2 inches to 2 inches wide.

2. No. 8 AWG and Smaller: Provide colored conductors.

3. Colors:
   c. Ground Wire: Green.

I. Circuit Identification:

1. Circuits Appearing in Circuit Schedules: Identify power, instrumentation, and control conductor circuits, using circuit schedule.
designations, at each termination and in accessible locations such as manholes, handholes, panels, switchboards, motor control centers, pull boxes, and terminal boxes.

2. Circuits Not Appearing in Circuit Schedules: Assign circuit name based on device or equipment at load end of circuit. Where this would result in same name being assigned to more than one circuit, add number or letter to each otherwise identical circuit name to make it unique.

3. Method: Identify with sleeves. Taped-on markers or tags relying on adhesives not permitted.

J. Connections and Terminations:
   1. Install wire nuts only on solid conductors.
   2. Install nylon self-insulated crimp connectors and terminators for instrumentation and control circuit conductors.
   3. Tape insulate all uninsulated connections.
   4. Install crimp connectors and compression lugs with tools approved by connector manufacturer.

3.18 GROUNDING

A. Grounding shall be in compliance with NFPA 70 and as shown.

B. Ground electrical service neutral at service entrance equipment to supplementary grounding electrodes.

C. Ground each separately derived system neutral to nearest effectively grounded building structural steel member or separate grounding electrode.

D. Bond together system neutrals, service equipment enclosures, exposed noncurrent-carrying metal parts of electrical equipment, metal raceways, ground conductor in raceways and cables, receptacle ground connections, and metal piping systems.

E. Shielded Instrumentation Cables:
   1. Ground shield to ground bus at power supply for analog signal.
   2. Expose shield minimum 1 inch at termination to field instrument and apply heat shrink tube.
   3. Do not ground instrumentation cable shield at more than one point.

F. Equipment Grounding Conductors: Provide in all conduits containing power conductors and control circuits above 50 volts.

G. Ground Rods: Install full length with conductor connection at upper end. Install one ground rod in each handhole.
3.19 LUMINAIRES AND ACCESSORIES

A. Install in accordance with manufacturer’s recommendations.
B. Install plumb and level at mounting heights shown.
C. Pole Mounted Fixtures: Provide cast-in-place concrete bases as shown.

3.20 LIGHTING CONTROL

A. Photocell: Mount at top of light pole nearest the location of the lighting control panel.

3.21 FIELD QUALITY CONTROL

A. Tests shall be performed in accordance with the requirements of Section 01 91 14, Equipment Testing and Facility Startup.
B. General:
   1. Test equipment shall have an operating accuracy equal to, or greater than, requirements established by NETA ATS.
   2. Test instrument calibration shall be in accordance with NETA ATS.
   3. Perform inspection and electrical tests after equipment has been installed.
   4. Perform tests with apparatus de-energized whenever feasible.
   5. Inspection and electrical tests on energized equipment are to be:
      a. Scheduled with Owner prior to de-energization.
      b. Minimized to avoid extended period of interruption to the operating plant equipment.
C. Tests and inspection shall establish that:
   1. Electrical equipment is operational within industry and manufacturer’s tolerances.
   2. Installation operates properly.
   3. Equipment is suitable for energization.
   4. Installation conforms to requirements of Contract Documents and NFPA 70.
D. Perform inspection and testing in accordance with NETA ATS, industry standards, and manufacturer’s recommendations.
E. Adjust mechanisms and moving parts for free mechanical movement.
F. Adjust adjustable relays and sensors to correspond to operating conditions, or as recommended by manufacturer.
G. Verify nameplate data for conformance to Contract Documents.

H. Realign equipment not properly aligned and correct unlevelness.

I. Properly anchor electrical equipment found to be inadequately anchored.

J. Tighten accessible bolted connections, including wiring connections, with calibrated torque wrench to manufacturer’s recommendations, or as otherwise specified.

K. Clean contaminated surfaces with cleaning solvents as recommended by manufacturer.

L. Provide proper lubrication of applicable moving parts.

M. Investigate and repair or replace:
   1. Electrical items that fail tests.
   2. Active components not operating in accordance with manufacturer’s instructions.
   3. Damaged electrical equipment.

N. Electrical Enclosures:
   1. Remove foreign material and moisture from enclosure interior.
   2. Vacuum and wipe clean enclosure interior.
   3. Remove corrosion found on metal surfaces.
   4. Repair or replace, as determined by Engineer, door and panel sections having damaged surfaces.
   5. Replace missing or damaged hardware.

O. Provide certified test report(s) documenting the successful completion of specified testing. Include field test measurement data.

P. Test the following equipment and materials:
   1. Conductors: Insulation resistance, No. 4 and larger only.
   2. Panelboards, switches, and circuit breakers.
   3. Motor controls.
   4. Grounding electrodes.
   5. Motors.

Q. Controls:
   1. Test control and signal wiring for proper termination and function.
   2. Test local control panels and other control devices for proper terminations, configuration and settings, and functions.
3. Demonstrate control, monitoring, and indication functions in presence of Owner and Engineer.

R. Balance electrical load between phases on panelboards after installation.

S. Voltage Testing:

1. When installation is complete and facility is in operation, check voltage at point of termination of electric utility supply system to Project.
2. Check voltage amplitude and balance between phases for loaded and unloaded conditions.
3. If unbalance exceeds 1 percent, or if voltage varies throughout the day and from loaded to unloaded conditions more than plus or minus 4 percent of nominal, make written request to electric utility to correct condition.
4. If corrections are not made, obtain written statement from a responsible electric utility official that voltage variations and/or unbalance are within their normal standards.

T. Equipment Line Current:

1. Check line current in each phase for each piece of equipment.
2. If electric utility makes adjustments to supply voltage magnitude or balance, make line current check after adjustments are made.

END OF SECTION
SECTION 26 05 02  
BASIC ELECTRICAL REQUIREMENTS

PART 1  GENERAL

1.01 RELATED SECTIONS

A. Requirements specified within this section apply to Division 26, Electrical. Work specified herein shall be performed as if specified in the individual sections.

1.02 REFERENCES

A. The following is a list of standards which may be referenced in this section:

2. National Electrical Manufacturers Association (NEMA):
   a. 250, Enclosures for Electrical Equipment (1000 Volts Maximum).

1.03 DESIGN REQUIREMENTS

A. For materials specified in this Section, minimum standard of quality shall be in accordance with applicable industry standards, including, but not limited to, National Electrical Manufacturers Association (NEMA), Electrical Equipment Manufacturers Association of Canada (EEMAC), American National Standards Institute (ANSI), Institute of Electrical and Electronic Engineers, Inc. (IEEE), UL, and federal standards publications.

B. Electrical components shall be UL listed and labeled and meet applicable requirements of Factory Mutual.

C. Compliance by the Contractor with the provisions of this Section does not relieve the Contractor of the responsibilities of furnishing equipment and materials of proper design, mechanically and electrically suited to meet operating guarantees at the specified service conditions.

D. Equipment and devices to be installed outdoors or in unheated enclosures shall be capable of continuous operation within an ambient temperature of minus 20 degrees F to 110 degrees F, and a relative humidity of 0 percent to 100 percent.
E. Where applicable, equipment and installation shall meet requirements for corrosive and hazardous locations.

F. Conform to the latest codes and legal requirements, obtain permits, and arrange for inspections.

1.04 ELECTRIC SERVICE DIVISION OF RESPONSIBILITY

A. Incoming underground electrical service facilities provided by the serving utility as part of its normal obligation to customers is work provided outside this Contract. Under this Contract, provide customer required service provisions and electrical work including, but not limited to, metering components and associated conduit and secondary facilities. Schedule and coordinate work of serving utility as required to provide electric service to the Work.

1.05 SUBMITTALS

A. Section 01 33 00, Submittal Procedures, requirements for submittals.

1.06 QUALITY ASSURANCE

A. Provide the Work in accordance with NFPA 70. Where required by Authority Having Jurisdiction (AHJ), material and equipment shall be labeled or listed by a nationally recognized testing laboratory or other organization acceptable to the AHJ, in order to provide a basis for approval under the NEC.

B. Materials and equipment manufactured within the scope of standards published by UL shall conform to those standards and shall have an applied UL listing mark or label.

C. Material and equipment must be listed and labeled for its intended purpose, environment, or application, especially when used in extreme climate areas.

1.07 ENVIRONMENTAL CONDITIONS

A. The following areas are classified nonhazardous and wet. Use materials and methods required for such areas.

1. Outdoor abovegrade areas.
2. Belowgrade hand holes and junction boxes.

B. The following areas are not classified. Use dust-tight and oil-tight NEMA 12 materials and methods.

1. Areas not covered above.
PART 2 PRODUCTS

2.01 GENERAL

A. Where two or more units of the same class of material or equipment are required, provide products of a single manufacturer. Component parts of materials or equipment need not be products of the same manufacturer.

B. Materials and Equipment: Labeled and/or listed as acceptable to the AHJ as suitable for the use intended.

C. Where two or more units of the same class of material are required, provide products of a single manufacturer. Component parts of materials or equipment need not be products of the same manufacturer.

D. Provide manufacturer's standard finish color except where specific color is indicated.

2.02 EQUIPMENT FINISH

A. Manufacturer’s standard finish color, except where specific color is indicated.

2.03 NAMEPLATES

A. Material: Laminated plastic.

B. Attachment Screws: Stainless steel.

C. Color: Black, engraved to a white core.

D. Letter Height:
   2. Other Electrical Equipment: 1/4-inch.

2.04 SIGNS AND LABELS

A. Sign size, lettering, and color shall be in accordance with NEMA Z535.4.

PART 3 EXECUTION

3.01 GENERAL

A. Electrical Drawings show general locations of equipment, devices, and raceway, unless specifically dimensioned. Contractor shall be responsible for actual location of equipment and devices and for proper routing and support of raceways, subject to approval of Engineer.
B. Check approximate locations of light fixtures, switches, electrical outlets, equipment, and other electrical system components shown on Drawings for conflicts with openings, structural members, and components of other systems and equipment having fixed locations. In the event of conflicts, notify Engineer in writing.

C. Install work in accordance with NECA Standard of Installation, unless otherwise specified.

D. Keep openings in boxes and equipment closed during construction.

E. Lay out work carefully in advance. Do not cut or notch any structural member or building surface without specific approval of Engineer. Carefully perform cutting, channeling, chasing, or drilling of floors, walls, partitions, ceilings, paving, or other surfaces required for the installation, support, or anchorage of conduit, raceways, or other electrical materials and equipment. Following such work, restore surfaces to original condition.

3.02 NAMEPLATES, SIGNS, AND LABELS

A. Equipment Nameplates:

1. Provide a nameplate to label electrical equipment, including panelboards, terminal junction boxes, disconnect switches, and control stations.

2. Disconnect switch nameplates shall include name and number of equipment powered or controlled by that device.

3. Panelboard nameplates shall include equipment designation, service voltage, and phases.

3.03 LOAD BALANCE

A. Drawings and Specifications indicate circuiting to electrical loads and distribution equipment.

B. Balance electrical load between phases as nearly as possible on switchboards, panelboards, motor control centers, and other equipment where balancing is required.

C. When loads must be reconnected to different circuits to balance phase loads, maintain accurate record of changes made, and provide circuit directory that lists final circuit arrangement.
3.04 CLEANING AND TOUCHUP PAINTING

A. Cleaning: Throughout the Work, clean interior and exterior of devices and equipment by removing debris and vacuuming.

B. Touchup Paint:

1. Touchup scratches, scrapes and chips on exterior and interior surfaces of devices and equipment with finish matching type, color, and consistency and type of surface of original finish.

2. If extensive damage is done to equipment paint surfaces, refinish entire equipment in a manner that provides a finish equal to or better than factory finish, that meets requirements of Specification, and is acceptable to Engineer.

3.05 PROTECTION FOLLOWING INSTALLATION

A. Protect materials and equipment from corrosion, physical damage, and effects of moisture on insulation and contact surfaces.

B. When equipment intended for indoor installation is installed at Contractor’s convenience in areas where subject to dampness, moisture, dirt or other adverse atmosphere until completion of construction, ensure adequate protection from these atmospheres is provided and acceptable to Engineer.

END OF SECTION
SECTION 31 10 00
SITE CLEARING

PART 1 GENERAL

1.01 DEFINITIONS
A. Interfering or Objectionable Material: Trash, rubbish, and junk; vegetation and other organic matter, whether alive, dead, or decaying; topsoil.
B. Clearing: Removal of interfering or objectionable material lying on or protruding above ground surface.
C. Grubbing: Removal of vegetation and other organic matter including stumps, buried logs, and roots greater than 2-inch caliper.
D. Stripping: Removal of topsoil remaining after applicable scalping is completed.
E. Project Limits: Areas, as shown or specified, within which Work is to be performed.

1.02 SUBMITTALS
A. Action Submittals: Drawings clearly showing clearing, grubbing, and stripping limits.

1.03 QUALITY ASSURANCE
A. Obtain Engineer’s approval of staked clearing, grubbing, and stripping limits, prior to commencing clearing, grubbing, and stripping.

1.04 SCHEDULING AND SEQUENCING
A. Prepare Site only after adequate erosion and sediment controls are in place.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION

3.01 GENERAL
A. Clear, grub, and strip areas actually needed for waste disposal, borrow, or Site improvements within limits shown or specified.
B. Do not injure or deface vegetation that is not designated for removal.
3.02 LIMITS

A. As follows, but not to extend beyond Project limits.
   1. Excavation 5 feet beyond top of cut slopes.
   2. Trench Excavation: 4 feet from trench centerline, regardless of actual trench width.
   3. Fill:
      a. Clearing and Grubbing: 5 feet beyond toe of permanent fill.
      b. Stripping 2 feet beyond toe of permanent fill.
   4. Waste Disposal:
      a. Clearing: 5 feet beyond perimeter.
      b. Scalping and Stripping: Not required.
      c. Grubbing: Around perimeter as necessary for neat finished appearance.
   5. Other Areas: As shown.

B. Remove rubbish, trash, and junk from entire area within Project limits.

3.03 CLEARING

A. Clear areas within limits shown or specified.

B. Fell trees so that they fall away from facilities and vegetation not designated for removal.

C. Cut stumps not designated for grubbing flush with ground surface.

D. Cut off shrubs, brush, weeds, and grasses to within 2 inches of ground surface.

3.04 GRUBBING

A. Grub areas within limits shown or specified.

3.05 STRIPPING

A. Do not remove topsoil until after clearing is completed.

B. Strip areas within limits to minimum depths shown or specified. Do not remove subsoil with topsoil.

3.06 DISPOSAL

A. Clearing and Grubbing Debris: Dispose of debris at the designated location onsite as specified by Owner.

B. Scalpings: As specified for clearing and grubbing debris.
C. Strippings: Dispose of strippings in waste disposal areas shown or approved by Owner.

END OF SECTION
PART 1 GENERAL

1.01 REFERENCES

A. The following is a list of standards which may be referenced in this section:

1. ASTM International (ASTM): D698, Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lb/ft³ (600 kN-m/m³)).

1.02 DEFINITIONS

A. Optimum Moisture Content: As defined in Section 31 23 23, Fill and Backfill.

B. Prepared Ground Surface: Ground surface after completion of clearing and grubbing, scalping of sod, stripping of topsoil, excavation to grade, and scarification and compaction of subgrade.

C. Relative Compaction: As defined in Section 31 23 23, Fill and Backfill.

D. Subgrade: Layer of existing soil after completion of clearing, grubbing, scalping of topsoil prior to placement of fill, roadway structure or base for floor slab. Subgrade for liner areas means prepared surface after completion of foundation layer preparation (or below underdrain blanket for those areas requiring an underdrain). See additional information herein for subgrade preparation.

E. Proof-Rolling: Testing of subgrade by compactive effort to identify areas that will not support the future loading without excessive settlement.

1.03 SEQUENCING AND SCHEDULING

A. Complete applicable Work specified in Section 02 41 00, Demolition; Section 31 10 00, Site Clearing; and Section 31 23 16, Excavation, prior to subgrade preparation.

B. Coordinate subgrade preparation with preparation of foundation layer, installation of GCL, HDPE geomembrane, and anchor trenches for the Central Corridor, and embankment fills and roadway materials for roadway areas.
1.04 QUALITY ASSURANCE

A. Notify Engineer when subgrade is ready for compaction or proof-rolling or whenever compaction or proof-rolling is resumed after a period of extended inactivity.

1.05 ENVIRONMENTAL REQUIREMENTS

A. Prepare subgrade when unfrozen and free of ice and snow.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION

3.01 GENERAL

A. Keep subgrade free of water, debris, and foreign matter during compaction or proof-rolling.

B. Bring subgrade to proper grade and cross-section and uniformly compact surface.

C. Do not use sections of prepared ground surface as haul roads. Protect prepared subgrade from traffic.

D. Maintain prepared ground surface in finished condition until next course is placed.

3.02 SUBGRADE FOR EMBANKMENT FILL

A. Under Earthfill: Compact upper 6 inches to minimum of 95 percent relative compaction.

3.03 SUBGRADE FOR FOUNDATION LAYER PREPARATION

A. After completion of excavation to grades as shown on Drawings, prepare the subgrade surface for the lining system by scarifying and compacting the top 6 inches of excavation to 95 percent relative compaction. Moisture condition as necessary to achieve specified compaction. Leave subgrade smooth and without ruts.

3.04 SUBGRADE FOR DITCHES

A. Subgrade shall meet requirements of embankment fill for fill areas. In cut areas, prepare subgrade to be firm and unyielding, track walk and ready for permanent soil stabilization.
B. In areas where ditches will be lined, subgrade shall be rolled smooth for liner placement.

3.05 MOISTURE CONDITIONING

A. Dry Subgrade: Add water, then mix to make moisture content uniform throughout.

B. Wet Subgrade: Aerate material by blading, discing, harrowing, or other methods, to hasten drying process.

3.06 TESTING

A. Proof-roll subgrade with equipment specified in Article Compaction, to detect soft or loose subgrade or unsuitable material, as determined by Engineer.

3.07 CORRECTION

A. Soft or Loose Subgrade:
   1. Adjust moisture content and recompact, or
   2. Over excavate as specified in Section 31 23 16, Excavation, and replace with suitable material from the excavation, as specified in Section 31 23 23, Fill and Backfill.

B. Unsuitable Material: Over excavate as specified in Section 31 23 16, Excavation, and replace with suitable material from the excavation, as specified in Section 31 23 23, Fill and Backfill.

END OF SECTION
PART 1  GENERAL

1.01  DEFINITIONS

A.  Common (Unclassified) Excavation: Removal of material not classified as rock excavation.

B.  Rock (Classified) Excavation:

1.  General: Removal of solid material which by actual demonstration cannot, in Engineer’s opinion, be reasonably loosened or ripped by single-tooth, hydraulically operated ripper mounted on crawler tractor in good condition and rated at minimum 310 flywheel horsepower (CAT D8 or approved equal); and which otherwise must be systematically broken by power-operated hammer, hydraulic rock breaker, expansive compounds, or other similar means prior to removal.

2.  Trench: Removal of solid material which by actual demonstration cannot, in Engineer’s opinion, be reasonably excavated with minimum 232-horsepower hydraulic excavator (CAT 324E or approved equal) in good condition and equipped with manufacturer’s standard boom, two rippers, and rock points or similar approved equipment; and which otherwise must be systematically broken by power-operated hammer, hydraulic rock breaker, expansive compounds, or other similar means prior to removal.

3.  Term “rock excavation” indicates removal of solid material, as specified above, and does not necessarily correspond to “rock” as implied by names of geologic formations.

4.  Removal of boulders larger than 1/2 cubic yard will be classified as rock excavation, if breaking them apart with power-operated hammer, hydraulic rock breaker, expansive compounds, or other similar means is both necessary and actually used for their removal.

1.02  SUBMITTALS

A.  Informational Submittals:

1.  Excavation Plan, Detailing:
   a.  Methods and sequencing of excavation and stockpiling.
   b.  Proposed locations of any temporary stockpiled excavated material.
   c.  Numbers, types, and sizes of equipment proposed to perform excavations.
d. Anticipated difficulties and proposed resolutions.

e. Reclamation (permanent stabilization) of onsite temporary spoil disposal areas.

1.03 QUALITY ASSURANCE

A. Provide adequate survey control to avoid unauthorized overexcavation.

1.04 WEATHER LIMITATIONS

A. Material excavated when frozen or when air temperature is less than 32 degrees F shall not be used as fill or backfill until material completely thaws.

B. Material excavated during inclement weather shall not be used as fill or backfill until after material drains and dries sufficiently for proper compaction.

1.05 SEQUENCING AND SCHEDULING

A. Site Preparation: Complete applicable Work specified in Section 31 10 00, Site Clearing, prior to excavating.

B. Dewatering: Conform to applicable requirements of this Section.

C. Excavation Support: Install and maintain as necessary to support sides of excavations (and trenches) and prevent detrimental settlement and lateral movement of existing facilities, adjacent property, and completed Work, as well as to protect worker safety.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION

3.01 GENERAL

A. Excavate to lines, grades, and dimensions shown and as necessary to accomplish Work. Excavate to within tolerance of plus or minus 0.1 foot, except where dimensions or grades are shown or specified as maximum or minimum. Allow for forms, working space, granular base, topsoil, and similar items, wherever applicable. Trim to neat lines where concrete is to be deposited against earth.

B. Do not overexcavate without written authorization of Engineer.
C. Review Excavation Plan with Engineer prior to beginning excavating activities. Obtain Engineer’s approval of deviations from Excavation Plan prior to their implementation.

D. Work excavation in a systematic manner. Continuously keep excavation graded to drain, and take necessary precautions to control erosion and prevent sediment releases, in conformance with Contractor’s Construction Period Sedimentation and Erosion Control Plan.

E. Excavate to the lines and grades shown on Drawings, leaving room for prepared subgrade and underdrain blanket system as shown or required. Protect subgrade in accordance with Section 31 23 13, Subgrade Preparation.

F. Excavation for the County Landfill Access Road will be performed to rough roadway subgrades by County in advance of Contractor Work. County will rough grade roadway and ditch to remove solid waste (refuse) from the excavation area, and backfill with Earthfill. Contractor will complete final excavation to shape road and ditch subgrades as necessary.

3.02 GENERAL (UNCLASSIFIED) EXCAVATION

A. Excavation is unclassified. Complete all excavation regardless of the type, nature, or condition of the materials encountered.

3.03 GENERAL TRENCHES

A. Minimum Width of Trenches:
   1. Single Pipes, Conduits, Direct-Buried Cables, and Duct Banks:
      a. Less than 4-inch Outside Diameter or Width: 18 inches.
      b. Greater than 4-inch Outside Diameter or Width: 18 inches greater than outside diameter or width of pipe, conduit, direct-buried cable, or duct bank.
   2. Multiple Pipes, Conduits, Cables, or Duct Banks in Single Trench: 18 inches greater than aggregate width of pipes, conduits, cables, duct banks, plus space between.
   3. Increase trench widths by thicknesses of sheeting.

B. Maximum Trench Width: Unlimited, unless otherwise shown or specified, or unless excess width will cause damage to existing facilities, adjacent property, or completed Work.

3.04 STOCKPILE EXCAVATION

A. Coordinate stockpile excavation with Owner.
B. When excavating material from Contractor’s stockpiles, excavate in a systematic manner. Expose only material required for immediate construction.

C. Keep stockpiles graded to drain and provide temporary erosion and stormwater control measures as needed to protect the work from damage. Apply permanent erosion control at completion of stockpile excavation in accordance with Section 31 32 00, Permanent Soil Stabilization.

3.05 TRENCH EXCAVATION FOR ANCHOR TRENCHES

A. Excavation: Excavate for the installation of Bottom Liner System (HDPE Geomembrane/GCL) anchor trench after the subgrade preparation zone is complete. All obstructions, such as tree roots, stumps, and other material of any type shall be removed.

B. At Bottom Liner System overlap with existing cell anchor trenches, carefully expose existing liner (geomembrane) surfaces using tools and methods that are protective of the existing liner (such as flat-bladed shovels and hand tools) in accordance with the approved Excavation Plan when within 12 inches of the existing liner.

C. Anchor Trench Width and Depth: The minimum anchor trench width shall be as shown on Drawings. Maintain leading edge of anchor trench smooth and rounded as practical to reduce stress on geosynthetic.

D. Contractor shall have sole responsibility for protection of the existing Bottom Liner systems within Original and East Cell E1 during exposure, connection, and backfill. Any damage to the existing liners caused by Contractor shall be repaired at Contractor’s expense.

3.06 EMBANKMENT AND CUT SLOPES

A. Shape, trim, and finish cut slopes to conform with lines, grades, and cross-sections shown, with proper allowance for topsoil or slope protection, where shown.

B. Remove stones and rock that exceed 3-inch diameter and that are loose and may roll down slope. Remove exposed roots from cut slopes.

C. Round tops of cut slopes in soil to not less than a 6-foot radius, provided such rounding does not extend offsite or outside easements and rights-of-way, or adversely impacts existing facilities, adjacent property, or completed Work.
3.07 STOCKPILING EXCAVATED MATERIAL

A. Stockpile excess excavated material not used in fills or as backfill in designated stockpile areas shown on Drawings.

B. Excess material from the project shall be placed in the stockpile at the location shown on Drawings. Contractor shall coordinate work with Owner and limit disturbance of the erosion and sediment control measures in and around the pile area. Only open (expose) the area required to place the material and work in a systematic and progressive fashion to limit disturbance. Reclaim (permanently stabilize) the stockpile as soon as possible.

C. Confine stockpiles to designated area shown on Drawings. Do not obstruct roadways or access to stockpiles.

D. Do not stockpile excavated material adjacent to trenches and other excavations unless excavation sideslopes and excavation support systems are designed, constructed, and maintained for stockpile loads.

E. Do not stockpile excavated materials near or over existing facilities, adjacent property, or completed Work, if weight of stockpiled material could induce excessive settlement.

F. Refer to Section 31 23 23, Fill and Backfill, for stockpile material placement requirements.

3.08 LOOSE/SOFT OR UNSUITABLE AREAS

A. Subexcavate to suitable material and backfill in accordance with Section 31 23 23, Fill and Backfill; refer to Article Replacing Overexcavated and Subexcavated Material.

3.09 DISPOSAL OF SPOIL

A. Dispose of excavated materials, which are unsuitable or not needed for fill or backfill, in designated spoil disposal areas. Materials not meeting definition of topsoil or general earthfill (debris, trash, etc.) shall be placed in a designated area onsite (within an active landfill area) at direction of Owner.

B. Dispose of debris resulting from removal of organic matter, trash, refuse, and junk as specified in Section 31 10 00, Site Clearing, for clearing and grubbing debris.

END OF SECTION
PART 1 GENERAL

1.01 REFERENCES

A. The following is a list of standards which may be referenced in this section:

1. American Concrete Institute (ACI):
   a. 301, Specifications for Structural Concrete for Buildings.
   b. 305R, Hot Weather Concreting.
   c. 306R, Cold Weather Concreting.
   d. 318/318R, Building Code Requirements for Structural Concrete.
   e. 347, Formwork for Concrete.

2. ASTM International (ASTM):
   a. A615, Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement.
   g. C494, Standard Specification for Chemical Admixtures for Concrete.
   h. C618, Standard Specification for Fly Ash and Raw or Calcined Natural Pozzolan for Use as a Mineral Admixture in Portland Cement Concrete.
   i. D75, Standard Practice for Sampling Aggregates.
   j. D698, Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft³ (600 kN-m/m³)).
   k. D1556, Standard Test Method for Density and Unit Weight of Soil in Place by the Sand-Cone Method.
   l. D1557, Test Method for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft³ (2,700 kN-m/m³)).
   m. D2922, Standard Test Methods for Density of Soil and Soil Aggregate in Place by Nuclear Methods (Shallow Depth).
   n. D4253, Standard Test Methods for Maximum Index Density and Unit Weight of Soils Using a Vibratory Table.
1.02 DEFINITIONS

A. Relative Compaction:
   1. Ratio, in percent, of as-compacted field dry density to laboratory maximum dry density as determined in accordance with ASTM D698.
   2. Apply corrections for oversize material to either as-compacted field dry density or maximum dry density, as determined by Engineer.

B. Optimum Moisture Content:
   1. Determined in accordance with ASTM Standard specified to determine maximum dry density for Relative Compaction.
   2. Determine field moisture content on basis of fraction passing 3/4-inch sieve.

C. Relative Density: Calculated in accordance with ASTM D4254 based on maximum index density determined in accordance with ASTM D4253 and minimum index density determined in accordance with ASTM D4254.

D. Prepared Ground Surface: Ground surface after completion of required demolition, clearing and grubbing, scalping of sod, stripping of topsoil, excavation to grade, and subgrade preparation.

E. Completed Course: A course or layer that is ready for next layer or next phase of Work.

F. Lift: Loose (uncompacted) layer of material.

G. Geosynthetics: Geotextiles, geogrids, geomembranes, or geosynthetic clay liner (GCL).

H. Well-Graded:
   1. A mixture of particle sizes with no specific concentration or lack thereof of one or more sizes.
   2. Does not define numerical value that must be placed on coefficient of uniformity, coefficient of curvature, or other specific grain size distribution parameters.
3. Used to define material type that, when compacted, produces a strong and relatively incompressible soil mass free from detrimental voids.

I. Influence Area:

1. Area within planes sloped downward and outward at 60-degree angle from horizontal measured from:
   a. 1 foot outside outermost edge at base of foundations or slabs.
   b. 1 foot outside outermost edge at surface of roadways or shoulder.
   c. 0.5 foot outside exterior at spring line of pipes or culverts.

J. Borrow Material: Material from required excavations or from designated borrow areas on or near Site.

K. Selected Backfill Material: Materials available onsite that Engineer determines to be suitable for specified use.

L. Imported Material: Materials obtained from sources offsite, suitable for specified use.

M. Structural Fill: Fill materials as required under structures, pavements, and other facilities.

N. Embankment Fill Material: Fill materials required to raise existing grade in areas other than under structures.

1.03 SUBMITTALS

A. Action Submittals:

1. Shop Drawings: Manufacturer’s recommendations for backfill around each buried structure (where applicable).
2. Samples: Imported material taken at source (as specified in Article Source Quality Control). Test results shall be available to Engineer within 48 hours after laboratory testing is completed.
3. Concrete mix design.

B. Informational Submittals:

1. Manufacturer’s data sheets for compaction equipment.
2. Certified test results from independent testing agency/laboratory.
3. Qualifications of Contractor’s hired independent testing agency/laboratory.
1.04 QUALIFICATIONS
   A. Independent Testing Agency/Laboratory: Minimum 10 years’ experience on related type projects (size and complexity) working with local soils in the area. Laboratory shall maintain calibrated instruments, equipment, and documented standard procedures for performing specified testing. All field testing shall be documented in terms of testing and sampling locations. GPS coordinates translated to the site for these locations are required.

1.05 QUALITY ASSURANCE/COORDINATION
   A. Notify Engineer or Owner when:
      1. Structure or landfill element is ready for backfilling, and whenever backfilling operations are resumed after a period of inactivity.
      2. Soft or loose subgrade materials are encountered wherever embankment or site fill is to be placed.
      3. Fill material appears to be deviating from Specifications.

1.06 SEQUENCING AND SCHEDULING
   A. Complete applicable Work specified in Section 02 41 00, Demolition; Section 31 23 16, Excavation; and Section 31 23 13, Subgrade Preparation, prior to placing fill or backfill.

   B. Backfill against concrete structures only after concrete has attained 70 percent of design strength. Obtain Engineer’s acceptance of concrete work and attained strength prior to placing backfill.

   C. Backfill around buried structures only after structure is set in position, securely anchored and ready to be backfilled, Engineer provides authorization to backfill, and completion of satisfactory leakage tests have been satisfactorily completed.

   D. Do not place road surfacing until after subgrade has been prepared as specified in Section 31 23 13, Subgrade Preparation.

1.07 SOURCE QUALITY CONTROL
   A. All imported materials specified in this section are subject to the following requirements:
      1. All tests necessary for the Contractor to locate an acceptable source of imported material shall be made by the Contractor and its approved independent testing agency/laboratory. Certification that the material conforms to the Specification requirements along with copies of the
certified test results shall be submitted to the Engineer for approval at least 10 working days before the material is required for use. All material samples to verify acceptable source of import material shall be furnished by the Contractor at the Contractor’s sole expense. Samples shall be representative and be clearly marked to show the source of the material and the intended use on the Project. Sampling of the material source shall be done by the independent testing agency/laboratory in accordance with ASTM D75. Notify the Engineer at least 24 hours prior to sampling. The Engineer may, at the Engineer’s option, observe the sampling procedures. Tentative acceptance of the material source may be based on an inspection of the source by the Engineer and/or the certified test results submitted by the Contractor to the Engineer, at the Engineer’s discretion. No imported materials shall be delivered to the site until the proposed source and materials tests have been tentatively accepted in writing by the Engineer. Final acceptance will be based on tests made on samples of material taken from the completed and compacted course by the independent testing agency/laboratory.

2. Gradation tests by the Contractor shall be made on samples taken at the place of production prior to delivery. Samples of the finished product for gradation testing shall be taken from each 500 tons of prepared materials or more often as determined by the Engineer, if variation in gradation is occurring, or if the material appears to depart from the Specifications. Test results shall be forwarded to the Engineer within 48 hours after sampling.

3. If tests conducted by the Contractor’s independent testing agency/laboratory indicate that the material does not meet Specification requirements, material placement will be terminated until corrective measures are taken. Material which does not conform to the Specification requirements and is placed in the work shall be removed and replaced at the Contractor’s sole expense. All sampling and testing performed by the Contractor shall be done at the Contractor’s sole expense.

PART 2 PRODUCTS

2.01 GENERAL EARTHFILL

A. Excavated material from required excavations free from rocks larger than 3 inches, from roots and other organic matter, ashes, cinders, trash, debris, and other deleterious materials.

B. Material containing more than 10 percent gravel, stones, or shale particles is unacceptable.
C. Provide imported material of equivalent quality, if required to accomplish Work.

2.02 FOUNDATION LAYER

A. Excavated material from required excavations free from rocks larger than 1-inch, from roots and other organic matter, ashes, cinders, trash, debris, and other deleterious materials.

B. Material shall contain sufficient fines (soil particles passing a U.S. No. 200 sieve) to compact into a low-permeability soil layer.

C. Owner’s designated stockpile for foundation layer is northeast of existing Cell E2.

2.03 GRANULAR FILL

A. Imported granular material.

B. 1-inch minus crushed gravel or crushed rock.

C. Free from dirt, clay balls, and organic material.

D. Well-graded from coarse to fine and containing sufficient fines to bind material when compacted, but with maximum 8 percent by weight passing No. 200 sieve.

2.04 DRAIN SAND

A. Free from clay, organic matter, or other deleterious material.

B. Gradation as determined in accordance with ASTM C117 and ASTM C136:

<table>
<thead>
<tr>
<th>Sieve Size</th>
<th>Percent Passing by Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>3/8-inch</td>
<td>100</td>
</tr>
<tr>
<td>1/4-inch</td>
<td>90 – 100</td>
</tr>
<tr>
<td>No. 4</td>
<td>65 – 80</td>
</tr>
<tr>
<td>No. 8</td>
<td>30 – 50</td>
</tr>
<tr>
<td>No. 16</td>
<td>15 – 30</td>
</tr>
<tr>
<td>No. 30</td>
<td>5 – 15</td>
</tr>
<tr>
<td>No. 100</td>
<td>0 – 3</td>
</tr>
<tr>
<td>No. 200</td>
<td>0 – 2</td>
</tr>
</tbody>
</table>
2.05 BACKFILL UNDER AND AROUND BURIED STRUCTURES

A. As specified for granular fill.

2.06 DRAIN GRAVEL

A. Free from clay, organic matter, or other deleterious material. Washed.

B. Round, smooth, competent rock.

C. General Type: Gradation as determined in accordance with ASTM C117 and ASTM C136:

<table>
<thead>
<tr>
<th>Sieve Size</th>
<th>Percent Passing by Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-1/2-inch</td>
<td>100</td>
</tr>
<tr>
<td>1-inch</td>
<td>80 – 100</td>
</tr>
<tr>
<td>3/4-inch</td>
<td>0 – 20</td>
</tr>
<tr>
<td>3/8-inch</td>
<td>0 – 2</td>
</tr>
<tr>
<td>No. 200</td>
<td>&lt;0.5</td>
</tr>
</tbody>
</table>

D. Sump: Gradation as determined in accordance with ASTM C117 and ASTM C136:

<table>
<thead>
<tr>
<th>Sieve Size</th>
<th>Percent Passing by Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>4-inch</td>
<td>100</td>
</tr>
<tr>
<td>3-inch</td>
<td>80 – 100</td>
</tr>
<tr>
<td>2-inch</td>
<td>0 – 20</td>
</tr>
<tr>
<td>1/2-inch</td>
<td>0 – 2</td>
</tr>
<tr>
<td>No. 200</td>
<td>&lt;0.5</td>
</tr>
</tbody>
</table>

2.07 RIPRAP

A. As specified in Section 31 37 00, Riprap.

2.08 CONCRETE

A. Concrete Product:

1. Ready-mixed meeting ASTM C94, Option A.
2. Portland Cement: ASTM C150, Type II.
3. Admixtures:
   b. Water-Reducing: ASTM C494, Type A or D.
   c. Fly Ash: ASTM C618, Class C or F.

4. Mix Design:
   a. Minimum Allowable 28-day Compressive Field Strength: 3,000 psi when cured.
   c. Slump Range: 3 inches to 5 inches.
   d. Air Entrainment: Between 3 percent and 6 percent by volume.

5. Mixing: Minimum 70 and maximum 270 revolutions of mixing drum. Nonagitating equipment is not allowed.

B. Reinforcing Steel:
   1. Deformed Bars: ASTM A615, Grade 60.

C. Ancillary Materials:
   1. Nonshrink Grout:
      b. Manufacturers: Master Builder Co. (Master Flow 928); Euclid Chemical Co. (Hiflow Grout).

2.09 COMPACTION EQUIPMENT

A. Compaction equipment shall be of suitable type and adequate to obtain the specified relative densities, and shall provide satisfactory breakdown of materials to form a dense and unyielding fill.

B. Compaction equipment shall be operated in strict accordance with the manufacturer’s instructions and recommendations. Equipment shall be maintained in such condition that it will deliver the manufacturer’s rated compactive effort. If inadequate relative densities are obtained, larger and/or different types of additional equipment shall be provided by the Contractor at the Contractor’s sole expense. Hand-operated equipment shall also be capable of achieving the specified relative densities.

2.10 EQUIPMENT FOR OPERATING OVER GEOSYNTHETICS

A. Track-mounted equipment with low ground pressure treads, no larger than a Caterpillar Model D6R LGP having a ground pressure of 5.0 psi or less, shall be used for spreading materials over the bottom liner system (geomembrane/GCL). In no case shall tracked equipment operate on less than 12 inches of cover over the bottom liner system.
B. Equipment other than the above described track-mounted equipment shall be operated above the bottom liner system on temporary haul roads at least 3 feet thick. Construction haul vehicles shall have a maximum contact pressure of 25 psi. Material used in temporary haul roads can be incorporated as part of the drain sand, provided material has not been contaminated and meets the requirements of drain sand. Otherwise, all construction haul road material shall be removed.

2.11 WATER FOR MOISTURE CONDITIONING
   A. Free of hazardous or toxic contaminates, or contaminants deleterious to proper compaction.

2.12 ROAD SURFACING AND BALLAST
   A. As specified in Section 32 11 23, Aggregate Base Courses.

2.13 SOIL COVER OVER GEOTEXTILES
   A. Refer to Section 31 32 19.16, Geotextile.

PART 3 EXECUTION

3.01 GENERAL
   A. Keep placement surfaces free of water, debris, and foreign material during placement and compaction of fill and backfill materials.

   B. Place and spread fill and backfill materials in horizontal lifts of uniform thickness, in a manner that avoids segregation, and compact each lift to specified relative densities prior to placing succeeding lifts. Slope lifts only where necessary to conform to final grades or as necessary to keep placement surfaces drained of water.

   C. During filling and backfilling, keep level of fill and backfill around each structure and buried tank even.

   D. Do not place fill or backfill, if fill or backfill material is frozen, or if surface upon which fill or backfill is to be placed is frozen.

   E. If pipe, conduit, duct bank, or cable is to be laid within fill or backfill:
      1. Fill or backfill to an elevation 2 feet above top of item to be placed.
      2. Excavate trench for installation of item.
      3. Install bedding, if applicable, as specified in Section 31 23 23.15, Trench Backfill.
      4. Install item.
5. Backfill envelope zone and remaining trench, as specified in Section 31 23 23.15, Trench Backfill, before resuming filling or backfilling specified in this section.

F. Tolerances:

1. Final Lines and Grades: Within 0.1 foot unless dimensions or grades are shown or specified otherwise.
2. Grade to establish and maintain slopes and drainage as shown. Reverse slopes are not permitted.

G. Settlement: Correct and repair any subsequent damage to structures, slabs, piping, and other facilities, caused by settlement of fill or backfill material.

3.02 BACKFILL UNDER AND AROUND STRUCTURES

A. Under Facilities: Within influence area beneath structures, slabs, roadways, piping, conduits, and other facilities, backfill with granular fill, unless otherwise shown. Place granular fill in lifts of 6-inch maximum thickness and compact each lift to minimum of 95 percent Relative Compaction.

B. Other Areas: Backfill with general earthfill to lines and grades shown, with proper allowance for material thicknesses. Place in Lifts of 8-inch maximum thickness and compact each lift to minimum 95 percent relative compaction.

3.03 FILL

A. Outside Influence Areas beneath Structures, Tanks, Slabs, Piping, and Other Facilities:

1. Unless otherwise shown, place earthfill as follows:
   a. Allow for 6-inch thickness of topsoil where required.
   b. Maximum 8-inch thick lifts.
   c. Place and compact fill across full width of embankment.
   d. Compact to minimum 95 percent relative compaction.
   e. Dress completed embankment with allowance for topsoil, crest surfacing, and slope protection, where applicable.

3.04 REPLACING OVEREXCAVATED AND SUBEXCAVATED MATERIAL

A. Replace excavation carried belowgrade lines shown or established by Engineer as follows:

1. If areas continue to be relatively soft but can be reinforced by fabric per the Engineer, install a woven (reinforcing) geotextile in the
overexcavated/subexcavated zone as specified in Section 31 32 19.16, Geotextile.

2. Beneath Fill or Backfill: Same material as specified for overlying fill or backfill.

3. Permanent Cut Slopes (Where Overlying Area is Not to Receive Fill or Backfill):
   a. Flat to Moderate Steep Slopes (3H:1V, Horizontal Run: Vertical Rise or Flatter): Earthfill.
   b. Steep Slopes (Steeper than 3H:1V):
      1) Correct overexcavated or subexcavated zones by transitioning between overcut areas and designed slope adjoining areas, provided such cutting does not adversely impact existing facilities, adjacent facility areas, or completed Work.
      2) Backfilling in these areas of steep slopes is restricted unless, in Engineer’s opinion, backfill will remain stable, and material is replaced as compacted earth fill. Coordinate with Engineer in these zones.

3.05 PREPARED NATIVE SUBGRADE/FOUNDATION LAYER

A. Conform to requirements of Section 31 23 13, Subgrade Preparation.

3.06 BACKFILL FOR SUMP

A. Use Sump Drain Gravel of the type specified herein. Place simultaneously on both sides of pipes in 6-inch lifts for full width of sump. Work the material around the lower part of the pipes and compact to ensure solid backing to underside of pipes and fittings. Place geotextile around gravel pack as shown on Drawings in accordance with Section 31 23 19.16, Geotextile.

3.07 BACKFILL FOR LINER ANCHOR TRENCHES

A. Liner anchor trenches shall be backfilled with selected earthfill as shown on Drawings, placed in 8-inch maximum lifts, and compacted to 95 percent relative compaction. HDPE geomembrane seam welds shall extend through the anchor trench to the bottom of the welded sheets. Extend GCL also through trench zone as shown.

3.08 PLACING FILL OVER GEOSYNTHETICS

A. General:
   1. Prior to placing material over geomembrane, notify Engineer. Do not cover installed geomembrane until after Engineer provides authorization to proceed.
2. Do not place materials on geomembrane where typical height of wrinkles is greater than 2 inches and spacing between wrinkles is less than 10 feet. Also, do not place soil materials in manner that will cause wrinkles to fold over or become confined to form a vertical ridge.

3. Place soil materials when geomembrane is cool and contracted and wrinkles are minimized.

4. If tears, punctures, or other geomembrane damage occurs during placement of overlying material, remove overlying products as necessary to expose damaged geomembrane, and repair damage as specified in Section 33 47 13.01, High Density Polyethylene (HDPE) Geomembrane Liner.

5. Geomembrane installer shall remain available during placement of overlying products to repair geomembrane if damaged.

6. Place fill over geosynthetics with sufficient care so as not to damage them.

7. Place fill only by back dumping and spreading evenly.

8. Dump fill only on previously placed fill.

9. While operating equipment, avoid sharp turns, sudden starts or stops that could damage geosynthetics.

B. Hauling and Spreading Equipment: Refer to Article Equipment for Operating Over Geosynthetics.

C. Spreading:

1. Spread fill in same direction as unseamed overlaps to avoid separation of seams and joints.

2. Never push fill downslope. Spread fill over sideslopes by pushing up from slope bottom. Limit distance material falls onto the geosynthetics to maximum of 2 feet.

3. Correct wrinkles in geosynthetics as specified in respective Specification section for each geosynthetic.

4. Maintain proper overlap of unseamed geosynthetics.

5. Avoid overstressing geosynthetics and seams.

D. Compaction: Compact fill only after uniformly spread to full lift thickness as specified herein.

E. Geosynthetic Damage:

1. Mark punctures, tears, or other damage to geosynthetics, so repairs may be made.

2. Clear overlying fill as necessary to repair damage.

3. Repairs to geosynthetics shall be made by respective installers as specified in respective specification section for each geosynthetic.
4. Refer to Section 33 47 13.07, Geosynthetic Clay Liner (GCL), for timing of cover of the liner system.

3.09 DRAIN SAND PLACEMENT FOR LEACHATE COLLECTION LAYER

A. Place material to lines and grades shown and as specified in Article Placing Fill Over Geosynthetics. Compact by tracking a minimum three passes with spreading equipment.

B. Contractor shall provide and maintain a means of continuously observing the depth of each material such as by freestanding markers until placement is complete, at intervals of 50 feet maximum each way or demonstrated use of GPS automated system. Sharp stakes or methods that could damage the geosynthetics will not be allowed. Contractor shall provide and operate air jetting equipment to assist Engineer’s checking of material depths. For purposes of bidding, assume depth checks on 100-foot grid pattern (that is, one test per 100-foot square grid area).

C. During material placement operations, the Engineer may also be monitoring geomembrane movement and integrity. At the Engineer’s request, the Contractor shall uncover (in addition to sand layer thickness checks) up to twenty 2-foot square areas of the HDPE geomembrane over the course of the project at no additional cost to the Owner.

3.10 CONCRETE

A. Quality Assurance:

1. Formwork: Unless otherwise specified, follow the recommendations of ACI 347.
2. Hot Weather Concreting: Conform to ACI 305R.
3. Cold Weather Concreting: Conform to ACI 306R.

B. Environmental Requirements:

1. Do not place Concrete when the ambient temperature is below 40 degrees F or approaching 40 degrees F and air temperature less than 40 degrees F for the first 7 days, without special protection to keep Concrete above 40 degrees F.
2. Do not use solvent curing compounds. Use only water-based curing methods.

C. Formwork:

1. Form Materials: Used dressed lumber for the slab edge formwork.
2. Construction:
   a. In accordance with ACI 347.
   b. Make joints tight to prevent escape of mortar and to avoid formation of fins.
   c. Brace as required to prevent distortion during concrete placement.

3. Form Removal:
   a. Remove after 72 hours after placement at the earliest.
   b. Remove forms with care to prevent scarring and damaging the surface and corners.

D. Placing Concrete:

1. Place concrete in accordance with ACI 301.
2. Prior to placing concrete, remove water from excavation and debris and foreign material from forms. Check reinforcing steel for proper placement and correct discrepancies.
3. Before depositing new concrete on old concrete, clean surface using sandblast or bushhammer or other mechanical means to obtain a 1/4-inch rough profile, and pour a cement-sand grout to minimum depth of 1/2-inch over the surface. Proportion 1 part cement to 2.5 parts sand by weight.
4. Place concrete as soon as possible after leaving mixer, without segregation or loss of ingredients, without splashing forms or steel above, and in layers not over 2 feet deep. Place within 1-1/2 hours after adding cement to mix.
5. Eight feet maximum vertical drop to final placement, when not guided with chutes or other devices to prevent segregation due to impact with reinforcing.
6. All concrete pads for the project shall be reinforced with #4 bar at 12 inches on center, each way. Provide a minimum of 1-1/2 inches of cover over the bars.

E. Compaction:

1. Vibrate concrete as follows:
   a. Apply approved vibrator at points spaced not farther apart than vibrator’s effective radius.
   b. Apply close enough to forms to vibrate surface effectively but not damage form surfaces.
   c. Vibrate until concrete becomes uniformly plastic.
   d. Vibrator must penetrate fresh placed concrete and into previous layer of fresh concrete below.
F. Finishing:

1. Exterior Slabs:
   a. Bull float with wood float, wood trowel, and lightly trowel with steel trowel.
   b. Finish with broom to obtain nonskid surface.
   c. Finish exposed edges with steel edging tool.

2. Pipe Penetration (Boot) Collars: Same as exterior slabs but finish smooth.

G. Protection and Curing:

1. Protect fresh concrete from direct rays of sunlight, drying winds, and wash by rain.
2. Use curing compound only where approved by Engineer. Cure formed surfaces with curing compound applied in accordance with manufacturer’s directions as soon as forms are removed and finishing is completed.
3. Remove and replace concrete damaged by freezing.

H. Protection of Liner System:

1. Protect liner system geosynthetics and components during all phases of concrete placement.
2. Damage to the liner system resulting from concrete placement activities shall be repaired by Contractor at no cost to Owner. Repairs shall be made by the trained installation crew of each liner system component.

3.11 PLACEMENT OF MATERIALS IN STOCKPILES

A. General Soil Stockpiles: Place material in maximum 12-inch lifts and compact by tracking with spreading equipment to provide a firm and unyielding surface. Keep stockpiles graded to drain and employ erosion control measures as specified in Section 01 57 13, Erosion and Sediment Control During Construction; and permanently stabilize in accordance with Section 31 32 00, Permanent Soil Stabilization.

3.12 FIELD QUALITY CONTROL TESTING

A. During fill and backfill activities, soil materials shall be verified for gradation and placement thicknesses in conformance with these specification and as shown on Drawings.

B. Testing requirements and locations shall be coordinated with (and approved by) the Engineer.
C. For tests conducted in the field, Contractor shall make available test results to the Engineer within 24 hours. If a sample is taken from the field and sent to a laboratory for testing, Contractor shall make available test results to the Engineer within 48 hours after the sample is taken in the field.

D. For bidding purposes, the following minimum test schedule shall be assumed:

1. In-place density tests shall be made on the following minimum schedule:
   a. Foundation Layer Preparation: Ten per acre.
   b. Trench Backfill: One per 250 linear feet per lift.
   c. Gravel Bases for Slabs: Two per slab.
   d. Roadways and Embankment Fill Areas: One per 250 feet per lift.
   e. Ditches: One per 200 linear feet (vegetated ditches excluded).

2. Standard Proctor laboratory density curves (five-point minimum) shall be submitted by Contractor for each imported material in accordance with ASTM D698. Samples of native materials used for embankment and backfill and additional samples of imported materials shall be taken at locations requested by Engineer.

E. Evaluation of Concrete Field Strength: One per concrete load; testing shall be done in accordance with ACI 318/318R.

3.13 ROAD SURFACING AND BALLAST

A. Place and compact as specified in Section 32 11 23, Aggregate Base Courses.

END OF SECTION
PART 1   GENERAL

1.01   REFERENCES

A.  The following is a list of standards which may be referenced in this section:

  2.  ASTM International (ASTM):
      f.  C618, Standard Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use in Concrete.
      h.  D698, Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft³ (600 kN-m/m³)).
      j.  D1557, Standard Test Methods for Laboratory Compaction Characteristics of Soil using Modified Effort (56,000 ft-lbf/ft³ (2,700 kN-m/m³)).
      k.  D2487, Standard Practice for Classification of Soils for Engineering Purposes (Unified Soil Classification System).
      l.  D4253, Standard Test Methods for Maximum Index Density and Unit Weight of Soils Using a Vibratory Table.
      m.  D4254, Standard Test Methods for Minimum Index Density and Unit Weight of Soils and Calculation of Relative Density.
1.02 DEFINITIONS

A. Base Rock: Granular material upon which manhole bases and other structures are placed.

B. Bedding Material: Granular material upon which pipes, conduits, cables, or duct banks are placed.

C. Imported Material: Material obtained by Contractor from source(s) offsite.

D. Lift: Loose (uncompacted) layer of material.

E. Pipe Zone: Backfill zone that includes full trench width and extends from prepared trench bottom to an upper limit above top outside surface of pipe, conduit, cable or duct bank.

F. Prepared Trench Bottom: Graded trench bottom after excavation and installation of stabilization material, if required, but before installation of bedding material.

G. Relative Compaction: The ratio, in percent, of the as-compacted field dry density to the laboratory maximum dry density as determined by ASTM D698. Corrections for oversize material may be applied to either as-compacted field dry density or maximum dry density, as determined by Engineer.

H. Relative Density: As defined by ASTM D4253 and ASTM D4254.

I. Selected Backfill Material: Material available onsite that Engineer determines to be suitable for a specific use.

J. Well-Graded:

1. A mixture of particle sizes that has no specific concentration or lack thereof of one or more sizes producing a material type that, when compacted, produces a strong and relatively incompressible soil mass free from detrimental voids. Satisfying both of the following requirements, as defined in ASTM D2487:
   a. Coefficient of Curvature: Greater than or equal to 1 and less than or equal to 3.
   b. Coefficient of Uniformity: Greater than or equal to 4 for materials classified as gravel, and greater than or equal to 6 for materials classified as sand.
1.03  SUBMITTALS

A.  Action Submittals:

1.  Shop Drawings: Manufacturer’s descriptive literature for marking tapes.

B.  Informational Submittals:

1.  Catalog and manufacturer’s data sheets for compaction equipment.
2.  Certified Gradation Analysis: Coordinate with Section 31 23 23, Fill and Backfill, for materials used in Trench Backfill.
3.  Controlled Low Strength Material: Certified mix design and test results. Include material types and weight per cubic yard for each component of mix.

PART 2  PRODUCTS

2.01 GEOTEXTILE

A.  As specified in Section 31 32 19.16, Geotextile.

2.02 MARKING TAPE

A.  General: Install outside of liner limits.

B.  Detectable:

1.  Solid aluminum foil, visible on unprinted side, encased in protective high visibility, inert polyethylene plastic jacket.
2.  Foil Thickness: Minimum 0.35 mils.
3.  Laminate Thickness: Minimum 5 mils.
4.  Width: 3 inches.
5.  Identifying Lettering: Minimum 1-inch high, permanent black lettering imprinted continuously over entire length.
6.  Joining Clips: Tin or nickel-coated furnished by tape manufacturer.
7.  Manufacturers and Products:
   a.  Reef Industries; Terra Tape, Sentry Line Detectable.
   b.  Mutual Industries; Detectable Tape.
   c.  Presco; Detectable Tape.

C.  Color: In accordance with APWA Uniform Color Code.

<table>
<thead>
<tr>
<th>Color*</th>
<th>Facility</th>
</tr>
</thead>
<tbody>
<tr>
<td>Red</td>
<td>Electric power lines, cables, conduit, and lightning cables</td>
</tr>
<tr>
<td>Orange</td>
<td>Communicating alarm or signal lines, cables, or conduit</td>
</tr>
</tbody>
</table>
2.03 TRACER WIRE

A. Material: Minimum 12-gauge solid copper or copper jacket with a steel core, with high-density polyethylene (HDPE) or high-molecular weight polyethylene (HMWPE) insulation suitable for direct bury.

B. Splices: Use wire nut or lug suitable for direct burial as recommended by tracer wire manufacturer.

C. Manufacturers:
   1. Copperhead Industries, LLC.
   2. Performance Wire & Cable Inc.

2.04 TRENCH STABILIZATION MATERIAL

A. In areas where trench bottom is not stable, apply trench stabilization material.

B. Granular Backfill: As specified for granular fill under Section 31 23 23, Fill and Backfill.

2.05 BEDDING MATERIAL AND PIPE ZONE MATERIAL

A. Unfrozen, friable, and no clay balls, roots, or other organic material.

B. Clean or gravelly sand with less than 5 percent passing No. 200 sieve, as determined in accordance with ASTM D1140, or gravel or crushed rock within maximum particle size and other requirements as follows unless otherwise specified.

1. Pipe Under 18-Inch Diameter: 3/4-inch maximum particle size, except 1/4 inch for stainless steel pipe, copper pipe, tubing, and plastic pipe under 3-inch diameter.
2. Pipe 18-Inch Diameter and Greater: 1-1/2-inch maximum particle size for ductile iron pipe, concrete pipe, welded steel pipe, and pretensioned or prestressed concrete cylinder pipe.
3. Perforated Pipe: Granular drain gravel material, as shown.
4. Conduit and Direct-Buried Cable:
   a. Sand, clean or clean to silty, less than 12 percent passing No. 200 sieve.
c. Maximum Size Particle: Pass a No. 4 sieve.
d. If more than 5 percent passes No. 200 sieve, the fraction that passes No. 40 sieve shall be nonplastic as determined in accordance with ASTM D4318.

2.06 DRAIN GRAVEL
   A. As specified in Section 31 23 23, Fill and Backfill.

2.07 SELECTED BACKFILL
   A. As specified in Section 31 23 23, Fill and Backfill.

2.08 GRAVEL SURFACING ROCK
   A. As specified in Section 32 11 23, Aggregate Base Courses.

2.09 TOPSOIL
   A. As specified in Section 32 91 13, Soil Preparation.

2.10 ABOVE PIPE ZONE
   A. Solid Wall Pipe (Trenches): Selected Earthfill.
   B. Perforated Pipe: Drain gravel, as shown.

2.11 SOURCE QUALITY CONTROL
   A. Refer to Section 31 23 23, Fill and Backfill.

PART 3 EXECUTION

3.01 TRENCH PREPARATION
   A. Water Control:
      1. Promptly remove and dispose of water entering trench as necessary to grade trench bottom and to compact backfill and install manholes, pipe, conduit, direct-buried cable, or duct bank. Do not place concrete, lay pipe, conduit, direct-buried cable, or duct bank in water.
      2. Remove water in a manner that minimizes soil erosion from trench sides and bottom.
      3. Provide continuous water control until trench backfill is complete.
B. Remove foreign material and backfill contaminated with foreign material that falls into trench.

3.02 TRENCH BOTTOM

A. Firm Subgrade: Grade with hand tools, remove loose and disturbed material, and trim off high areas and ridges left by excavating bucket teeth. Allow space for bedding material if shown or specified.

B. Soft Subgrade: If subgrade is encountered that may require removal to prevent pipe settlement, notify Engineer. Engineer will determine depth of overexcavation, if any required.

3.03 TRENCH STABILIZATION MATERIAL INSTALLATION

A. Rebuild trench bottom with trench stabilization material.

B. Place material over full width of trench in 6-inch lifts to required grade, providing allowance for bedding thickness.

C. Compact each lift so as to provide a firm, unyielding support for the bedding material prior to placing succeeding lifts.

3.04 BEDDING

A. Furnish imported bedding material where, in the opinion of Engineer, excavated material is unsuitable for bedding or insufficient in quantity.

B. Place over full width of prepared trench bottom in two equal lifts when required depth exceeds 8 inches.

C. Hand grade and compact each lift to provide a firm, unyielding surface.

D. Minimum thickness as follows:

1. Pipe 15 Inches and Smaller: 4 inches.
2. Pipe 18 Inches to 36 Inches: 6 inches.
3. Pipe 42 Inches and Larger: 8 inches.
4. Conduit: 3 inches.
5. Direct-Buried Cable: 3 inches.

E. Check grade and correct irregularities in bedding material. Loosen top 1 inch to 2 inches of compacted bedding material with a rake or by other means to provide a cushion before laying each section of pipe, conduit, direct-buried cable, or duct bank.
F. Install to form continuous and uniform support except at bell holes, if applicable, or minor disturbances resulting from removal of lifting tackle.

G. Bell or Coupling Holes: Excavate in bedding at each joint to permit proper assembly and inspection of joint and to provide uniform bearing along barrel of pipe or conduit.

3.05 BACKFILL PIPE ZONE

A. Upper limit of pipe zone shall not be less than following:
   1. Pipe: 12 inches, unless shown otherwise.
   2. Conduit: 3 inches, unless shown otherwise.
   3. Direct-Buried Cable: 3 inches, unless shown otherwise.
   4. Duct Bank: 3 inches, unless shown otherwise.

B. Restrain pipe, conduit, cables, and duct banks as necessary to prevent their movement during backfill operations.

C. Place material simultaneously in lifts on both sides of pipe and, if applicable, between pipes, conduit, cables, and duct banks installed in same trench.
   1. Pipe 10-Inch and Smaller Diameter: First lift less than or equal to 1/2 pipe diameter.
   2. Pipe Over 10-Inch Diameter: Maximum 6-inch lifts.

D. Thoroughly tamp each lift, including area under haunches, with handheld tamping bars supplemented by “walking in” and slicing material under haunches with a shovel to ensure voids are completely filled before placing each succeeding lift.

E. Do not use power-driven impact compactors to compact pipe zone material.

3.06 MARKING TAPE INSTALLATION

A. Continuously install marking tape along centerline of buried piping, on top of last lift of pipe zone material. Coordinate with piping installation drawings.

   1. Detectable Marking Tape: Install with nonmetallic piping and waterlines.

3.07 TRACER WIRE INSTALLATION AND TESTING

A. Install tracer wire continuously along centerline of nonmetallic buried piping.
B. Attach wire to top of pipe using tape at maximum of 10-foot intervals. In areas where depth of cover is excessive for allowing detection of tracer wire with electronic pipe locator, install tracer wire within pipe backfill directly above pipe centerline at a minimum depth of 3 feet.

C. Install splices in accordance with manufacturer’s instructions for direct bury applications. Tie ends of wire to be joined in a knot as required to reduce tension on splice.

D. Bring tracer wire to surface at valve box and manhole. Tracer wire shall be brought to surface at least every 1,000 feet. If distance between pipe appurtenances exceeds 1,000 feet, install valve box to allow access to tracer wire. Mark valve box cover with the word “TRACER”. Coil enough excess tracer wire at each appurtenance to extend wire 12 inches aboveground.

E. Test continuity of tracer wire using electronic pipe locator in presence of Engineer.

3.08 BACKFILL ABOVE PIPE ZONE

A. General:

1. Process excavated material to meet specified gradation requirements.
2. Adjust moisture content as necessary to obtain specified compaction.
3. Do not allow backfill to free fall into trench or allow heavy, sharp pieces of material to be placed as backfill until after at least 2 feet of backfill has been provided over top of pipe.
4. Do not use power driven impact type compactors for compaction until at least 4 feet of backfill is placed over top of pipe.
5. Backfill to grade with proper allowances for topsoil, crushed rock surfacing, and pavement thicknesses, wherever applicable.
6. Backfill around structures with same class backfill as specified for adjacent trench, unless otherwise shown or specified.

B. Backfill:

1. Backfill with selected earth backfill.
2. Leave trench with backfill material neatly mounded across the entire trench width, but not more than 6 inches above the adjacent ground surface.
3. In lawn, garden, or similar type areas, maintain trench level with the existing adjacent grade.
4. At Other Locations:
   a. Estimate and provide amount of backfill material required so that after normal settlement, settled surface will match adjacent ground surface.
b. Neatly windrow material over trench, and remove excess.
c. Correct excess or deficiency of backfill material apparent after settlement and within correction period by regrading, and disposing of excess material or adding additional material where deficient.

3.09 BACKFILL FOR LEACHATE COLLECTION TRENCHES

A. Use drain gravel of the type specified. Place simultaneously on both sides of the perforated pipe in 6-inch lifts for full width of trench/ditch. Work the material around the pipe to compact to ensure solid support and backing to underside of pipe (and fittings). Wrap geotextile around trench as shown on Drawings and in accordance with Section 31 32 19.16, Geotextile.

3.10 MAINTENANCE OF TRENCH BACKFILL

A. After each section of trench is backfilled, maintain surface of backfilled trench even with adjacent ground surface until final surface restoration is completed.

B. Gravel Surfacing Rock: Add gravel surfacing rock where applicable and as necessary to keep surface of backfilled trench even with adjacent ground surface, and grade and compact as necessary to keep surface of backfilled trenches smooth, free from ruts and potholes, and suitable for normal traffic flow.

C. Other Areas: Add excavated material where applicable and keep surface of backfilled trench level with adjacent ground surface.

3.11 SETTLEMENT OF BACKFILL

A. Settlement of trench backfill, or of fill, or facilities constructed over trench backfill will be considered a result of defective compaction of trench backfill.

3.12 FIELD QUALITY CONTROL TESTING

A. Refer to Section 31 23 23, Fill and Backfill.

END OF SECTION
SECTION 31 32 00
PERMANENT SOIL STABILIZATION

PART 1 GENERAL

1.01 WORK OF THIS SECTION

A. This section covers the Work to permanently manage and stabilize the Site. Refer to Section 01 57 13, Erosion and Sediment Control During Construction, for requirements associated with managing stormwater and erosion during construction activities. Permanent soil stabilization measures shall be coordinated with temporary measures which are employed. Contractor shall stage Work in such manner to limit disturbance and finish and stabilize areas as Work is completed. Leaving areas open and vulnerable to erosion and sediment transport is not acceptable. The Work shall include the furnishing of all labor, materials, tools, and equipment to perform such work and services necessary as herein specified and as indicated on Drawings.

1.02 REFERENCES

A. The following is a list of standards which may be referenced in this section:

1. ASTM International (ASTM):
   a. D3776, Standard Test Method for Mass Per Unit Area (Weight) of Fabric.

1.03 DEFINITIONS

A. Maintenance Period: Begin maintenance immediately after each area is planted and continue for a period of 8 weeks after all planting under this section is completed.

B. Permanent Soil Stabilization: Finished surfacing to be placed on permanent and cut and fill slopes for roadway embankments as shown on Drawings, on stockpile areas for surplus material stockpiles, and on Contractor disturbed areas requiring soil erosion stabilization. Permanent soil stabilization consists of surface preparation, placement hydroseed with seed, fertilizer, tackifier, and mulch, and placement of erosion control matting.
C. Satisfactory Stand:

1. Grass or section of grass of 10,000 square feet or larger that has:
   a. No bare spots larger than 3 square feet.
   b. Not more than 10 percent of total area with bare spots larger than 1 square foot.
   c. Not more than 15 percent of total area with bare spots larger than 6 square inches.

D. Oversteepened Areas: Areas with slopes steeper than 3H:1V, as approved by Engineer.

1.04 SUBMITTALS

A. Action Submittals: Product data for commercial products.

B. Informational Submittals:

1. Subschedule of drainage, erosion, and sedimentation control.
3. Manufacturer’s Installation Instructions: Commercial products.
4. Seed certifications.
5. Copies of delivery invoices or other proof of quantities of mulch and fertilizer.

1.05 DELIVERY, STORAGE, AND PROTECTION

A. Per manufacturer’s recommendations.

1. Furnish in standard containers with seed name, lot number, net weight, percentages of purity, germination, and hard seed and maximum weed seed content, clearly marked for each container of seed.
2. Keep dry during storage.

B. Hydroseeding Mulch: Mark package of wood fiber mulch to show air dry weight.

1.06 SEQUENCING AND SCHEDULING

A. Engineer’s acceptance of the Stormwater Pollution Prevention Plan (SWPPP) with applicable sections required prior to starting earth disturbing activities. Refer to Drawings and Section 01 57 13, Erosion and Sediment Control During Construction.
B. Complete soil preparation, seeding, fertilizing, mulching and matting within 5 calendar days after final grades have been reached. If permanent stabilization is delayed, final grades must be maintained and protected from erosion until permanent stabilization is completed.

C. Notify Engineer at least 3 calendar days in advance of:
   1. Materials delivery.
   2. Start of planting activity.

D. Seeding: Perform under favorable weather conditions during seasons that are normal for such Work as determined by accepted local practice.

1.07 MAINTENANCE

A. Operations:
   1. Perform during maintenance period to include:
      a. Watering: Water as needed to maintain plant life during dry periods.
      b. Washouts: Repair by filling with topsoil, fertilizing, seeding, and mulching.
      c. Mulch and Matting: Replace wherever and whenever washed out or blown away.
      d. Reseed unsatisfactory areas or portions thereof immediately at the end of the maintenance period if a satisfactory stand has not been produced.
      e. Reseed during next planting season if scheduled end of maintenance period falls after October 1.
      f. Reseed entire area if satisfactory stand does not develop by July 1 of the following year.
   2. Inspect, repair, and replace as necessary all erosion control measures during the time period from start of construction to completion of construction.

1.08 PERMANENT SOIL STABILIZATION AREAS

A. General: Permanent soil stabilization to be placed on all final cut and fill slopes associated with new roadway construction; all areas disturbed by construction activities; completed surplus soil stockpile areas; and borrow excavation areas.
PART 2 PRODUCTS

2.01 FERTILIZER

A. Commercial, uniform in composition, free-flowing, suitable for application with equipment designed for that purpose.

B. Fertilizer shall have the following minimum percentage of plant food by weight:

1. Mix:
   b. Ammonical Nitrogen: 16 percent.
   c. Urea Nitrogen: 2 percent.
   d. Soluble Potash: 10 percent.
   e. Sulfur: 19 percent.

C. Fertilizer shall be suitable for hydraulic application.

2.02 SEED

A. Fresh, clean new-crop seed that complies with the tolerance for purity and germination established by Official Seed Analysts of North America.

B. Mix (use standard facility seed mix):

3. Canada Bluegrass: 29.03 percent.

2.03 MULCH

A. Wood Cellulose Fiber Mulch:

1. Specially processed wood fiber containing no growth or germination inhibiting factors.
2. Dyed a suitable color to facilitate inspection of material placement.
3. Manufactured such that after addition and agitation in slurry tanks with water, the material fibers will become uniformly suspended to form homogenous slurry.
4. When hydraulically sprayed on ground, material will allow absorption and percolation of moisture.
2.04 TACKIFIER

A. Derived from natural organic plant sources containing no growth or germination-inhibiting materials.

B. Capable of hydrating in water, and to readily blend with other slurry materials.

C. Wood Cellulose Fiber: If tackifier added as a separate layer, add as tracer (150 pounds per acre).

D. Manufacturers and Products:
   1. Organic Tackifier: Hydrostick, Finn Corp, 9281 LeSaint Dr., Fairfield, OH 45014; (800) 543-7166.
   2. Organic Tackifier: Hydrotack, Finn Corp, 9281 LeSaint Dr., Fairfield, OH 45014; (800) 543-7166.

2.05 EROSION CONTROL MATTING

A. Excelsior mat or straw blanket; staples as recommended by matting manufacturer.

B. Manufacturers and Products:
   1. Akzo Industries, Asheville, NC; Curlex Mat.
   2. North American Green, Evansville, IN; S150 blanket.

2.06 S150 BLANKET TACKIFIER

A. Derived from natural organic plant sources containing no growth or germination-inhibiting materials.

B. Capable of hydrating in water, and to readily blend with other slurry materials.

C. Wood Cellulose Fiber: Add as tracer, at rate of 150 pounds per acre.

D. Manufacturers and Products:
   2. Terra; Tack AR.
   3. J-Tack; Reclamare.
PART 3 EXECUTION

3.01 SOIL PREPARATION

A. Before start of hydroseeding, and after surface has been shaped and graded, and lightly compacted to uniform grade, scarify soil surface to minimum depth of 1 inch.

3.02 HYDROSEEDING

A. Prepare 1-inch depth seed bed; obtain Engineer’s acceptance prior to proceeding.

B. Seeding shall not be done during windy weather or when the ground is frozen, excessively wet, or otherwise unsuitable. Seed shall be placed at the rate and mix specified herein. Seed shall be sown by an approved hydroseeder that uses water as the carrying agent and maintains continuous agitation through paddle blades. It shall have an operating capacity sufficient to agitate, suspend, and mix into a homogeneous slurry the specified amount of seed and water or other material. Distribution and discharge lines shall be large enough to prevent stoppage and shall be equipped with a set of hydraulic discharge spray nozzles that will provide a uniform distribution of the slurry.

C. Seed and fertilizer may be applied in one application.

D. Hydroseed all areas disturbed by Contractor, except for areas covered with structures, rock, or pavements.

E. Apply by hydroseeding method on moist soil, but only after free surface water has drained away. Prevent drift and displacement of mixture into other areas.

F. Application:

1. Prepare and apply slurry as follows:

<table>
<thead>
<tr>
<th>Item</th>
<th>Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Seed Mix</td>
<td>30 pounds per acre</td>
</tr>
<tr>
<td>Fertilizer</td>
<td>200 pounds per acre</td>
</tr>
<tr>
<td>Wood Cellulose Fiber Mulch</td>
<td>1,500 pounds per acre</td>
</tr>
<tr>
<td>Water</td>
<td>As necessary</td>
</tr>
<tr>
<td>Tackifier</td>
<td>40 - 60 pounds per acre</td>
</tr>
</tbody>
</table>
3.03 MULCHING

A. Apply uniformly on disturbed areas that will remain undisturbed for 7 days or more, as prescribed by the Contractor’s Erosion Control Plan or as requested by Engineer.

B. Application: Sufficiently loose to permit penetration of sunlight and air circulation, and sufficiently dense to shade ground, reduce evaporation rate, and prevent or materially reduce erosion of underlying soil.

1. Wood Cellulose Fiber: 1,500 pounds per acre.

3.04 EROSION CONTROL MATTING

A. Place in areas requiring Permanent Soil Stabilization.

B. Staple in place with the appropriate overlap, according to the manufacturer’s instructions. Overlap matting such that the uphill mat overlaps on top of the downhill mat. Matting shall be placed in areas requiring additional stabilization, or at the request of the Engineer.

3.05 TACKIFIER

A. Can be applied with mulch or after mulch is in place.

3.06 STOCKPILES

A. The Contractor shall limit the amount of silt carried away in stormwater runoff from temporary stockpiles by installing filter fences around the base of each stockpile, as prescribed by the Contractor’s Erosion Control Plan.

B. When the Contractor removes material from the stockpiles, the Contractor shall replace and repair erosion control measures.

C. After each stockpile reaches final grade, the Contractor shall stabilize the soil within permanent stabilization, including hydroseeding and matting.

D. All stockpile side slopes shall be track-walked to ready for hydroseed application.

3.07 HYDROSEED MAINTENANCE

A. Contractor shall apply a second application of the specified fertilizer to each hydroseeded area during the growing season that follows the growing season in which each area was seeded.
B. Work under this section shall include complete responsibility for maintaining adequate protection from disturbance for all hydroseeded areas. Damaged or washed out areas shall be filled and repaired at no additional expense to the Owner.

C. Hydroseeded areas that do not properly germinate or grow shall be reseeded in accordance with the specifications for the original seeding. Hand broadcasting will not be allowed.

D. Upon completion of maintenance period and on written notice from Contractor, Engineer, will, within 15 days of receipt, determine if a satisfactory stand has been established.

E. If a satisfactory stand has not been established, Engineer will make another determination upon written notice from Contractor following the next growing season.

END OF SECTION
SECTION 31 32 19.16
GEOTEXTILE

PART 1    GENERAL

1.01 REFERENCES

A. The following is a list of standards that may be referenced in this section:

   1. ASTM International (ASTM):
      g. D4716, Test Method for Determining the (In-Plane) Flow Rate per Unit Width and Hydraulic Transmissivity of a Geosynthetic Using a Constant Head.
      n. D6193, Standard Practice for Stitches and Seams.

1.02 DEFINITIONS

A. Fabric: Geotextile, a permeable geosynthetic comprised solely of textiles.
B. Maximum Average Roll Value (MaxARV): Maximum of series of average roll values representative of geotextile furnished.

C. Minimum Average Roll Value (MinARV): Minimum of series of average roll values representative of geotextile furnished.

D. Nondestructive Sample: Sample representative of finished Work, prepared for testing without destruction of Work.

E. Overlap: Distance measured perpendicular from overlapping edge of one sheet to underlying edge of adjacent sheet.

F. Seam Efficiency: Ratio of tensile strength across seam to strength of intact geotextile, when tested according to ASTM D4884.

1.03 SUBMITTALS

A. Action Submittals:

1. Shop Drawings:
   a. Manufacturer material specifications and product literature.
   b. Description of proposed method of geotextile deployment, sewing equipment, sewing methods, and provisions for holding geotextile temporarily in place until permanently secured.

2. Samples:
   a. Geotextile: One-piece, minimum 18 inches long, taken across full width of roll of each type and weight of geotextile furnished for Project. Label each with brand name and furnish documentation of lot and roll number from which each Sample was obtained.
   b. Field Sewn Seam: 5-foot length of seam, 12 inches wide with seam along center, for each type and weight of geotextile.

B. Informational Submittals: Certifications from each geotextile manufacturer that furnished products have specified property values. Certified property values shall be either minimum or maximum average roll values, as appropriate, for geotextiles furnished.

1.04 DELIVERY, STORAGE, AND HANDLING

A. Deliver each roll with sufficient information attached to identify it for inventory and quality control.

B. Handle products in manner that maintains undamaged condition.
C. Do not store products directly on ground. Ship and store geotextile with suitable wrapping for protection against moisture and ultraviolet exposure. Store geotextile in way that protects it from elements. If stored outdoors, elevate and protect geotextile with waterproof cover.

1.05 SCHEDULING AND SEQUENCING

A. Where geotextile is to be laid directly upon ground surface, prepare subgrade as specified in Section 31 23 13, Subgrade Preparation, first.

B. Notify Engineer whenever geotextiles are to be placed. Do not place geotextile without Engineer’s approval of underlying materials.

PART 2 PRODUCTS

2.01 SEPARATION GEOTEXTILE

A. The separation geotextile shall be a nonwoven pervious sheet of polyester, polypropylene, polyethylene, or polyamide fibers oriented into a stable network so that the fibers retain their relative position with respect to each other. The fabric shall be composed of continuous or discontinuous (staple) fibers held together through spun-bonding, melt-bonding, resin-bonding, or needle-punching. The edges of the fabric shall be selvaged or otherwise finished to prevent the other material from pulling away from the fabric. The fabric shall be woven into a nominal unseamed width of 15 feet or greater. The geotextile shall be as manufactured by Carthage Mills, Cincinnati, OH; Amoco Fabrics and Fibers, Austell, GA; Synthetic Industries, Chattanooga, TN; or Mirafi, Pendergrass, GA. The fabric shall conform to the physical strength requirements in Table No. 1.

<table>
<thead>
<tr>
<th>Property</th>
<th>Physical Requirements</th>
<th>Test Method</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mass (Weight), oz./sq. yd., min.</td>
<td>8.0</td>
<td>ASTM D5261</td>
</tr>
<tr>
<td>Water Permittivity sec⁻¹, min.</td>
<td>1.5</td>
<td>ASTM D4491 (Falling Head)</td>
</tr>
<tr>
<td>Apparent Opening Size (AOS), U.S. Standard Sieve Size</td>
<td>70 max. opening 100 min. opening</td>
<td>ASTM D4751</td>
</tr>
<tr>
<td>Grab Tensile Strength, lbs., min.</td>
<td>140</td>
<td>ASTM D4632</td>
</tr>
<tr>
<td>Grab Elongation, % min.</td>
<td>50</td>
<td>ASTM D4632</td>
</tr>
</tbody>
</table>
Table No. 1. Physical Strength Requirements (for Separation Geotextile)

<table>
<thead>
<tr>
<th>Property</th>
<th>Physical Requirements</th>
<th>Test Method</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mullen Burst Strength, psi, min.</td>
<td>210</td>
<td>ASTM D3786</td>
</tr>
<tr>
<td>Puncture Strength, lbs., min.</td>
<td>75</td>
<td>ASTM D4833</td>
</tr>
<tr>
<td>Trapezoid Tear Strength, lbs., min.</td>
<td>65</td>
<td>ASTM D4533</td>
</tr>
<tr>
<td>Ultraviolet Radiation Resistance, % Retention</td>
<td>70</td>
<td>ASTM D4355</td>
</tr>
</tbody>
</table>

2.02 CUSHION GEOTEXTILE

A. Cushion geotextile shall meet the Specifications for separation geotextile and shall conform to the physical strength requirements in Table No. 2.

Table No. 2. Physical Strength Requirements (for Cushion Geotextile)

<table>
<thead>
<tr>
<th>Physical</th>
<th>Physical Requirements</th>
<th>Test Method</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mass (Weight), oz./sq. yd., min.</td>
<td>16.0</td>
<td>ASTM D5261</td>
</tr>
<tr>
<td>Water Permittivity sec(^{-1}), min.</td>
<td>0.5</td>
<td>ASTM D4491 (Falling Head)</td>
</tr>
<tr>
<td>Apparent Opening Size (AOS), U.S. Standard Sieve Size</td>
<td>140 minimum opening</td>
<td>ASTM D4751</td>
</tr>
<tr>
<td>Grab Tensile Strength, lbs., min.</td>
<td>200</td>
<td>ASTM D4632</td>
</tr>
<tr>
<td>Grab Elongation, % min.</td>
<td>50</td>
<td>ASTM D4632</td>
</tr>
<tr>
<td>Mullen Burst Strength, psi, min.</td>
<td>300</td>
<td>ASTM D3786</td>
</tr>
<tr>
<td>Puncture Strength, lbs., min.</td>
<td>120</td>
<td>ASTM D4833</td>
</tr>
<tr>
<td>Trapezoid Tear Strength, lbs., min.</td>
<td>80</td>
<td>ASTM D4533</td>
</tr>
<tr>
<td>Ultraviolet Radiation Resistance, % Retention</td>
<td>70</td>
<td>ASTM D4355</td>
</tr>
</tbody>
</table>

2.03 WOVEN (REINFORCING) GEOTEXTILE

A. Composed of polymeric yarn interlaced to form planar structure with uniform weave pattern.
B. Calendared or finished so yarns will retain their relative position with respect to each other.

C. Polymeric Yarn: Long-chain synthetic polymers (polyester or polypropylene) with stabilizers or inhibitors added to make filaments resistant to deterioration due to heat and ultraviolet light exposure.

D. Sheet Edges: Selvaged or finished to prevent outer material from separating from sheet.

E. Unseamed Sheet Width: Minimum 12 feet.

F. Physical Properties: Conform to requirements in Table No. 3 (Type II Roadway Separation fabric).

<table>
<thead>
<tr>
<th>Property</th>
<th>Requirement</th>
<th>Test Method</th>
</tr>
</thead>
<tbody>
<tr>
<td>Apparent Opening Size (AOS)</td>
<td>No. 30 U.S. Standard Sieve Size (or finer)</td>
<td>ASTM D4751</td>
</tr>
<tr>
<td>Water Permittivity</td>
<td>0.02 sec (^{-1}), MinARV</td>
<td>ASTM D4491 (Falling Head)</td>
</tr>
<tr>
<td>Grab Tensile Strength</td>
<td>200 lb, MinARV</td>
<td>ASTM D4632</td>
</tr>
<tr>
<td>Grab Elongation</td>
<td>&lt;15 percent, MaxARV</td>
<td>ASTM D4632</td>
</tr>
<tr>
<td>Trapezoidal Tear Strength</td>
<td>75 lb, MinARV</td>
<td>ASTM D4533</td>
</tr>
<tr>
<td>Puncture Strength</td>
<td>75 lb, MinARV</td>
<td>ASTM D4833</td>
</tr>
<tr>
<td>Ultraviolet Radiation Resistance</td>
<td>70 percent strength retention, MinARV after 500 hours</td>
<td>ASTM D4355</td>
</tr>
</tbody>
</table>

**PART 3 EXECUTION**

**3.01 GENERAL**

A. The geotextile fabric shall be placed in the manner and at the locations shown on Drawings or as directed by the Engineer.

B. At the time of installation, fabric shall be rejected if it has defects, rips, holes, flaws, deterioration, or damage incurred during manufacture, transportation, storage, or placement. Visual review of the fabric shall be performed once the fabric has been placed and prior to placement of any overlying materials.
C. The fabric shall be placed with the machine direction (long dimension) parallel to the pipe alignment or slope, unless otherwise directed by the Engineer, and shall be laid smooth and free of tension, stress, folds, wrinkles, or creases.

D. Securing pins or other methods that may damage the liner systems will not be permitted. Bags of soil or other methods approved by the Engineer shall be used to temporarily secure the geotextile during installation. Securing pins or staples are permitted outside of liner areas (along roadways). Refer to Article Securing Reinforcing Geotextile.

E. The fabric shall be protected at all times during construction from contamination by surface runoff and any fabric so contaminated shall be removed and replaced with uncontaminated fabric.

F. Do not operate machinery directly on the geotextile. When placing material over joints, place in the direction from the overlying geotextile to the underlying geotextile. Prevent puncture, tear, or displacement of geotextile and protect from damage. Replace torn areas and holes by placing a patch of geotextile having dimensions at least 2 feet greater than the tear or hole. The patch shall be sewn or secured by other method as approved by the Engineer.

3.02 SEAMS

A. Edge seams shall overlap a minimum of 12 inches or as otherwise shown.

3.03 SECURING REINFORCING GEOTEXTILE

A. Secure Reinforcing Geotextile with Securing Pins or Staples:

1. Insert securing pins with washers through geotextile.
2. Securing Pin Alignment:
   a. Midway between edges of overlaps.
   b. 6 inches from free edges.
3. Spacing of Securing Pins:

<table>
<thead>
<tr>
<th>Slope</th>
<th>Maximum Pin Spacing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Steeper than 3:1</td>
<td>2 feet</td>
</tr>
<tr>
<td>3:1 to 4:1</td>
<td>3 feet</td>
</tr>
<tr>
<td>Flatter than 4:1</td>
<td>5 feet</td>
</tr>
</tbody>
</table>

4. Install additional pins across each geotextile sheet as necessary to prevent slippage of geotextile or to prevent wind from blowing geotextile out of position.
5. Push each securing pin through geotextile until washer bears against geotextile and secures it firmly to subgrade.
6. Where staples are used instead of securing pins, install in accordance with alignment and spacing above. Push in to secure geotextile firmly to subgrade.

3.04 SEPARATION APPLICATIONS

A. This section is applicable to installation of separation geotextile between drain gravel and drain sand and all other locations where separation geotextile is shown on Drawings.

B. The separation geotextile shall be placed over the drain gravel prior to placement of drain sand. Fabric shall cover all drain gravel and drain pipe. Place fabric in a way and with sufficient slack for geotextile to fully cover drain gravel when drain sand is placed.

C. Longitudinal (end of roll) seams shall be overlapped a minimum of 12 inches in the direction of the pipe alignment with the upstream fabric on top of the downstream fabric.

D. Care shall be taken during drain sand installation to prevent damage to the fabric.

3.05 CUSHION APPLICATIONS

A. The geotextile fabric shall be placed with the machine direction parallel to the pipe alignment or slope. The upstream strip of fabric shall overlap the downstream strip. The fabric shall be installed in such a manner that all longitudinal (end of roll) seams shall have a minimum overlap of 18 inches.

B. Do not damage the underlying geomembrane.

C. Any damage to the geotextile during its installation or during placement of drain gravel or piping shall be replaced by the Contractor.

D. Drain gravel shall not be dropped on the fabric from a height greater than 1 foot. Any damage to the fabric during placement of drain gravel or piping shall be corrected prior to proceeding with work.

3.06 PLACING PRODUCTS OVER GEOTEXTILE

A. Before placing material over geotextile, notify Engineer. Do not cover installed geotextile until after Engineer provides authorization to proceed.
B. If tears, punctures, or other geotextile damage occurs during placement of overlying products, remove overlying products as necessary to expose damaged geotextile. Repair damage as specified in Article Repairing Geotextile.

3.07 RIPRAP APPLICATIONS

A. Overlap geotextile at each joint with upstream sheet of geotextile overlapping downstream sheet.

B. Limit height of riprap fall onto geotextile to prevent damage.
   1. Drop Height: 0.5 foot for protection of geotextile.

3.08 REPAIRING GEOTEXTILE

A. Repair or replace torn, punctured, flawed, deteriorated, or otherwise damaged geotextile.

B. Repair Procedure:
   1. Place patch of undamaged geotextile over damaged area and at least 18 inches in all directions beyond damaged area.
   2. Remove interfering material as necessary to expose damaged geotextile for repair.
   3. Sew patches or secure patches with heat fusion tacking or with pins and washers (outside of lined areas) or by other means approved by Engineer.

3.09 REPLACING CONTAMINATED GEOTEXTILE

A. Protect geotextile from contamination that would interfere, in Engineer’s opinion, with its intended function. Remove and replace contaminated geotextile with clean geotextile.

END OF SECTION
SECTION 31 32 20
STRIP DRAINS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. This section covers the work necessary to furnish and install strip drains as part of the leachate collection system in the Central Corridor landfill area as shown on Drawings.

1.02 REFERENCES

A. The following is a list of standards that may be referenced in this section:

1. ASTM International (ASTM):
   g. D4716, Test Method for Determining the (In-Plane) Flow Rate Per Unit Width and Hydraulic Transmissivity of a Geosynthetic Using a Constant Head.

1.03 DEFINITIONS

A. Strip Drains: Prefabricated drainage composites consisting of a geotextile wrapped drainage core that serves to collect subsurface water collecting over
the liner and rapidly convey it to an appropriate point of discharge, and meets the minimum specified requirements as stated herein.

B. Minimum Average Roll Value: The mean of the average roll test values for all rolls of strip drains tested minus two standard deviations.

1.04 SUBMITTALS

A. Action Submittals:

1. Shop Drawings:
   a. Manufacturer’s specifications and literature for each geomembrane furnished, and all products used to complete the installation.
   b. Descriptive installation drawings and literature including specifications for splicing and geotextile end wrapping or end capping.

2. Samples:
   a. Two samples of the following:
      1) 2 linear feet of the strip drain.
      2) Two 1-foot minimum lengths of strip drain spliced with a geotextile wrap or end cap on one end.

B. Informational Submittals:

1. Mill certificate from the strip drain manufacturer attesting that the strip drain used on this project meets the chemical, physical, and manufacturing requirements specified herein.

2. Certified test reports for each shipment of material attesting that the strip drains meet the requirements of this Specification.

3. Recommended methods for handling and storage of products.

C. Exceptions: Listing of all exceptions to the requirements specified herein.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Materials shall be handled in such a manner as to ensure delivery to the site in sound, undamaged condition. Materials delivered to the site shall be inspected for damage, and unloaded and stored with a minimum of handling.

B. During shipment and storage, strip drains shall be wrapped in burlap or similar heavy-duty protective covering. Materials shall not be stored directly on the ground. The storage area shall be such that the fabric is protected from mud, soil, dust, and debris. Strip drain materials that are not to be installed immediately shall be stored indoors in their original packaging; if outdoors, they shall be elevated and shall be protected from moisture and from the direct...
rays of the sun under a light-colored, heat-reflective opaque cover in a manner that provides free airflow space between the materials and the cover.

C. At the time of installation, strip drain shall be rejected if it has defects, holes, flaws, deterioration, or damage incurred during manufacture, transportation, or storage.

PART 2 PRODUCTS

2.01 GEOTEXTILE WRAP

A. The geotextile wrap surrounding the strip drain core shall be a nonwoven, pervious sheet of polypropylene or polyester fibers oriented into a stable network so that the fibers retain their relative position with respect to each other. The fabric shall be composed of continuous fiber or discontinuous (staple) fibers held together through needle-punching. The edges of the fabric shall be finished to prevent the fibers from pulling away from the fabric.

B. The geotextile shall conform to requirements in Table 1.

<table>
<thead>
<tr>
<th>Table 1 Geotextile Wrap</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physical Property</td>
</tr>
<tr>
<td>Permeability, sec&lt;sup&gt;-1&lt;/sup&gt;</td>
</tr>
<tr>
<td>Apparent Opening Size, U.S. Standard Sieve Size</td>
</tr>
<tr>
<td>Grab Tensile Strength, lb</td>
</tr>
<tr>
<td>Grab Elongation, percent</td>
</tr>
<tr>
<td>Puncture Strength, lb</td>
</tr>
<tr>
<td>Mullen Burst Strength, psi</td>
</tr>
<tr>
<td>Trapezoid Tear, lb</td>
</tr>
<tr>
<td>Fungus Resistance</td>
</tr>
<tr>
<td>Wide Width Strength, lb/in Machine Direction</td>
</tr>
</tbody>
</table>

<sup>a</sup>Minimum average roll values.
C. The fabric shall completely encapsulate the strip drain core, except for the ends, and shall have a sealed seam that does not allow soil particles larger in diameter than the apparent opening size (AOS) rating for the fabric to enter.

D. The fabric shall be glued, heat bonded, or otherwise attached to the apex or tips of the drainage core so the fabric will not interfere with flow through the core channels when covered with soil.

E. Geotextile end caps and fabric used for repair shall conform to this Specification section.

2.02 STRIP DRAIN CORE

A. The strip drain core shall consist of perforated plastic, polyethylene, or high-density polyethylene formed into channels, nipples, tubes, cusped sections, or waffle-like profiles that can collect water from all directions and rapidly convey collected water in flow channels, lengthwise along its long axis.

B. The strip drain core shall conform to the requirements in Table 2. The core shall also be capable of conveying flow transverse to the long axis.

<table>
<thead>
<tr>
<th>Physical Property</th>
<th>Minimum Required Value</th>
<th>Test Method</th>
</tr>
</thead>
<tbody>
<tr>
<td>Thickness, in.</td>
<td>3/4 min. 1-1/4 max.</td>
<td>ASTM D5199</td>
</tr>
<tr>
<td>Crush Strength, psf</td>
<td>7,500</td>
<td>ASTM D1621 Modified</td>
</tr>
<tr>
<td>Width, in.</td>
<td>11.5</td>
<td>—</td>
</tr>
<tr>
<td>Flow Rate, gpm/ft width</td>
<td>13</td>
<td>ASTM D4716 (14.5 psi load drainage gradient = 0.10)</td>
</tr>
<tr>
<td>Geotextile-wrapped core in soil environment</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fungus Resistance</td>
<td>No growth</td>
<td>ASTM G21</td>
</tr>
<tr>
<td>Roll Length, ft</td>
<td>350</td>
<td>—</td>
</tr>
</tbody>
</table>

C. The strip drain (core plus attached geotextile) shall be as manufactured by American Wick Drain Corp., Monroe, NC; Contech Construction Products, Inc., Middletown, OH; or American Drainage Systems, Waxhaw, NC.
2.03 Manufacturer’s (Source) Quality Control

A. Factory test strip drain geotextile wrap and core materials for specified physical properties per manufacturer’s QC Plan, also including those properties listed in tables under Articles Geotextile Wrap and Strip Drain Core.

2.04 Splices and Standard Outlet Fittings

A. Splice or coupling to be used for joining lengths of strip drains shall be from the same manufacturer as the strip drains. All materials and tools necessary to splice lengths of strip drain per the manufacturer’s recommendations shall be provided by the Contractor.

2.05 Tape

A. Tape used for connections on the strip drains shall be polyethylene tape manufactured for use underground.

PART 3 Execution

3.01 Placement of Strip Drains

A. The strip drains shall be placed at the locations shown on Drawings or as directed by the Engineer, in accordance with manufacturer’s recommendations. The strip drain shall be placed with the long dimension angled cross-slope to intercept leachate flowing downslope, unless otherwise directed by the Engineer, and shall be laid smooth and free of tension, stress, folds, wrinkles, or creases.

B. Strip drains with a different core configuration on each side shall be placed with the more pervious side facing up.

C. Strip drains shall be anchored in place during placement of drain sand as shown on Drawings or approved by the Engineer. The Contractor shall anchor the strip drains such that they will remain in their original position, orientation, and spacing after drain sand is placed. Drain sand shall be placed over strip drains in such a way as to minimize horizontal forces that would tend to displace strip drain horizontally or vertically. Strip drains shall be maintained flat against the subgrade at all times during backfilling. In no case shall low ground pressure tracked equipment be allowed to operate on less than 12 inches of cover over the strip drains, except over underdrain systems to compact sand layer.

D. Strip drains shall penetrate the collection trench geotextile and terminate in the drain gravel as shown on Drawings.
3.02 PROTECTION OF STRIP DRAINS

A. All upstream exposed sections of the core shall be covered with an end cap, as recommended by the manufacturer.

B. The strip drains shall be protected at all times during construction and installation from contamination by surface runoff or construction debris. Any strip drain contaminated by mud, silt, or other foreign materials that may plug the geotextile wrap shall be removed and replaced with uncontaminated strip drain, at the Contractor’s sole expense.

C. Should the strip drain geotextile be damaged during any step of the installation, the torn or punctured section shall be repaired by placing a piece of strip drain geotextile that extends at least 18 inches in all directions beyond the damaged area and taping the geotextile as required in these Specifications.

D. Damaged core sections shall be removed and replaced with an undamaged section of strip drain in accordance with the manufacturer’s recommendations.

3.03 JOINING LENGTHS OF STRIP DRAINS

A. Lengths of strip drain shall be connected by means of a splice per the manufacturer’s recommendations. Typical splicing details may differ depending on the product used. At a minimum, splicing shall mean:

1. Cut the core as necessary to ensure a square end of core.
2. Connect the core sections per the manufacturer’s recommendations.
3. Replace the geotextile over the core.
4. Tape the splice per the manufacturer’s recommendations, but no less than 6 inches in width. The Contractor shall ensure that the strip drain core is not bent from too tight a tape wrap and that the core lies flat against the geomembrane.

3.04 CAPPING ENDS OF STRIP DRAINS WITH GEOTEXTILE

A. Upper ends of strip drains not discharging to collection trenches shall be capped with a geotextile end cap or shall be cut and wrapped with geotextile, per the manufacturer’s recommendations.

B. Tape the capped ends of the geotextile a minimum width of 6 inches around the core.
3.05 FIELD QUALITY CONTROL

A. Engineer to cross-check material certifications with delivered roll and lot numbers to verify material delivered is acceptable.

END OF SECTION
SECTION 31 37 00
RIPRAP

PART 1 GENERAL

1.01 REFERENCES

A. The following is a list of standards which may be referenced in this section:

1. ASTM International (ASTM):

1.02 DEFINITIONS

A. Refer to applicable definitions in Section 31 23 23, Fill and Backfill.

1.03 SUBMITTALS

A. Action Submittals:

1. Shop Drawings: Description and location of proposed sources of riprap bedding and riprap.

B. Informational Submittals:

1. Quarry Certificate of Conformance and supporting documentation showing proposed riprap bedding or riprap meet Standard Specification gradation and materials requirements.
2. Certified Test Results:
   a. Riprap:
      1) Gradation.
      2) Abrasion resistance.
3. Trip tickets showing source, type, and weight of each load of material delivered to Site.

1.04 QUALITY ASSURANCE

A. Riprap Source: Quarry that has produced riprap and has performed satisfactorily on other projects for at least 3 years.
B. Site Visit: Make arrangements for Engineer to visit quarry site to observe materials proposed for riprap and riprap bedding.

1.05 SCHEDULING AND SEQUENCING

A. Complete subgrade preparation as specified in Section 31 23 13, Subgrade Preparation, and geotextile installation as specified in Section 31 32 19.16, Geotextile, prior to placing riprap.

PART 2 PRODUCTS

2.01 GEOTEXTILE RIPRAP BEDDING

A. Separation geotextile as specified in Section 31 32 19.16, Geotextile.

2.02 RIPRAP

A. Hard and durable quarry stone free from fractures, bedding planes, pronounced weathering, and earth or other adherent coatings.

B. Minimum Dimension of Individual Pieces: Not less than 1/3 maximum dimension.

C. Abrasion Resistance: Maximum 35 percent wear as determined in accordance with ASTM C535.

D. Bulk Density: Minimum 160 pounds per dry cubic foot.

E. Gradation: Smaller pieces shall generally fill voids between larger pieces without either excess or deficiency of one or more sizes of stone.

<table>
<thead>
<tr>
<th>Class</th>
<th>Thickness (Inches)</th>
<th>Weight (Pounds)</th>
<th>% Greater Than</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>12</td>
<td>150</td>
<td>0 to 5</td>
</tr>
<tr>
<td></td>
<td></td>
<td>100</td>
<td>30</td>
</tr>
<tr>
<td></td>
<td></td>
<td>50</td>
<td>75</td>
</tr>
<tr>
<td></td>
<td></td>
<td>25</td>
<td>90</td>
</tr>
</tbody>
</table>

PART 3 EXECUTION

3.01 PLACING RIPRAP

A. Place riprap to lines and grades shown.
B. No mechanical compaction of riprap is required; however, work riprap bedding as necessary to distribute it and to eliminate detrimental voids. Avoid overworking or long pushes that result in segregation of particle sizes.

C. Grade surface of riprap bedding free from irregularities and to tolerances of 0.2 feet from established grade.

D. Place and grade riprap in a manner that avoids subgrade disturbance.

E. Place riprap on geotextile without puncturing or damaging geotextile. If damaged, repair geotextile prior to proceeding.

END OF SECTION
SECTION 32 11 23
AGGREGATE BASE COURSES

PART 1 GENERAL

1.01 REFERENCES

A. The following is a list of standards which may be referenced in this section:

1. American Association of State Highway and Transportation Officials (AASHTO):
   a. T11, Standard Method of Test for Materials Finer Than 75\(\mu\)m (No. 200) Sieve in Mineral Aggregates by Washing.
   b. T27, Standard Method of Test for Sieve Analysis of Fine and Coarse Aggregates.
   f. T99, Standard Specification for the Moisture-Density Relations of Soils Using a 2.5 kg (5.5 pound) Rammer and a 305 mm (12 in) Drop.
   g. T180, Standard Specification for Moisture-Density Relations of Soils Using a 4.54 kg (10-lb) Rammer and a 457 mm (18-in) Drop.
   i. T265, Standard Method of Test for Laboratory Determination of Moisture Content of Soils.
   j. T310, Standard Specification for In-Place Density and Moisture Content of Soil and Soil-Aggregate by Nuclear Methods (Shallow Depth).

2. ASTM International (ASTM):
   a. C88, Test Method for Soundness of Aggregates by Use of Sodium Sulfate or Magnesium Sulfate.
   b. D1883, Test Method for CBR (California Bearing Ratio) of Laboratory Compacted Soils.
   d. D4791, Test Method for Flat Particles, Elongated Particles, or Flat and Elongated Particles in Coarse Aggregate.
1.02 DEFINITIONS

A. Completed Course: Compacted, unyielding, free from irregularities, with smooth, tight, even surface, true to grade, line, and cross-section.

B. Completed Lift: Compacted with uniform cross-section thickness.

1.03 SUBMITTALS

A. Action Submittals:

1. Samples: Submit for specified materials 10 days prior to delivery to Site, as requested by Engineer.

B. Informational Submittals:

1. Certified Test Results on Source Materials: Submit copies from commercial testing laboratory 14 days prior to delivery of materials to Project showing materials meeting the physical qualities specified.
2. Certified results of in-place density tests from independent testing agency.

PART 2 PRODUCTS

2.01 BALLAST (GRANULAR SUBBASE)

A. Clean, hard, durable pit run gravel or fractured stone.

B. Gradation shall conform to AASHTO T27, as follows:

1. 3-inch minus “Ballast” material as supplied by Fighting Creek Pit (standard material used at the landfill).

2.02 ROAD SURFACING (GRAVEL)

A. Clean, hard durable, pit run gravel or crushed stone graded from coarse to fine containing enough fines to bind material when compacted.

B. Physical Qualities:

1. Abrasion, AASHTO T96: 35 percent maximum wear.
2. Fractured Face: 60 percent minimum particles.
3. Liquid Limit, AASHTO T89: Maximum 30 percent.
4. Plasticity Index, AASHTO T90: Maximum 6 percent.
5. Resistance (R) Value, AASHTO T190: 75, minimum.
C. Gradation, AASHTO T27, Based on U.S. Standard Sieves:

<table>
<thead>
<tr>
<th>Sieve Designation (Square Opening)</th>
<th>Material</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-1/4-inch</td>
<td>100</td>
</tr>
<tr>
<td>1-inch</td>
<td>80 - 100</td>
</tr>
<tr>
<td>1/2-inch</td>
<td>60 - 90</td>
</tr>
<tr>
<td>No. 4</td>
<td>35 - 60</td>
</tr>
<tr>
<td>No. 8</td>
<td>25 - 50</td>
</tr>
<tr>
<td>No. 40</td>
<td>8 - 30</td>
</tr>
<tr>
<td>No. 200</td>
<td>2 - 9</td>
</tr>
</tbody>
</table>

2.03 SOURCE QUALITY CONTROL

A. Perform tests necessary to locate acceptable source of materials meeting specified requirements.

B. Final approval of aggregate material will be based on test results of installed materials.

C. Should separation of coarse from fine materials occur during processing or stockpiling, immediately change methods of handling materials to correct uniformity in grading.

PART 3 EXECUTION

3.01 SUBGRADE PREPARATION

A. As specified in Section 31 23 13, Subgrade Preparation.

B. Obtain Engineer’s acceptance of subgrade before placing base course or surfacing material.

C. Do not place base course or surfacing materials in snow or on soft, muddy, or frozen subgrade.

3.02 EQUIPMENT

A. Compaction Equipment: Adequate in design and number to provide compaction and to obtain specified density for each layer.
3.03 HAULING AND SPREADING

A. Hauling Materials:
   1. Do not haul over surfacing in process of construction.
   2. Loads: Of uniform capacity.
   3. Maintain consistent gradation of material delivered; loads of widely varying gradations will be cause for rejection.

B. Spreading Materials:
   1. Distribute material to provide required density, depth, grade, and dimensions with allowance for subsequent lifts.
   2. Produce even distribution of material upon roadway or prepared surface without segregation.
   3. Should segregation of coarse from fine materials occur during placing, immediately change methods of handling materials to correct uniformity in grading.

3.04 CONSTRUCTION OF COURSES

A. Ballast (Granular Subbase):
   2. Completed Course Total Thickness: As shown.
   3. Spread lift on preceding course to required cross-section.
   4. Lightly blade and roll surface until thoroughly compacted.
   5. Add keystone to achieve compaction and as required when aggregate does not compact readily due to lack of fines or natural cementing properties, as follows:
      a. Use leveling course or surfacing material as keystone.
      b. Spread evenly on top of base course, using spreader boxes or chip spreaders.
      c. Roll surface until keystone is worked into interstices of base course without excessive displacement.
      d. Continue operation until course has become thoroughly keyed, compacted, and will not creep or move under roller.
   6. Blade or broom surface to maintain true line, grade, and cross-section.

B. Road Surfacing (Gravel):
   1. Maximum Completed Lift Thickness: 6 inches.
   2. Completed Course Total Thickness: As shown.
   3. Spread on preceding course in accordance with cross-section shown.
   4. Blade lightly and roll surface until material is thoroughly compacted.
3.05 ROLLING AND COMPACTION

A. Commence compaction of each layer of material after spreading operations and continue until density of 95 percent of maximum density has been achieved as determined by AASHTO T99.

B. Roll each layer of material until material does not creep under roller before succeeding layer is applied.

C. Commence rolling at outer edges and continue toward center; do not roll center of road first.

D. Apply water as needed to obtain specified densities.

E. Place and compact each lift to required density before succeeding lift is placed.

F. Remove floating or loose stone from surface of preceding course before placing leveling course.

G. Surface Defects: Remedy by loosening and rerolling. Reroll entire area, including surrounding surface, until thoroughly compacted.

H. Finished surface shall be true to grade and crown before proceeding with surfacing.

3.06 SURFACE TOLERANCES

A. Blade or otherwise work surfacing as necessary to maintain grade and cross-section at all times, and to keep surface smooth and thoroughly compacted.

B. Gravel Surfacing: Within 0.04 foot from lower edge of 10-foot straightedge placed on finished surface, parallel to centerline.

3.07 FIELD QUALITY CONTROL TESTING

A. In-Place Density Tests:

1. General: Refer to Article Field Quality Control Testing, in Section 31 23 23, Fill and Backfill, for coordination requirements.

2. Show proof that areas meet specified requirements before requesting that Engineer identify density test confirmation locations.
3. Refer to the table below for minimum sampling and testing requirements for road surfacing.

<table>
<thead>
<tr>
<th>Property</th>
<th>Test Method</th>
<th>Frequency</th>
<th>Sampling Point</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gradation</td>
<td>AASHTO T11 and AASHTO T27</td>
<td>One sample every 500 tons</td>
<td>Production output or stockpile</td>
</tr>
<tr>
<td>Moisture Density (Maximum Density)</td>
<td>AASHTO T99, Method D</td>
<td>One test for every aggregate grading produced</td>
<td>Production output or stockpile</td>
</tr>
<tr>
<td>In-Place Density and Moisture Content</td>
<td>AASHTO T310, and AASHTO T265 for moisture content</td>
<td>One for each 250 tons but at least every 5,000 sq ft of area</td>
<td>In-place completed, compacted area</td>
</tr>
</tbody>
</table>

3.08 CLEANING

A. Remove excess material from the Work area. Clean stockpile and staging areas of all excess aggregate.

END OF SECTION
SECTION 33 05 01.10
HIGH-DENSITY POLYETHYLENE (HDPE) PIPE AND FITTINGS

PART 1   GENERAL

1.01 REFERENCES

A. The following is a list of standards that may be referenced in this section:

1. American Society of Mechanical Engineer’s (ASME):
   b. B18.2.2, Square and Hex Nuts (Inch Series).
2. American Water Works Association (AWWA):
   a. C906, Polyethylene (PE) Pressure Piping and Fittings, 4 in. through 63 in., for Water Distribution and Transmission.
3. ASTM International (ASTM):
   a. A193/A193M, Standard Specification for Alloy-Steel and Stainless Steel Bolting Materials for High Temperature or High Pressure Service and Other Special Purpose Applications.
   b. A194/A194M, Standard Specification for Carbon and Alloy Steel Nuts for Bolts for High Pressure or High Temperature Service, or Both.
   k. F2620, Standard Practice for Heat Fusion Joining of Polyethylene Pipe and Fittings.
5. Plastics Pipe Institute (PPI):
   a. Handbook of Polyethylene Pipe.
   b. Technical Note 38, Bolt Torque for Polyethylene Flanged Joints.
   c. TR-33, Generic Butt Fusion Joining Procedure for Field Joining of Polyethylene Pipe.

1.02 SUBMITTALS

A. Action Submittals:
   1. Shop Drawings: Catalog information confirming pipe, fittings, and other materials conform to requirements of this section.

B. Informational Submittals:
   1. Manufacturer’s Certificate of Compliance, in accordance with Section 01 43 33, Manufacturers’ Field Services.
   2. Infrared temperature gun product data.
   3. Certificates of qualification for persons to be fusing HDPE pipe.
   4. Testing Plan:
      a. Submit at least 15 days prior to testing and include the following as a minimum:
         1) Testing dates.
         2) Piping systems and section(s) to be tested.
         3) Method of isolation.
         4) Method of conveying water from source to system being tested.
         5) Calculation of maximum allowable leakage for piping section(s) to be tested.
   5. Certifications of Calibration: Approved testing laboratory certificate if pressure gauge for hydrostatic test has been previously used. If pressure gauge is new, no certificate is required.
   6. Test report documentation.

1.03 QUALITY ASSURANCE

A. Qualifications:
   2. Persons fusing HDPE pipe shall be certified under 49 CFR § 192.285 have minimum of 5 years of experience with fusing HDPE pipe and shall have received a minimum of 20 hours of training for fusing HDPE pipe from pipe supplier or fusing equipment supplier.
1.04 GENERAL
   A. Like items of material specified shall be provided by one manufacturer.
   B. All pipe sizes shown on Drawings are nominal diameter.

1.05 DELIVERY, STORAGE, AND HANDLING
   A. Shipping: Do not cut, kink, or otherwise damage pipe during transportation.
   B. Storage:
      1. Limit stacking of pipe to a height that will not cause excessive deformation of bottom layers of pipes under anticipated temperature conditions.
      2. Where necessary, because of ground conditions, store pipe on wooden sleepers, spaced suitably and of such widths as not to allow deformation of pipe at point of contact with sleeper or between supports.
      3. Keep pipe shaded from direct sunlight prior to installation in trench.

1.06 CONNECTIONS TO EXISTING PIPE
   A. Fusing to Existing Pipe: Comply with manufacturer’s or distributor’s recommendations based on Site conditions and PPI TR-33. Take extra precaution in hazardous site areas.

PART 2 PRODUCTS

2.01 MANUFACTURERS
   A. Pipe and fittings specified in this section shall be products of:
      1. CP Chem Performance Pipe.
      2. JM-Manufacturing Co.

2.02 MATERIALS
   A. Pipe and Fittings:
      1. Conform to requirements of AWWA C906.
      2. In compliance with NSF 61.
      3. Resin: Polyethylene resin shall meet or exceed requirements of ASTM D3350 for PE 3408 material. Pressure rating shall be based on hydrostatic design stress of 800 psi at 73.4 degrees F.
      4. Pipe lengths, fittings, and flanged connections to be joined by thermal butt-fusion shall be of a compatible resin mix for the fusion process.
5. Fittings:
   a. Sizes 6 Inches and Smaller: Molded and fabricated from polyethylene pipe.
   b. Sizes 8 Inches and Larger: Use thermal butt-fusion.
   c. Polyethylene fittings shall have same or higher pressure rating as pipe.

B. Backup Rings:

   1. Convoluted for Flanged Connections:
      a. ASTM A240/A240M, Type 316 stainless steel.
      b. Complete with one-piece, molded polyethylene flange adapters.
      c. Flanged Connections: Same or greater pressure rating as pipe.

C. Gaskets: Material, size, and thickness shall be as recommended by pipe or flange manufacturer, and in accordance with PPI Technical Note 38.

D. Joints: Thermal butt-fusion or electrofusion, except where connecting to unions, valves, and equipment with flanged or threaded connections that may require future disassembly.

E. Bolts, Nuts, Washers:

   1. Type 316 stainless steel, ASTM A193/A193M, Grade B8 hex head bolts; and ASTM A194/A194M, Grade 8 hex head nuts.
   2. Bolts: Fabricated in accordance with ASME B18.2.2 and provided with washers of same material as bolts.

F. Wall Anchor:

   1. Material: Same as HDPE pipe.
   2. Internal Diameter: Equal to adjacent pipe.
   3. Shear Strength: Equal to or greater than tensile strength of adjacent pipe.
   4. Fabrication: Butt fusion. Extrusion bead welding is not allowed.

G. Electrofusion Flex Restraint:

   1. Material: HDPE.
   3. Designed for restraining movement of HDPE pipe.
   4. Manufacturers:
      a. Central Plastics Company.
      b. ISCO Industries.

H. Special Markings: As specified in Section 31 23 23, Fill and Backfill.
I. Products that restrain HDPE pipe with wedges, machined serrations, or clamps are not acceptable.

2.03 PIPE SCHEDULE

A. All pipes are iron pipe size (IPS), unless otherwise noted.

B. All pipes called out on Drawings are nominal diameter.

C. HDPE Pipe Schedule:

<table>
<thead>
<tr>
<th>Pipe Description</th>
<th>Nominal Diameter (inches)</th>
<th>SDR</th>
<th>Perforations^a</th>
</tr>
</thead>
<tbody>
<tr>
<td>Central Collector^b</td>
<td>10</td>
<td>11</td>
<td>6/12&quot;/0.5&quot;</td>
</tr>
<tr>
<td>Leachate Discharge Line and Stormwater Bypass (nonperforated)</td>
<td>10</td>
<td>11</td>
<td>N/A</td>
</tr>
</tbody>
</table>

Notes:
^a X/Y/Z; X = number of holes per row (spaced equidistant around pipe circumference, stagger holes between rows. For example, pipe with 4 holes per row stagger 45 degrees between rows.); Y = spacing between rows; Z = perforation hole size.
^b Associated cleanout extension (solid wall) pipe is of the same nominal diameter and SDR as the collector.

PART 3 EXECUTION

3.01 INSTALLATION

A. General:

1. Install polyethylene pipe in conformance with AWWA M55, PPI TR-33, ASTM F2620, and pipe manufacturer’s recommendations.
2. Joining: Butt-fuse pipes and fittings in accordance with pipe manufacturer’s recommendations. Depending on Site conditions, perform butt-fusion joining in or outside of excavation.
3. Connect HDPE pipe to auxiliary equipment such as valves, pumps, tanks, and other piping systems with flanged connections as follows:
   a. Polyethylene flange adapter, thermally butt-fused to end of pipe. Flange “stub ends” are not allowed.
   b. Bolt and nut of sufficient length to show a minimum of three complete threads when joint is made and tightened to manufacturer’s standard.
   c. Follow requirements of PPI Technical Note 38, including mandatory 4-hour bolt re-torquing.

4. Special Precautions at Flanges: Support polyethylene pipe connected to heavy fittings, manholes, and rigid structures in such a manner that no subsequent relative movement between polyethylene pipe at flanged joint and rigid structures is possible.

5. Minimum Long-Term Field Bending Radius: Restricted to limits recommended by AWWA M55, Table 8-2.

B. Placement in Trench:

1. Handle joined pipeline in such a manner that pipe is not damaged by dragging it over sharp and cutting objects.
2. Position slings for handling pipeline away from butt-fused joints.
3. Remove sections of damaged pipe and replace it with undamaged pipe. Damaged pipe is defined as pipe with kinks or gouges exceeding 10 percent of pipe wall thickness.
4. Exercise care when lowering pipe into trench to prevent damage or twisting of pipe.
5. At flanges, valves, and connections, excavate out trench bottom sufficiently to ensure clearance between undisturbed trench bottom and flange, valve, or connection.

3.02 FIELD QUALITY CONTROL

A. Joint Weld Testing:

2. Specimens: Cut pipe 12 inches on each side of field made joint. Rejoin ends and proceed with Work.
3. Test Frequency:
   a. First 500 Linear Feet: Two joints selected at random by Engineer.
   b. Each Test Failure: Two additional joints selected at random by Engineer.
B. Pipeline Hydrostatic Test:

1. General:
   a. Notify Engineer in writing 5 days in advance of testing. Perform testing in presence of Engineer.
   b. Furnish testing equipment and perform tests in manner satisfactory to Engineer. Testing equipment shall provide observable and accurate measurements of initial service leak and allowable make-up water volume under specified conditions.
   c. Test newly installed pipelines.
   d. Isolate new pipelines that are connected to existing pipelines.
   e. Using water as test medium, pipes shall successfully pass a hydrostatic test prior to acceptance.
   f. Conduct field hydrostatic test on buried piping after trench has been completely backfilled. Testing may, as approved by Engineer, be done prior to placement of asphaltic concrete or roadway structural section.
   g. Contractor may, if field conditions permit and as determined by Engineer, partially backfill trench and leave joints open for inspection and conduct initial service leak test. Final field hydrostatic test shall not be conducted until backfilling has been completed as specified above.
   h. Supply of temporary water shall be as stated in Section 01 50 00, Temporary Facilities and Controls.
   i. Dispose of water used in testing in accordance with federal, state, and local requirements.

2. Preparation:
   a. Install temporary thrust blocking or other restraint as necessary to prevent movement of pipe and protect adjacent piping or equipment. Make necessary taps in piping prior to testing.
   b. Wait 5 days minimum after concrete thrust blocking or designed thrust collars are installed to perform pressure tests. If high-early strength cement is used for thrust blocking, wait may be reduced to 2 days.
   c. Prior to test, remove or suitably isolate appurtenant instruments or devices that could be damaged by pressure testing.
   d. New Piping Connected to Existing Piping: Isolate new piping with grooved-end pipe caps, blind flanges, or other means as acceptable to Engineer.

3. Procedure:
   a. Test pressure shall be 200 psi as measured at low point of pipeline.
   b. Maximum filling velocity shall not exceed 0.25 feet per second, calculated based on full area of the pipe.
c. Expel air from pipe system during filling.
d. Test procedure shall be in accordance with ASTM F2164.
   1) Initial Expansion Phase: Add water as required to maintain test pressure for 4 hours.
   2) Test Phase: Reduce pressure by 10 psi and start pressure test.
   3) Test is successful if pressure says within 5 percent of initial value for 1 hour.
e. If test is not completed because of leakage, equipment failure, or other reasons, depressurize test section and allow it to relax for at least 8 hours before retesting.
f. If there is leakage, repair defective pipe section and repeat hydrostatic test.

3.03 CLEANING

A. Following assembly and testing, flush pipelines with water. Make sure not to contribute water to a leachate ponds holding leachate, thereby generating additional leachate.

B. Gravity Line: Prior to final acceptance and final inspection of the system by Engineer, flush and clean all parts of the system, while also operating valves. Remove all accumulated construction debris, rocks, gravel, and all other foreign matter at or near closest manhole. If necessary, use mechanical rodding or bucketing equipment.

END OF SECTION
SECTION 33 21 00
LANDFILL GAS SYSTEM

PART 1  GENERAL

1.01  REFERENCES

A.  The following is a list of standards that may be referenced in this section:

1. American National Standards Institute (ANSI):
   c. B18.2.1, Stainless Steel Bolts.
   d. B18.2.2, Square and Hex Nuts (Inch Series).

2. American Water Works Association (AWWA): C906, Polyethylene (PE) Pressure Piping and Fittings, 4-In. through 63-In., for Water Distribution and Transmission.

3. ASTM International (ASTM):
   d. A307, Standard Specification for Carbon Steel Bolts and Studs, 60,000 PSI Tensile Strength.
   f. A615, Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement.
   g. D2657, Standard Practice for Heat Fusion Joining of Polyolefin Pipe and Fittings.
   h. D2837, Long Term Strength (LTHS) at 73.4°F, 1600 psi.
   l. F894, Standard Specification for Polyethylene (PE) Large Diameter Profile Wall Sewer and Drain Pipe.
1.02 DESCRIPTION

A. This Work, at the north end of the work area, shall consist of the construction of the landfill gas piping, and installation of valves and associated appurtenances as shown or required. On the south end of the work area, Work shall consist of disconnecting the existing landfill gas piping and place a blind flange on the existing pipe to abandon the corridor piping for removal, and place caps on the two existing leachate recirculation pipes.

B. All earthwork required for the new 12-inch landfill gas pipe, including trench excavation, pipe bedding, and backfill, shall be in accordance with Division 31, Section 31 23 23, Fill and Backfill, and Section 31 23 23.15, Trench Backfill.

C. Work also includes abandonment and removal of the existing landfill gas and leachate piping system located in the work area.

1.03 SUBMITTALS

A. Action Submittals:

1. Manufacturer’s product data showing dimensions, materials, and capacity information.
2. Manufacturer’s certification that materials meet or exceed minimum requirements as specified.
3. Health and Safety Plan as described in Article Health and Safety Plan of this Specification.
4. Certificates of qualification for persons to be fusing HDPE pipe.
5. Certifications of Calibration: Approved testing laboratory certificate if pressure gauge for air test has been previously used. If pressure gauge is new, no certificate is required.
6. Manufacturer shall submit to the Engineer two copies of all test results which shall include a certification that materials to be delivered are represented by the samples tested and that such delivered materials meet or exceed the specified requirements.
7. Test report documentation.

1.04 QUALITY CONTROL

A. Testing by Manufacturer:

1. Manufacturer shall test all materials as required by these Specifications and the standards referenced.
2. No material shall be delivered until test results and certifications are in the hands of the Engineer.
3. Engineer shall have free access to all testing and records pertaining to material to be delivered to the Job Site.
4. The Engineer may elect to be present at any or all material testing operations.

B. Joint tests are intended for qualification of joint design and shall be considered to be a qualification test to establish the adequacy of the manufacturer’s joint design. The manufacturer shall certify that tests have been performed within the last year with pipes equivalent in size and design and that they have passed the test enumerated in the specifications. Tests may be waived for pipes of different strength class if joint design is the same as the pipe tested.

C. Persons fusing HDPE pipe shall be certified under 49 CFR § 192.285, and have a minimum of 5 years’ experience with fusing HDPE pipe and shall have received training for fusing HDPE pipe in accordance with recommendations of pipe supplier or fusing equipment supplier.

D. Like items of material specified shall be provided by one manufacturer.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Shipping: Do not cut, kink, or otherwise damage pipe during transportation.

B. Storage:
   1. Limit stacking of pipe to a height that will not cause excessive deformation of bottom layers of pipes under anticipated temperature conditions.
   2. Where necessary due to ground conditions, store pipe on wooden sleepers, spaced suitably and of such widths as not to allow deformation of pipe at point of contact with sleeper or between supports.

1.06 ENVIRONMENTAL CONDITIONS

A. Fusing Conditions:
   1. Match cell class and pipe SDR of new pipe to existing pipe, where applicable.
   2. Adhere to guidelines for environmental restrictions.
   3. Take extra precaution in hazardous areas.

1.07 HEALTH AND SAFETY PLAN

A. Refer to Section 01 50 00, Temporary Facilities and Controls, for requirements.
1.08 EXISTING LANDFILL GAS SYSTEM CONNECTION

A. The Contractor shall coordinate and schedule connection to the existing landfill gas collection in accordance with the requirements of this section.

B. Work Responsibilities:

1. The Owner will take responsibility for the following Work:
   a. Deactivating and re-activating, and oversight of all active gas system components.
   b. Operation of all landfill gas system valves and components.

2. The Contractor shall be responsible for the following Work:
   a. Providing new materials as indicated on Drawings or as directed by the Owner’s written authorization.
   b. Providing to the Owner a schedule of the Contractor’s desired phasing for the connection of the new pipelines to the existing landfill gas system, as shown on Drawings. Due to the landfill hours of operation, no active system piping shall be disconnected until after 8:00 a.m., and all reconnected system piping shall be reconnected and in stable operation by 5:00 p.m., unless otherwise approved by the Owner.
   c. Providing 72 hours’ written notice to the Owner for any work required by the Owner’s forces or representatives.
   d. Disposing and hauling salvaged pipe.
   e. Remove and dispose of all existing landfill gas and leachate piping, valves, concrete boxes and vaults, and other equipment and items associated with the existing systems.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Pipe and fittings specified in this section shall be products of:

   1. CP Chem Performance Pipe.
   2. JM-Manufacturing Co.
   3. “Or-equal.”

2.02 HIGH DENSITY POLYETHYLENE (HDPE) PIPE AND FITTINGS

A. Pipe and fittings used for the gas collection manifold piping system, unless otherwise designated on Drawings, shall be high density polyethylene (HDPE) pipe conforming to the following specifications:

   1. The same manufacturer shall supply polyethylene pipe and fittings. Pipe and fittings from different manufacturers shall not be interchanged.
2. Pipe sizing shall be in accordance with ASTM F714.
3. The maximum allowable hoop stress shall be 800 psi at 73.4 degrees F.
4. The polyethylene pipe shall be homogenous throughout and free of visible cracks, holes, foreign inclusions, or other injurious defects. Any pipe with nicks, scrapes, or gouges deeper than 5 percent of the nominal wall thickness shall be rejected. The pipe shall be uniform in color, opacity, density, and other physical properties.
5. HDPE pipe and fittings shall be made from polyethylene resin compound qualified as Type III, Category 5, Class C, Grade P34 in ASTM D1248. HDPE pipe and fittings shall conform to Cell Classification 345464C or 355434C (ASTM D3350). Diameter shall be as shown on Drawings.
   a. All gas manifold pipe shall have a minimum working pressure of 160 psi at 73.4 degrees F and a minimum SDR of 11.
6. This material shall have a long-term hydrostatic strength of 1,600 psi when tested and analyzed by ASTM D2837, and listed by the Plastic Pipe Institute as PE 3408 resin.
7. Polyethylene compound shall be suitably protected against degradation by ultraviolet light by means of carbon black, well dispersed by precompounding in a concentration of not less than 2 percent.
8. The pipe shall contain no recycled compound except that generated on the manufacturer’s own plant from resin of the same specification from the same raw supplier.
9. The following information shall be continuously marked on the pipe or spaced at intervals not exceeding 5 feet:
   a. Name and/or trademark of the pipe manufacturer.
   b. Nominal pipe size.
   c. Standard Dimensional Ratio (SDR).
   d. PE 3408.
   e. Manufacturing Standard Reference.
   f. A production code from which the date and place of manufacture can be determined.

B. Fittings shall be manufactured in accordance with ASTM D3261, and shall be manufactured by injection molding, a combination of extrusion and machining, or fabrication from HDPE pipe conforming to these Specifications. Fittings shall be from the same manufacturer as the pipe and shall have the same or numerically smaller SDR than pipe connecting to the fitting. Fittings shall be molded, for sizes 6 inches and smaller.

1. All reducing tees shall be factory-molded if available as a standard item by any manufacturer having pipe and meeting these Specifications. If not available as a standard item, branch saddle reducing tees shall be used. Reducers shall be shop fabricated. Field fabricated branch saddle tees will not be allowed.
2. All molded fittings shall have the same or higher pressure ratings as the pipe when installed in accordance with the latest technical specifications. All fabricated fittings shall have the same or higher pressure rating as the adjoining pipe when installed in accordance with the manufacturer’s recommendations.

C. Flanges: ASTM A240, Type 304 or Type 316 stainless steel, ASME B16.1 Standard drilling. Flanges shall be complete with one-piece, molded polyethylene stub ends. Flanged connections shall have same or greater pressure rating as pipe with safety factor of 2. Stub ends same grade HDPE and pressure rating as pipe. Blinds shall be 1-inch-thick HDPE.

D. Gaskets: Gasket material, size, and thickness shall be as recommended by pipe or flange manufacturer. Gasket material shall be Viton and of the size and thickness as recommended by pipe or flange manufacturer.

E. Bends made in pipe without fittings shall not exceed the minimum bending radius per manufacturer’s recommendations.

F. Bolts, Nuts, Washers: Type 316 stainless steel, ASTM A193, Grade B8 hex head bolts; and ASTM A194, Grade 8 hex head nuts. Bolts shall be fabricated in accordance with ASME B 18.2.2 and provided with washers of same material as bolts.

G. Joints: Thermal butt-fusion, except where connecting to unions, valves, and equipment with flanged connections that may require future disassembly.

H. Electrofusion Couplers: Couplers shall be rigid, straight coupler constructed of injection-molded polyethylene with embedded heating coils. Electrofusion couplers shall be Frialen Straight Couplers as manufactured by Friatec. Install at locations approved by Engineer.

I. Marking Tape: As specified in Section 31 23 23.15, Trench Backfill, Article Marking Tape.

2.03 PIPE SCHEDULE

A. All pipes are iron pipe size (IPS), unless otherwise noted.

B. All pipes called out on Drawings are nominal diameter.
2.04 VALVES – BUTTERFLY AND GATE

A. Butterfly Valves (buried, 8 inches or greater in diameter):
   1. Shall be resilient seated butterfly valves of appropriate line size. Valve shall be lugged or wafer-style, cast iron body with Viton seat and shaft seal, Type 416 stainless steel shaft and rotary manual gear with 2-inch square operating nut.
   2. Shall be DeZurik Model BHP, 8, L1, CS, TC, S2-S10-FT-TT*X, D Yahoo with 2-inch square actuator for buried service, Tourangeau Nor Wes Corp., 20475 SW Avery Court, Tualatin, OR; no approved equal.

B. Butterfly Valves (above ground, 8-inch or greater in diameter):
   1. Shall be manufactured with PVC wafer style bodies as manufactured by Asahi America Type 57 (no approved equal) with PVC/polypropylene construction with a Viton liner, seat, and seals. Valves shall be provided with a worm gear operator, position indicator and handwheel for operation. Valves shall be rated for full vacuum service.
   2. Shall be Asahi brand 8-inch butterfly valves and no approved equal.

2.05 VALVE BOXES

A. Valve boxes shall be installed on all buried valves. The box shall be of cast iron (or approved equal) two-piece slip type standard design with a base corresponding to the size of the valve. The valve box shall be a Carson Model No. 1730, Valco systems; or approved equal.

B. Valve stem extensions shall have 2-inch square operating nut and self-centering rockplate support. Valve stem extensions shall raise operating nuts to within 6 inches of the finish ground surface.

C. Provide a bollard the road shoulder perpendicular to valve, as shown on Drawings. Bollard shall be located 4 feet from edge of road.

2.06 GAS MANIFOLD TRENCH MATERIAL

A. Excavating, backfilling, and compacting shall conform to Division 31, Earthwork, of these Specifications.

B. All earthwork material shall conform to Division 31, Earthwork, of these Specifications.
PART 3  EXECUTION

3.01  INSTALLATION

A.  HDPE Installation:

1.  HDPE pipe which is to be installed underground shall be laid in a manner that the excavation, pipe laying, and backfilling of the pipe trench, as described on Drawings, shall be completed within the same day and before the Contractor leaves the Site on that day or as approved by the Engineer/Owner. Trench excavation and backfill shall be Section 31 23 16, Excavation, Section 31 23 23, Fill and Backfill, and Section 31 23 23.15, Trench Backfill, of these Specifications.

2.  When necessary to cut the HDPE pipe, the pipe shall be cut using a chain saw, a tool, or tools specifically designed to leave a smooth, even and square end on the pipe material to be cut. Cut ends shall be reamed to the full inside diameter of the pipe.

3.  The individual lengths of pipe and all fittings (unless otherwise noted) shall be jointed together by thermal butt fusion. This pipe shall be fused of the same type, grade, and class of polyethylene compound and supplied by the same raw material supplier.
   a.  Butt fusion shall be made only when the pipe materials to be jointed are clean and dry, and only at ambient temperatures of 40 degrees F and above, or as approved by the Engineer.
   b.  The butt fusion shall be accomplished according to the pipe manufacturer’s recommendation.
   c.  Contractor shall remove HDPE shavings and debris as a result of cutting or butt fusion prior to fusing pipe or flush pipe prior to testing.

4.  The Contractor shall take care when handling the pipe so as to not damage it by dragging it over sharp and cutting objects. Sections of the pipe with gouges or cuts shall be cut out and the ends of the pipe rejoined.

5.  The minimum slope for gas and condensate piping placement is a continuous 2 percent, unless otherwise specified, in the direction shown, or from high points to low points as indicated on Drawings.

6.  Where shown on Drawings, or for ease of installation, lengths of pipe shall be joined together by the use of flanges rather than thermal fusion. Flange bolts shall be tightened by pulling down on diametrically opposite nuts until proper bolt torque values are achieved. Bolt torques for HDPE flanges shall not exceed the maximum value, according to manufacturer specifications, for each appropriate pipe size.
   a.  Contractor shall provide necessary gaskets and bolting to install between adjoining flanges. Flanged connections are required
7. Special Provisions at Flanges: Support polyethylene pipe connected to heavy fittings, and rigid structures in such a manner that no subsequent relative movement between polyethylene pipe at flanged joint and rigid structures is possible.

8. Placement in Trench:
   a. Handle joined pipeline in such a manner that pipe is not damaged by dragging it over sharp and cutting objects.
   b. Position slings for handling pipeline away from butt-fused joints.
   c. Remove sections of damaged pipe and replace it with undamaged pipe. Damaged pipe is defined as pipe with kinks or gouges exceeding 10 percent of pipe wall thickness.
   d. Exercise care when lowering pipe into trench to prevent damage or twisting of pipe.
   e. Snake pipe from one side of trench to other to allow for thermal and settling movements.
   f. At flanges, valves, and connections, excavate trench bottom out sufficiently to ensure clearance between undisturbed trench bottom and flange, valve, or connection.

B. Valve Installation:

1. All gas valves shall be oriented for operator convenience with the operation handle or actuator in the most accessible position. Butterfly valves shall be installed with the internal shaft axis in the horizontal position.

2. General: Valves and accessories will be installed in a manner and location as shown on Drawings or as required for the application and in accordance with manufacturer’s instructions. Size of valve is equal to line piping in which valve is installed unless otherwise noted on Drawings. Support all valves where necessary. In case of conflict between these Specifications and a governing code, the higher standard shall prevail.

3. Accessories: Provide all accessories necessary, such as spacers, for proper valve operation as specified or required for the application. Belowgrade butterfly valves shall be installed with 2-inch square operating nuts. Valves shall be installed in a concrete valve box as shown on Drawings. Provide at least two T wrenches for buried valve operation for all sizes and depths of operating nuts and placed at convenient locations. A bollard shall be placed next to the valve vault for identification.

4. Adjustments: Check and adjust valves and accessories for smooth and optimum operation. Lubricate in accordance with manufacturer’s recommendations.
3.02 PIPE AIR TEST

A. HDPE Gas Pipe:

1. Test all landfill gas piping with a low pressure air test prior to commencing normal service on this Project. All testing must be completed before beginning backfill. The test requirement shall apply to pipe associated with Bid Items. The Contractor shall provide all required temporary plugs, flanges, and blind flanges; and all test equipment. The Engineer shall be present to inspect, observe, and accept tests. The Contractor shall notify the Engineer at least 48 hours in advance of any planned test. The Engineer may at any time require a calibration test of gauges or other instrumentation that is incorporated in the test equipment.

2. Procedures for a Low Pressure Air Test:
   a. Interior of the pipe shall be clean, free of foreign materials and water prior to the test.
   b. Plug all pipe outlets with suitable test plugs. Brace each plug securely. Segments to be tested can be isolated using the nearest valve or by temporarily installing plugs or blind flanges. If valves are not suitable for testing, temporary plugs or bland flanges are required.
   c. Add air slowly to the portion of the pipe installation under test until the internal pipe pressure is raised to 4.0 psig.
   d. Check exposed pipe and plugs for abnormal leakage by coating with a soap solution. If any failures are observed, bleed off air and make necessary repairs. Restart the test.
   e. After the appropriate internal pressure is obtained, allow at least 5 minutes for air temperatures to stabilize, adding only the amount of air required to maintain test pressure.
   f. After a 10-minute stabilization period, disconnect air supply.
   g. Start stop watch. The required test period is 60 minutes and there is no allowable internal pressure change. The test period shall be the same for a segment of the system or the entire system. The gauge used for the testing shall be certified accurate, marked in 1/10-pound per square inch increments.

3.03 CLEANING

A. Following assembly and testing, flush pipelines with water. Make sure not to contribute water to a leachate pond holding leachate, thereby generating additional leachate.

B. Landfill Gas Lines: Prior to final acceptance and final inspection of the system by the Engineer, flush and clean all parts of the system, while also operating
valves. Remove all accumulated construction debris, rocks, gravel, and all other foreign matter. If necessary, use mechanical rodding or bucketing equipment.

3.04 REMOVAL OF EXISTING GAS AND LEACHATE SYSTEM PIPING

A. The Contractor shall take responsibility for abandoning, removing, protecting, and disposing of all existing gas and leachate pipe, vaults, valves, etc. used in the existing gas and leachate systems. The existing HDPE pipe shall be cut up into sections and disposed of within the landfill at the direction of the Owner.

B. The Contractor shall coordinate and schedule pipe removal in accordance with the requirements of this Section. After gas and leachate pipes to be removed have been deemed offline by the Owner, the Contractor shall abandon and reconnect or install fittings so the system can be put back into service. After completion of this work to the north and south ends, the Contractor can remove and dispose of all existing HDPE pipe. No charge will be made to the Contractor for disposal of materials at the landfill.

END OF SECTION
KOOTENAI COUNTY SOLID WASTE CENTRAL CORRIDOR PROJECT

SECTION 33 41 01
CULVERTS

PART 1 GENERAL

1.01 REFERENCES

A. The following is a list of standards which may be referenced in this section and any supplemental Data Sheets:

1. American Association of State Highway and Transportation Officials (AASHTO):
2. ASTM International (ASTM):

1.02 SUBMITTALS

A. Action Submittals:

1. Shop Drawings: Catalog information confirming pipe, fittings, and other materials conform to requirements of this section.

B. Informational Submittals: Qualifications for HDPE and stainless steel pipe manufacturers and installers.

1.03 QUALIFICATIONS

A. Pipe Manufacturer: Listed with Plastic Pipe Institute as meeting recipe and mixing requirements of resin manufacturer for resin used to manufacture pipe for this Project.

B. Persons fusing HDPE pipe shall be certified under 49 CFR § 192.285, and have minimum of 5 years’ of experience with fusing HDPE pipe and shall have received training for fusing HDPE pipe in accordance with recommendations of pipe Supplier or fusing equipment Supplier.
C. Stainless steel pipe fitters and welders shall hold a current certifications.

1.04 GENERAL

A. Like items of material specified shall be provided by one manufacturer.

B. All pipe sizes are Iron Pipe Size (IPS) and are shown on Drawings as nominal diameter.

C. All standard dimension ratios (SDRs) are as shown on Drawings, where applicable.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Shipping: Do not cut, kink, or otherwise damage pipe during transportation.

B. Storage:

1. Limit stacking of pipe to a height that will not cause excessive deformation of bottom layers of pipes under anticipated temperature conditions.

2. Where necessary because of ground conditions, store pipe on wooden sleepers, spaced suitably and of such widths as not to allow deformation of pipe at point of contact with sleeper or between supports.

1.06 ENVIRONMENTAL CONDITIONS

A. Fusing Conditions for HDPE Pipe:

1. Match cell class and pipe SDR of new pipe to existing pipe, where applicable.

2. Adhere to fusing guidelines for environmental restrictions.

3. Take extra precaution in hazardous Site areas.

PART 2 PRODUCTS

2.01 PIPE AND FITTINGS

A. Corrugated Steel Pipe:

1. Corrugated steel pipe (CSP) shall be used in culvert crossings and similar applications. Pipe shall conform to the following specifications:

   a. Corrugated steel pipe shall meet the requirements of AASHTO M-36, zinc coated (galvanized).
b. All CSP fittings shall be fabricated in a workmanlike manner, develop the full strength of the material being joined, and finished to conform to appropriate requirements of AASHTO M-36.

c. Corrugated steel pipe shall jointed by using coupling bands applied as recommended by the manufacturer and approved by Construction Manager.

d. Angles, bolts, and nuts shall be as recommended by manufacturer for the type of pipe used and as approved by Construction Manager.

e. Gauge for pipe to be used shall be 12 gauge.

f. Flared End Section for Corrugated Steel Pipe: Galvanized steel end sections shall be flared, beveled, shop-assembled units to serve as structural, hydraulic and esthetic treatment to corrugated steel pipe culverts. They may be attached to culverts by threaded bolts, by riveting or bolting in accordance with manufacturer’s standard procedure. End sections shall have a turned-down lip or toe plate at the wide end to act as a cutoff. Materials for steel end sections shall be galvanized steel conforming to the requirements of AASHTO M-36. If end section is shop-attached to a stub of pipe, pipe stub shall not be lighter in gauge than the end section.

B. HDPE Pipe:

1. General:
   a. Pipe and fittings specified in this section shall be products of:
      1) CP Chem Performance Pipe.
      2) JM-Manufacturing Co.

2. Materials:
   a. Pipe and Fittings:
      1) Conform to requirements of AWWA C906.
      2) Polyethylene resin shall meet or exceed requirements of ASTM D3350 for PE 4710 material with cell classification of 445474C or better.
      3) Pipe sizes shall conform to ASTM F714.
      4) Pipe lengths, fittings, and flanged connections to be joined by thermal butt-fusion shall be of same type, grade, and class of polyethylene compound and supplied from same raw material Supplier.
      5) Fittings shall be molded for sizes 6 inches and smaller and shall be fabricated from polyethylene pipe; for sizes 8 inches and larger, by means of thermal butt-fusion. Ends of fabricated fittings shall not be trimmed to match pipe section to which they are going to be joined. Polyethylene
fittings shall have same or higher pressure rating as pipe when installed.

6) Flanges: ASTM A240, Type 304 or Type 316 stainless steel, ASME B16.1 standard drilling. Flanges shall be complete with one-piece, molded polyethylene stub ends. Flanged connections shall have same or greater pressure rating as pipe with safety factor of 2. Stub ends same grade HDPE and pressure rating as pipe.

7) Gaskets: Gasket material, size, and thickness shall be as recommended by pipe or flange manufacturer.

8) Joints: Thermal butt-fusion, except where connecting to unions, valves, and equipment with flanged connections that may require future disassembly.

9) Bends made in pipe without fittings shall not exceed the minimum bending radius per manufacturer’s recommendations.

10) Bolts, Nuts, Washers: Type 316 stainless steel, ASTM A193, Grade B8 hex head bolts; and ASTM A194, Grade 8 hex head nuts. Bolts shall be fabricated in accordance with ASME B18.2.2 and provided with washers of same material as bolts.

11) Electrofusion Couplers: Couplers shall be rigid, straight coupler constructed of injection-molded polyethylene with embedded heating coils. Electrofusion couplers shall be Frialen Straight Couplers as manufactured by Friatec. Install at locations approved by Engineer.

PART 3 EXECUTION

3.01 INSTALLATION OF PIPE, FITTINGS, AND APPURTEANCES

A. General:

1. Pipe laying shall proceed upgrade with spigot ends pointing in direction of flow.

2. Excavate bell holes at each joint to permit correct assembly and inspection of entire joint.

3. Pipe invert may deviate from line or grade up to 1/2 inch for line and 1/4 inch for grade, provided that finished pipe line will present a uniform bore, and such variation does not result in a level or reverse sloping invert, or less than minimum slope shown.

4. Pipe bedding shall form continuous and uniform bearing and support for pipe barrel between joints. Pipe shall not rest directly on bell or pipe joint.

5. Prevent entry of foreign material into gasketed joints.
6. Plug or close off pipes that are temporarily stubbed off for connection with temporary watertight plugs.

B. Corrugated Steel Pipe:

1. Joints and related work for field assembly of fittings shall conform to requirements of straight pipe.
2. Inspect pipe and fittings before installation. Clean ends thoroughly, remove dirt and foreign matter.
3. Mark minor field adjustments by pulling standard joints. Maximum allowable angle of 75 percent of manufacturers recommended or angle which results from 3/4-inch pull out from normal joint closure, whichever is less. Maximum allowable gap of 1/8 inch between bell and spigot at weld location.

C. HDPE Pipe:

1. Fabricate and install polyethylene pipe in strict conformance with ASTM D2774, and pipe manufacturer’s recommendations.
2. Joining: Butt-fuse pipes and fittings in accordance with pipe manufacturer’s recommendations. Depending on Site conditions, perform butt-fusion joining in or outside of excavation.
3. Mechanical Connections: Connect HDPE pipe to auxiliary equipment such as valves, pumps, tanks, and other piping systems with flanged connections as follows:
   a. Polyethylene “stub end”, thermally butt-fused to ends of pipe.
   b. Backing flange, as specified.
   c. Bolt and nut of sufficient length to show a minimum of three complete threads when joint is made and tightened to manufacturer’s standard. Retorque nuts after 4 hours.
   d. Gaskets as specified.
4. Special Precautions at Flanges: Support polyethylene pipe connected to heavy fittings, manholes, and rigid structures in such a manner that no subsequent relative movement between polyethylene pipe at flanged joint and rigid structures is possible.
5. Placement in Trench:
   a. Handle joined pipeline in such a manner that pipe is not damaged by dragging it over sharp and cutting objects.
   b. Position slings for handling pipeline away from butt-fused joints.
   c. Remove sections of damaged pipe and replace it with undamaged pipe. Damaged pipe is defined as pipe with kinks or gouges exceeding 10 percent of pipe wall thickness.
d. Exercise care when lowering pipe into trench to prevent damage or twisting of pipe.

e. Snake pipe from one side of trench to other to allow for thermal and settling movements.

f. At flanges, valves, and connections, excavate trench bottom out sufficiently to ensure clearance between undisturbed trench bottom and flange, valve, or connection.

3.02 CLEANING

A. Visually inspect all pipe sections and demonstrate to the Engineer that all pipes are free of debris and foreign matter.

END OF SECTION
PART 1  GENERAL

1.01  REFERENCES

A.  The following is a list of standards which may be referenced in this section:

1.  ASTM International (ASTM):
   b.  A194/A194M, Standard Specification for Carbon and Alloy Steel Nuts for Bolts for High Pressure and High Temperature Service, or both.
   m.  D1004, Standard Test Method for Tear Resistance (Graves Tear) of Plastic Film and Sheeting.
1.02 DEFINITIONS

A. Boot: Watertight collar fabricated from geomembrane sheet for sealing geomembrane to pipes and other objects that penetrate geomembrane.

B. Film Tearing Bond: Failure in ductile mode of one bonded sheet, by testing, prior to complete separation of bonded area.

C. Geomembrane: Essentially impermeable geosynthetic composed of one or more layers of polyolefin materials fusion bonded into single-ply integral sheet.

D. Panel: Piece of geomembrane composed of two or more sheets seamed together.

E. Sheet: Seamless piece of geomembrane.

F. Watertight: Geomembrane installation free of flaws and defects that will allow passage of water and gases, liquids, and solids to be contained under anticipated service conditions.

1.03 SUBMITTALS

A. Action Submittals:

1. Shop Drawings:
   a. Manufacturer’s specifications, literature for each geomembrane furnished, and products used to complete installation.
   b. Compensation allowance calculation and numerical values for temperature induced geomembrane expansion and contraction.
   c. Polymer Resin: Product identification and Supplier.
   d. Geomembrane sheet layout with proposed size, number, position, and sequence of sheet placement, and location of field seams.
e. Proposed equipment for material placement.
f. Procedures for material installation.

B. Informational Submittals:

1. Qualifications:
   a. Manufacturer.
   b. Installer.
   c. Independent testing agency.

2. Quality Assurance Program: Written description of geomembrane manufacturer’s and installer’s formal programs for manufacturing, fabricating, handling, installing, seaming, testing, and repairing geomembrane.

3. Manufacturer’s Certificate of Compliance, in accordance with Section 01 43 33, Manufacturers’ Field Services.

4. Production dates for geomembrane.

5. Testing:
   a. Factory QC test results for supplied geomembrane.
   b. Certified field seam test results.

6. Geomembrane Installer’s Certification of Subsurface Acceptability: Form attached at end of this section.

7. Special guarantee.

1.04 QUALIFICATIONS

A. Independent Testing Agency: 5 years’ experience in field of geomembrane testing. Laboratory shall maintain calibrated instruments, equipment, and documented standard procedures for performing specified testing.

B. Manufacturer: Successfully manufactured a minimum of 10 million square feet of each type of geomembrane material specified.

C. Installer: Successfully installed a minimum of 10 million square feet of each type of geomembrane product specified in applications similar to the Project.

D. Minimum qualifications stated above will be deemed met if the firm or cumulative experience of key personnel (supervisors and trained installation/testing technicians) proposed for this Project has minimum experience specified. If key personnel provision is used to qualify the firm, submit letter stating key personnel meet the minimum experience requirements and those individuals are available for and will be committed to this Project.
1.05 COORDINATION MEETINGS

A. Meet at least once prior to commencing each of the following activities:
   1. Fabrication of panels and boots.
   2. Installation of geomembrane.

B. Attendees:
   1. Contractor’s designated quality control representative.
   2. Engineer.
   3. Representatives of geomembrane installer.
   4. Others requested by Engineer.

C. Topics:
   1. Specifications and Drawings.
   2. Submittal requirements and procedures.
   3. Schedule for beginning and completing geomembrane installation.
   4. Training for installation personnel.
   5. Installation crew size.
   6. Establishing geomembrane marking system, to include sheet identification, defects, and satisfactory repairs, to be used throughout Work.

D. Seam Installation and Testing Demonstration: Performed by geomembrane installer, for each type of seam required.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Geomembrane:
   1. Individually package each sheet and protect from damage during shipment.
   2. Mark each package with identification of material type, size, and weight.

1.07 ENVIRONMENTAL REQUIREMENTS

A. Do not install geomembrane or perform seaming under the following conditions, unless it can be demonstrated to satisfaction of Engineer that performance requirements can be met under these conditions:
   1. Air temperature is less than 35 degrees F or more than 90 degrees F.
   2. Relative humidity is more than 90 percent.
   3. Raining, snowing, frost is in ground, or wind is excessive.
B. Do not place granular materials on geomembrane when ambient temperature is less than 35 degrees F, unless it can be demonstrated to satisfaction of Engineer that materials can be placed without damage.

1.08 SEQUENCING AND SCHEDULING

A. Before placing geomembrane on soil surfaces, prepare subgrade as specified in Section 31 23 13, Subgrade Preparation, and Section 31 23 23, Fill and Backfill.

B. Do not attach geomembrane to new concrete surfaces until after concrete has attained two-thirds of design compressive strength.

C. Do not place geomembrane over concrete surfaces until finish of concrete surfaces.

1.09 SPECIAL GUARANTEE

A. Provide manufacturer’s extended guarantee or warranty, with Owner named as beneficiary, in writing, as special guarantee. Special guarantee shall provide for correction, or at option of Owner, removal and replacement of Work specified in this Specification section found defective during periods below, commencing on date of Substantial Completion. Duties and obligations for correction or removal and replacement of defective Work as specified in General Conditions.

1. Guaranty geomembrane against manufacturing defects, deterioration due to ozone, ultraviolet, and other exposure to elements for period of 20 years on pro rata basis.

2. Guaranty geomembrane against defects in material and factory seams for period of 2 years.

3. Guaranty geomembrane against defects resulting from installation for period of 2 years.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Geomembrane:

1. GSE Lining Technology, Inc., Houston, TX.

2. Poly-Flex, Inc., Grand Prairie, TX.

3. AGRU America, Georgetown, SC.
2.02 GEOMEMBRANE

A. Composition:
   1. High density polyethylene (HDPE) containing no plasticizers, fillers, extenders, reclaimed polymers, or chemical additives, except following:
      a. Approximately 2 percent by weight of carbon black to resin for ultraviolet resistance.
      b. Antioxidants and heat stabilizers, not to exceed 1.5 percent total by weight, may be added as required for manufacturing.

B. Furnish in rolled single-ply continuous sheets with no factory seams.

C. Sheet Thickness: Minimum values determined in accordance with ASTM D5199 and shall not include ridges of rough-surfaced HDPE geomembrane.

D. Sheet Width: Minimum 22 feet.

E. Roll Length: Longest that will be manageable and reduce field seams.

F. Rough-Surfaced HDPE Geomembrane: Manufactured so that surface irregularities that produce specified friction are adequately fused into sheet or are extruded with sheet, on both sides of sheet. Texture is to be in addition to base thickness specified for sheet.

G. Meet manufacturer’s most recent published specifications and required minimum HDPE geomembrane values in this table.

<table>
<thead>
<tr>
<th>Property</th>
<th>Required Value</th>
<th>Test Method</th>
</tr>
</thead>
<tbody>
<tr>
<td>Specific Gravity</td>
<td>0.940 to 0.936, g/cc; not more than 15% greater than base resin density</td>
<td>ASTM D792, Method A-1 or ASTM D1505</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Rough-Surfaced, HDPE Minimum Properties, Each Direction</th>
</tr>
</thead>
<tbody>
<tr>
<td>Thickness, min., for thinner areas of textured sheet</td>
</tr>
<tr>
<td>Tensile Stress at Yield</td>
</tr>
<tr>
<td>Elongation at Yield</td>
</tr>
<tr>
<td>Puncture Resistance</td>
</tr>
<tr>
<td>Tear Resistance</td>
</tr>
</tbody>
</table>
### Minimum Physical Properties for HDPE Geomembrane – Central Corridor Liner and Roadway Lined Ditches

<table>
<thead>
<tr>
<th>Property</th>
<th>Required Value</th>
<th>Test Method</th>
</tr>
</thead>
<tbody>
<tr>
<td>Brittleness Temperature</td>
<td>Minus 70 degrees F, no cracks</td>
<td>ASTM D746 (Proc. B)</td>
</tr>
<tr>
<td>Coefficient of Linear Thermal Expansion</td>
<td>$1.2 \times 10^{-4}$ in/in/degree C</td>
<td>ASTM D696</td>
</tr>
<tr>
<td>Hydrostatic Resistance</td>
<td>$7.5$ lb/sq in/mil thickness</td>
<td>ASTM D751, Method A</td>
</tr>
<tr>
<td>Environmental Stress Crack</td>
<td>1,500 hours</td>
<td>ASTM D1693, Condition B ($50^\circ$C) and 10% Igepal Solution</td>
</tr>
<tr>
<td>Bonded Seam Strength in Shear</td>
<td>$2$ lb/in-width/mil thickness, min. &amp; FTB</td>
<td>ASTM D 6392</td>
</tr>
<tr>
<td>Bonded Seam Strength in Peel</td>
<td>$1.2$ lb/in-width/mil thickness, min. &amp; FTB</td>
<td>ASTM D6392</td>
</tr>
<tr>
<td>Water Absorption, Weight Change/Adap.</td>
<td>$0.085%$ max.</td>
<td>ASTM D570</td>
</tr>
</tbody>
</table>

Notes:
1. Commercially available micrometers may be used that have a 60-degree taper to a point with a radius of $1/32$ inch. Engineer shall make enough measurements of thinner areas of textured sheet to develop statistical basis for thickness.

### Minimum Physical Properties for HDPE Geomembrane – Stormwater Berm Liner

<table>
<thead>
<tr>
<th>Property</th>
<th>Required Value</th>
<th>Test Method</th>
</tr>
</thead>
<tbody>
<tr>
<td>Specific Gravity</td>
<td>$0.940$ to $0.936$, g/cc; not more than $15%$ greater than base resin density</td>
<td>ASTM D792, Method A-1 or ASTM D1505</td>
</tr>
</tbody>
</table>

### Rough-Surfaced, HDPE Minimum Properties, Each Direction

<table>
<thead>
<tr>
<th>Property</th>
<th>Required Value</th>
<th>Test Method</th>
</tr>
</thead>
<tbody>
<tr>
<td>Thickness, min., for thinner areas of textured sheet</td>
<td>28 mil</td>
<td>ASTM D5199, Modified Note 1, or ASTM D5994</td>
</tr>
<tr>
<td>Tensile Stress at Yield</td>
<td>$2$ lb/mil thickness</td>
<td>ASTM D638</td>
</tr>
<tr>
<td>Elongation at Yield</td>
<td>$12%$ plus or minus $3%$</td>
<td></td>
</tr>
<tr>
<td>Puncture Resistance</td>
<td>$1$ lb/mil thickness</td>
<td>ASTM D4833</td>
</tr>
<tr>
<td>Tear Resistance</td>
<td>$0.70$ lb/mil thickness</td>
<td>ASTM D1004, Die C</td>
</tr>
</tbody>
</table>
### Minimum Physical Properties for HDPE Geomembrane – Central Corridor Liner and Roadway Lined Ditches

<table>
<thead>
<tr>
<th>Property</th>
<th>Required Value</th>
<th>Test Method</th>
</tr>
</thead>
<tbody>
<tr>
<td>Brittleness Temperature</td>
<td>Minus 70 degrees F, no cracks</td>
<td>ASTM D746 (Proc. B)</td>
</tr>
<tr>
<td>Coefficient of Linear Thermal Expansion</td>
<td>$1.2 \times 10^{-4}$ in/in/degree C</td>
<td>ASTM D696</td>
</tr>
<tr>
<td>Hydrostatic Resistance</td>
<td>7.5 lb/sq in/mil thickness</td>
<td>ASTM D751, Method A</td>
</tr>
<tr>
<td>Environmental Stress Crack</td>
<td>1,500 hours</td>
<td>ASTM D1693, Condition B (50°C) and 10% Igepal Solution</td>
</tr>
<tr>
<td>Bonded Seam Strength in Shear</td>
<td>2 lb/in-width/mil thickness, min. &amp; FTB</td>
<td>ASTM D 6392</td>
</tr>
<tr>
<td>Bonded Seam Strength in Peel</td>
<td>1.2 lb/in-width/mil thickness, min. &amp; FTB</td>
<td>ASTM D6392</td>
</tr>
<tr>
<td>Water Absorption, Weight Change/Adap.</td>
<td>0.085% max.</td>
<td>ASTM D570</td>
</tr>
</tbody>
</table>

**Notes:**
1. Commercially available micrometers may be used that have a 60-degree taper to a point with a radius of 1/32 inch. Engineer shall make enough measurements of thinner areas of textured sheet to develop statistical basis for thickness.

---

**H.** Extrudate for Fusion Welding of HDPE Geomembranes: Formulated from the same resin as geomembrane and shall meet applicable physical property requirements.

**2.03 BOOTS**

**A.** Fabricated of same material as geomembrane sheets to fit around penetrations, without folds, stretching, or unsupported areas.

**B.** Flanges:

1. Angle: Match slope or bottom where penetration passes through liner.
2. Width: Minimum 2 feet, plus dimension of penetration.
2.04 SEALANT CAULKING
   A. Two-component sealant formulated of 100 percent polyurethane elastomer, such as Elastuff 120 Mastic as supplied by United Paint and Coatings, Greenacre, WA.
   B. Butyl rubber sealant such as Butylgrip Sealant, supplied by the Biddle Company, St. Louis, MO.

2.05 STAINLESS STEEL BANDS
   A. As manufactured by Breeze Clamp Products, Saltsburg, PA.

2.06 ALUMINUM CLAMP MATERIAL
   A. In accordance with ASTM B211, Alloy 5052, Temper H32.
      1. Strips: 2 inches wide by 1/4 inch thick.
      2. Channel: 2 inches wide by 1/8 inch thick.

2.07 NEOPRENE RUBBER PAD
   A. Compression Strip Beneath Battens:
      1. 2 inches wide by 1/4-inch-thick.
      2. 35 durometer to 45 durometer, in accordance with ASTM D2240 hardness.
   B. Contact Cement: As recommended by neoprene rubber pad manufacturer.
   C. Manufacturer: Aero Rubber Co., Inc., Bridgeview, IL.

2.08 PROTECTIVE FOAM
   A. Medium to high-density rigid board.
   B. Manufacturers and Products
      1. General Plastics Manufacturing Corp, Tacoma, WA; Polyurethane Last-a-Foam.
      2. Dow Chemical Corp., Midland, MI; Polyethylene Ethafoam.

2.09 CAST-IN-PLACE HDPE EMBEDMENT
   A. Properties: Compatible for attaching geomembrane materials by extrusion welding to provide watertight seal.
B. Manufacturers:
   1. GSE Lining Technologies, Houston, TX.
   3. AGRU America, Georgetown, SC.

2.10 FACTORY TESTING
   A. Per standard factory testing program as approved by Engineer for the application.

PART 3 EXECUTION

3.01 PREPARATION
   A. Geomembrane Inspection: During unwrapping visually inspect and mark each imperfection for repair.
   B. Do not place geomembrane until condition of subgrade or geosynthetics installed is acceptable to Engineer.
   C. Subgrade: Maintain in smooth, uniform, and compacted condition as specified in Section 31 23 13, Subgrade Preparation, during installation of geomembrane.
   D. Concrete Surfaces in Contact with Geomembrane:
      1. As specified in Section 31 23 23, Fill and Backfill, unless otherwise specified herein.
      2. Provide smooth surface, free of projections, rough spots, voids, honeycomb, or other irregularities. Grind uneven concrete surface to which geomembrane is to be attached, flat and smooth. Round edges to minimum 1/2-inch radius.
      3. Clean contact surfaces of dirt, dust, oil, curing compounds, and other coatings by sandblasting.
   E. Before installation begins, inspect all liner system materials for damage. Materials that cannot be repaired, in Engineer’s judgment, shall be rejected and removed from site. Areas that can be repaired shall be marked and done so in conformance with this specification.

3.02 WELDING UNITS
   A. Single or double hot-wedge fusion seam welding.
   B. Extrusion welding systems.
3.03 GEOMEMBRANE INSTALLATION

A. Prepare subgrade as specified in Section 31 23 13, Subgrade Preparation, and Section 31 23 23, Fill and Backfill.

B. Do not install geomembrane or seam unless Contractor can demonstrate successful performance and test results showing seams meet strength specifications.

C. Protection:
   1. Do not use geomembrane surfaces as work area for preparing patches, storing tools and supplies, or other uses. Use protective cover as work surface, if necessary.
   2. Instruct workers about requirements for protection of geomembrane, such as, handling geomembrane material in high winds, handling of equipment, and walking on geomembrane surfaces. Shoes of personnel walking on geomembrane shall be smooth bonded sole or be covered with smooth type of overboot. Prohibit smoking, eating, or drinking in vicinity of geomembrane, placing heated equipment directly on geomembrane, or other activities that may damage geomembrane.
   3. Do not operate equipment without spark arrestors in vicinity of geomembrane material nor place generators or containers of flammable liquid on geomembranes.
   4. Protect from vehicle traffic and other hazards.
   5. Keep free of debris during placement.
   6. Prevent uplift, displacement, and damage by wind.
   7. Only small rubber-tired equipment, with maximum tire inflation pressure of 5 pounds per square inch, shall be allowed directly on geomembrane, unless otherwise approved by Engineer. Demonstrate that equipment can be operated without damaging geomembrane.

D. Placement:
   1. Miscellaneous products required for completion of geomembrane installation shall be in accordance with this specification and geomembrane manufacturer’s recommendations.
   2. Reduce field seaming to the minimum amount possible. Horizontal seams on slopes will not be acceptable. Seams parallel to toe shall be at least 5 feet from toe. Align rough-sided sheets in manner that maximizes their frictional capabilities along slope.
3. Prevent wrinkles, folds, or other distress that can result in damage or prevent satisfactory alignment or seaming. Provide for factors such as expansion, contraction, overlap at seams, anchorage requirements, seaming progress, and drainage.

4. Temporarily weight sheets with sandbags to anchor or hold them in position during installation. Use continuous holddowns along edges to prevent wind flow under sheet.
   a. Bag Fabric: Sufficiently close knit to preclude fines from working through bags.
   b. Bags: Contain not less than 40 pounds nor more than 60 pounds of sand having 100 percent passing No. 8 screen and shall be securely closed after filling to prevent sand loss.
   c. Do not use tires or paper bags, whether or not lined with plastic. Burlap bags, if used, shall be lined with plastic.
   d. Immediately remove damaged or improperly sealed bags from work area, and clean up spills.

5. Anchor perimeter of geomembrane as shown or as otherwise approved by Engineer. Anchor and seal geomembrane to structures, pipes, and other types of penetrations as shown.

6. Place overlying geotextile or soil cover as shown on Drawings immediately following completion of geomembrane installation and field testing as acceptable to Engineer.

E. Field Seams:

1. Wipe sheet contact surfaces clean to remove dirt, dust, moisture, and other foreign materials and prepare contact surfaces in accordance with seaming method accepted by Engineer.

2. Lap sheet edges to form seams. Adjust edges to be seamed and temporarily anchor to prevent wrinkling and shrinkage.

3. Seams shall not go through a boot. Locate seams minimum of 2 feet from boot.

4. Avoid seam intersections involving more than three thicknesses of geomembrane material. Offset seam intersections at least 2 feet. Extend seams through anchor trench to sheet edges.

5. Seal seam “T” intersections by removing excess material and extrusion welding lap joint.

6. Seam sheets together, using fusion-extrusion or hot-wedge welding system, equipment, and techniques.

7. Capping of Field Seams: Use 8-inch wide (minimum) cover strip of same thickness as geomembrane (and from same roll, if available). Position strip over center of field seam and weld to geomembrane using fillet weld each side, including copper wire as described above for spark testing.
F. HDPE Embedments:

1. Coordinate with Section 31 23 23, Fill and Backfill, and supplier.
2. Attach to forms by nailing strip every 18 inches to ensure flat surface is tight against form.
3. Allow 1/4-inch to 3/8-inch spacing between butt joints to allow for thermal expansion before welding joints.
4. Allow 6-inch spacing from walls or edges of concrete.
5. Chamfer ends of butt joints or intersection joints to allow for extrusion welding seal of strip.
6. On sloped or horizontal surfaces, embedments with air release holes may be pushed into poured concrete.
7. Seal nail and air holes with extrudate prior to installing membrane.
8. Make full perimeter weld of geomembrane to embedment to ensure maximum watertightness.

G. Penetrations:

1. Construct penetrations through the geomembrane as shown on Drawings.
2. No wrinkles shall exist in the geomembrane at the location of clamps, penetrations, or other locations.
3. Tighten steel clamping bands until neoprene rubber pads are compressed 12 percent to 15 percent of total pad thickness.
4. Anchors and seals of the geomembrane to pipe and round penetrations shall be of the compression flange type or of the boot type.
5. Boot Seals: Place tightly fitting factory fabricated boots without folds around the penetrations. Seal the boot to the geomembrane in accordance with procedures for a field seam using extrusion welding methods. Seal the boot to the penetration using adhesives, rubber pads, and stainless steel clamping bands as shown on Drawings.
6. The cast-in-place embedment assembly shall be installed in accordance with manufacturer’s recommendations, providing a water-tight seal.

H. Boot Seals:

1. Preparation: Thoroughly clean contact surfaces.
2. Place boot around penetrations so flange is supported everywhere in full contact with subgrade, and is free of wrinkles.
3. Seal boot to surrounding geomembrane as specified for field seams using extrusion-welding methods.
4. Tighten steel clamping bands until neoprene rubber pads are compressed 12 percent to 15 percent of total pad thickness.
3.04 PLACING PRODUCTS OVER GEOMEMBRANE

A. Refer to Section 31 23 23, Fill and Backfill.

3.05 REPAIRING GEOMEMBRANE

A. Any geomembrane surface showing injury because of scuffing, penetration by foreign objects, or distress from rough subgrade shall be replaced or covered and sealed with an additional layer of geomembrane material of proper size.

B. Repair damage or rejected seams with pieces of flat and unwrinkled geomembrane material free from defects and seams. Patches shall be tightly bonded on completion of repair Work.

C. Patch shall be neat in appearance and of size 18 inches larger in all directions than area to be repaired. Round corners of patch to minimum 1-inch radius.

D. Prepare contact surfaces and seam patch in accordance with Paragraph Field Seams.

1. Pull and hold flat receiving surface in area to be patched.
2. Seal each patch by extrusion welding continuous bead along edge, with no free edge remaining.
   a. Vacuum box test each patch on completion.

3.06 FIELD QUALITY CONTROL

A. Prior to starting geomembrane installation and daily thereafter for installation on subgrade, geomembrane installer shall certify in duplicate that surface upon which geomembrane shall be installed is acceptable, on form located at end of section.

B. Identify each test by date of sample, date of test, sample location, name of individual who performed test, standard test method used, list of departures from standard test methods, at minimum.

C. In-Place Observation and Testing:

1. Visually inspect geomembrane sheets, seams, anchors, seals, and repairs for defects as installation progresses and again on completion.
2. Depending on seam welding equipment used, test each seam and repair using vacuum testing device, spark testing device, or air channel pressure test for double wedge welded seams.
3. Perform testing in presence of Engineer.
D. Field Testing Equipment:

1. Tensiometer:
   a. Motor driven portable tensile tester with jaws capable of traveling at measured rate of 2 inches per minute (for HDPE).
   b. Equip with gauge which measures force in unit pounds exerted between jaws.
   c. Minimum capacity of 500 pounds.
2. Vacuum Box: Conform to ASTM D5641.
3. High Voltage Spark Detector: Tinker and Rasor Holiday Detector, Model AP-W, set at 20,000 volts.

E. Field Seam Sampling:

1. Verify that seaming equipment and operators are performing adequately. Produce test seam samples at beginning of each shift for each seaming crew. In addition, if seaming has been suspended for more than 1/2 hour, or if breakdown of seaming equipment occurs, produce test seam samples prior to resuming seaming.
2. Sample Size: 12 inches wide plus seam width, and 30 inches long.
3. Nondestructive Sampling:
   a. For boots and seams that cannot be otherwise tested, insert copper wire for spark test at edge of overlapping sheet in extrudate of weld prior to filet welding. Position to within 1/8 inch of sheet edge.
   b. Frequency: Minimum one Sample per 500 feet of field seam or portion thereof, and minimum one Sample per seaming crew per 4-hour work period.
   c. Produce Samples using same materials, equipment, personnel, and procedures as field seams made at time of work in progress and under same conditions.
4. Destructive Sampling:
   a. Frequency: Determined by Engineer; assume one per 500 feet of field seam installed.
   b. Remove Samples from field seams at locations selected by Engineer.
   c. Repair field seams in accordance with repair procedures specified in these Specifications.
5. Sample Identification:
   a. Number, date, and identify each sample as to personnel making seam and location of sample or location of field seam Work in progress at time Sample is made.
   b. Mark location of Sample, or location of field seam in progress at time sample is made, on panel/sheet layout drawing.
6. Contractor shall conform to the following testing requirements for nondestructive and destructive seam tests used to define quality of field seams:
   a. Perform shear and peel testing on portion of sample as specified hereinafter using approved field tensiometer.
   b. Send portion of sample by overnight service to approved Independent Testing Agency for verification of field test results.
   c. Archive a portion of sample for potential verification testing later.
   d. Independent Testing Agency shall provide preliminary test results by facsimile or other means no later than 24 hours after Samples have been received from Contractor, unless otherwise approved by Engineer. Certified test results shall be provided no more than 7 days after Samples have been received from Contractor.

7. Conform to ASTM D6392 and this specification.
   a. Seam testing for geomembrane includes strength tests, vacuum box testing, high voltage spark tests, air channel pressure tests, and probing.
   b. Leak testing includes and electrical resistivity testing.

F. Field Seam Strength Sample Testing:

1. General:
   a. Test each sample for seam peel and tensile strength.
   b. Save test samples, including specimens tested, until notified by Engineer relative to their disposal.
   c. Each sample that fails under test shall be shipped immediately by express delivery to Engineer for determination of corrective measures required.

2. Field Seam Acceptance Criteria: Seam strength equal to 90 percent of that of parent material. Parent material shall be tested in accordance with ASTM D638.
   a. Bonded Shear Strength of HDPE:
      1) In Shear: Minimum 2 pounds per inch width per mil thickness as determined in accordance with ASTM D6392.
      2) In Peel: Minimum 1.2 pounds per inch width per mil thickness as determined in accordance with ASTM D6392.

3. Test Failure:
   a. If sample fails, entire field seam from which it was taken shall be considered a failure and shall be rejected as a result of nonconformance with specification requirements. Comply with following corrective measures:
      1) Nondestructive Sample Failure: Rerun field weld test using same sample. If that test passes, Engineer may assume error was made in first test and accept field seam. If second test
fails, cap each field seam represented by failed sample and submit new test sample made during capping procedure.

2) Destructive Sample Failure: Rerun field weld test using new sample from same seam. If that test passes, Engineer may assume error was made in first test and accept field seam. If second test fails, either cap field seam between two previous passed seam test locations that include failed seam or take another sample on each side of failed seam location (10 feet minimum), and test both. If both pass, cap field seam between two locations. If either fails, repeat process of taking samples for test. Each field seam shall be bounded by two passed test locations prior to acceptance.

G. Vacuum Box Testing of Geomembrane Welds:

1. Vacuum box test each of these types of welds: Fillet, extrusion lap, and single hot-wedge fusion lap.

H. High-Voltage Spark Testing of Fillet Welds:

1. Provide each seam to be tested with copper wires properly embedded in seam as shown and with provisions for electrical grounding to test equipment.
2. Pass spark tester along length of seam containing copper wire.
3. Presence of a visible spark along tested seam shall be evidence of a faulty seam.

I. Air Channel Pressure Testing of Double Hot-Wedge Seam:

1. Insert a needle with gauge in air space between welds. Pump air into space to 30 psi and hold for 5 minutes.
2. At end of 5 minutes, depressurize seam by placing needle hole in air space between welds at opposite end of seam and observe gauge.
3. Seam is acceptable if seam maintains at least 27 psi during 5-minute hold and pressure drops within 30 second of depressurization.
4. Seam is acceptable if seam maintains a minimum of 27 psi. If pressure drops below 27 psi during test period, or does not drop during 30-second depressurization period, repair needle holes and retest seam by same procedure or vacuum box test along entire length of seam.
5. Vacuum box test entire length of seam if second air pressure test fails.
   a. If no bubbles appear in vacuum box, lower weld will be considered defective and upper seam is acceptable.
   b. If bubbles appear in vacuum box, repair each defective area by extrusion welding and test again by vacuum box.
6. As alternative to vacuum box testing, apply soap solution to exposed seam edge while maintaining required air channel test pressure.
   a. If bubbles appear, mark, trim unbonded edge, and extrusion weld defective areas.
   b. If no bubbles appear and test pressure cannot be maintained, leak is judged to be in bottom or second seam.
7. If leak is judged to be in bottom seam, cap strip length of seam tested.
8. Mark and repair needle holes.

J. Documentation:

1. Record Documents, include the following:
   a. Panel and sheet numbers.
   b. Seaming equipment and operator identification.
   c. Temperature and speed setting of equipment.
   d. Date seamed.
   e. Identity and location of each repair, cap strip, penetration, boot and sample taken from installed geomembrane for testing.

3.07 MANUFACTURER’S SERVICES

A. Provide authorized representative of geomembrane manufacturer onsite for technical supervision and assistance during the following:

1. Preparation and inspection of surfaces on which geomembrane is to be placed.
2. Inspection of geomembrane prior to installation.
3. Installation of geomembrane.
4. Placement of cover over installed geomembrane.
5. Certification of Proper Installation.

3.08 CLEANUP

A. Clean up work area as the Work proceeds. Take particular care to ensure that no trash, tools, and other unwanted materials are trapped beneath geomembrane and that scraps of geomembrane material are removed from the work area prior to completion of installation.
3.09 SUPPLEMENT

A. The supplement listed below, following “End of Section,” is a part of this Specification.

1. Geomembrane Installer’s Certification of Subsurface Acceptability.

END OF SECTION
GEOMEMBRANE INSTALLER’S CERTIFICATION
OF
SUBSURFACE ACCEPTABILITY

Geomembrane installer, for Kootenai County Central Corridor Landfill Project, hereby certify that supporting surfaces are acceptable for installation of geomembrane, undersigned having personally inspected condition of constructed surfaces. This certification is for areas shown on Attachment or defined as follows:

__________________________________________________________________________

__________________________________________________________________________

__________________________________________________________________________

Condition of supporting surfaces in defined area meets or exceeds minimum requirements for installation of geomembrane.

Signed: ________________________________
(Representative of Geomembrane Installer)

__________________________________________________________________________

(Position)

Date: ________________________________

Witness: ________________________________
SECTION 33 47 13.07
POND AND RESERVOIR LINERS—GEOSYNTHETIC CLAY LINER (GCL)

PART 1 GENERAL

1.01 REFERENCES

A. The following is a list of standards that may be referenced in this section:

1. ASTM International (ASTM):
   f. D5321, Standard Test Method for Determining the Coefficient of Soil and Geosynthetic or Geosynthetic and Geosynthetic Friction by the Direct Shear Method.
   h. D5889, Standard Practice for Quality Control of Geosynthetic Clay Liners.
   l. D6496, Standard Test Method of Determining Average Bonding Peel Strength Between the Top and Bottom Layers of Needle Punched Geosynthetic Clay Liners.

   Method 9100, Saturated Hydraulic Conductivity, Saturated Leachate Conductivity, and Intrinsic Permeability.
1.02 DEFINITIONS

A. Geosynthetic Clay Lining (GCL): Flexible panel made of a layer of domestic, natural, high swelling sodium bentonite clay (montmorillonite) encapsulated between two geotextiles.

B. Geotextile: Woven or nonwoven permeable manmade textile used with geotechnical engineering related materials.

C. Maximum Average Roll Value (MaxARV): Maximum of a series of average roll values representative of product furnished.

D. Minimum Average Roll Value (MinARV): Minimum of a series of average roll values representative of product furnished.

E. Overlap: Distance measured perpendicular from overlapping edge of one sheet to underlying edge of adjacent sheet.

1.03 SUBMITTALS

A. Action Submittals:

1. Shop Drawings:
   a. Product Data:
      1) Montmorillonite content by weight, typical moisture content, and swell index values.
      2) Recommended sealing compound.
      3) Repair adhesive.
   b. Layout and installation drawings, including procedures for carrying out the Work in coordination with deployment of HDPE geomembrane.
   c. Panel joining methods.
   d. Handling and storage instructions.

2. Samples: On request from Engineer, 2 square yards of material from each shipment.

3. Test Panel: Set up, build, and arrange with the Engineer a GCL test panel to monitor hydration during the project period.

B. Informational Submittals:

1. Manufacturer’s Certificate of Compliance.
2. Certified factory test results.
3. Mill Certificate or Affidavit:
   a. Signed by legally authorized official from company manufacturing materials.
b. Attest that geosynthetic materials meet chemical, physical, and manufacturing requirements stated in this Specification.

c. Mill certificate from GCL manufacturer attesting that GCL materials meet the chemical, physical, and manufacturing requirements stated in this Specification.

d. Complete description for handling and storage of the GCL and associated products including, but not limited to, methods of unloading, inspection, covered storage on pallets or in an enclosed storage facility, and recording the quantity and lot numbers for each package.

1.04 QUALITY ASSURANCE

A. Prior to packaging the finished product, manufacturer shall inspect surface of each roll by using strong light source on one side of panel and observing other side for zones of inadequate bentonite distribution or by using other reliable methods, such as physical measurements or sampling, to detect deficiencies in uniformity of bentonite distribution. Deficient rolls shall be rejected.

B. Label each roll with length, width, and weight, along with lot number and date of manufacture.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Store GCL in a dry, protected facility or in protected area on pallets off the ground. Cover materials stored outside with heavy, waterproof covering that allows free flow of air between covering and materials.

PART 2 PRODUCTS

2.01 MANUFACTURERS AND PRODUCTS

A. Needle-Punched GCL Products:

1. Colloid Environmental Technologies Co. (CETCO), Arlington Heights, IL; Bentomat DN.

2. GSE Lining Technology, Houston, TX; Bentofix NWL.

2.02 GEOSYNTHETIC CLAY LINING

A. Panels of bentonite and encapsulating geotextiles manufactured shall perform as continuous lining. Panels shall contain a Min ARV of 0.75 pound per square foot of high-swelling granular sodium bentonite clay at 0 percent moisture content, or equivalent weight at other moisture content using ASTM D5993.
B. Bentonite Properties:

1. High quality natural sodium bentonite without chemical resistance enhancers or polymers.
2. 90 percent typical montmorillonite content by weight.
3. Minimum Bentonite Swell Index of 24 mL/2g when tested pursuant to ASTM D5890.
4. Maximum fluid loss of 18 mL when based on ASTM D5891 test standard.

C. GCL shall be manufactured so the bentonite component is continuously contained throughout GCL and to support geotextile so that no displacement of the bentonite occurs when material is unrolled, moved, cut, torn, or punctured. To contain granular bentonite, GCL materials shall be stabilized by process of needle punching through top and bottom layers of geotextile and bentonite.

D. Encapsulating geotextile materials shall protect the bentonite component and be sufficiently porous to allow bentonite flow-through to create a positive bentonite-to-bentonite seal at seams. The geotextile shall be polypropylene, “or-equal,” consisting of two nonwoven geotextile components which are needle-punched together. The nonwoven geotextile shall have minimum mass per area of 6 ounces per square yard.

E. Prior to packaging the finished product, the manufacturer shall inspect each roll over the entire surface area by using a strong light source on one side of the panel and observing the other side for zones of inadequate bentonite distribution or by using other reliable methods to detect deficiencies in the uniformity of the bentonite distribution. Deficient rolls shall be rejected.

F. Each roll shall be labeled with the length, width, and weight, along with the lot number and date of manufacture.

G. The GCL shall be BENTOMAT® DN as manufactured by Colloid Environmental Technologies Co. (CETCO), Arlington Heights, IL; BENTOFIX® NW as manufactured by GSE, Houston, TX; “or-equal,” and shall meet the following requirements:

<table>
<thead>
<tr>
<th>Property</th>
<th>Requirement</th>
<th>Test Method</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mass (Weight), lb/sq yd, MinARV</td>
<td>9.5</td>
<td>ASTM D5993</td>
</tr>
</tbody>
</table>
## GCL Material Properties

<table>
<thead>
<tr>
<th>Property</th>
<th>Requirement</th>
<th>Test Method</th>
</tr>
</thead>
<tbody>
<tr>
<td>Geomembrane Thickness, MinARV (applies only to geomembrane component)</td>
<td>N/A</td>
<td>ASTM D5199</td>
</tr>
<tr>
<td>Bentonite Content, lb/sq ft at 0% moisture content, MinARV</td>
<td>0.75</td>
<td>ASTM D5993</td>
</tr>
<tr>
<td>Clay Moisture Content, %, max.</td>
<td>12</td>
<td>ASTM D4643</td>
</tr>
<tr>
<td>Woven Carrier Geotextile Weight oz/sq yd, MinARV</td>
<td>3.1</td>
<td>ASTM D5261</td>
</tr>
<tr>
<td>Nonwoven Cover Geotextile Weight oz/sq yd, MinARV</td>
<td>6.0</td>
<td>ASTM D5261</td>
</tr>
<tr>
<td>Grab Strength, lbs-width, Tested Dry, MinARV</td>
<td>90</td>
<td>ASTM D4632</td>
</tr>
<tr>
<td>Peel Strength, lbs-inch width, Tested Dry, MinARV</td>
<td>2.5</td>
<td>ASTM D6496</td>
</tr>
<tr>
<td>Index Flux, m³/m²/sec, max. at 5 psi</td>
<td>1x10⁻⁸</td>
<td>ASTM D5887</td>
</tr>
<tr>
<td>Finished GCL Roll Width, Feet, MinARV</td>
<td>15</td>
<td>Linear Measurement</td>
</tr>
<tr>
<td>Finished GCL Roll Length, Feet, MinARV</td>
<td>150</td>
<td>Linear Measurement</td>
</tr>
</tbody>
</table>

### 2.03 BENTONITE SEALING COMPOUND

A. Bentonite sealing compound in powder or granular form shall be same product used in manufacture of GCL materials.

B. Sealing compound shall be applied to seal around penetrations and structures shown on Drawings. Use manufacturer’s recommended minimum amount of sealing compound to use in each instance in order to affect adequate seal.

C. The sealing compound shall be furnished by the manufacturer of the GCL product furnished for Project.

### 2.04 REPAIR ADHESIVE

A. Repair adhesive for securing GCL patches shall be nontoxic adhesive as recommended by GCL manufacturer.
2.05 SOURCE QUALITY CONTROL

A. Perform tests in accordance with ASTM D5889, unless otherwise specified herein.

B. Factory test for specified physical material properties per manufacturer’s QC Plan, and those listed in table under Article Geosynthetic Clay Lining. Tests shall be representative of materials used on Project.

PART 3 EXECUTION

3.01 GENERAL

A. Conform to ASTM D5889 and the following requirements:

1. Inspect GCL materials delivered to Site for damage. Inventory by quantity, lot number, panel size, and weight. Provide copy of inventory to Engineer.

2. Store GCL in a dry, protected area or building on pallets off the ground and covered with a heavy, water-proof membrane which allows free flow of air between membrane and the product.

3. Remove only quantity of material from storage that is to be installed during current work day.

3.02 SUBGRADE PREPARATION

A. Surface on which GCL is to be installed shall be prepared in accordance with Section 31 23 13, Subgrade Preparation, and Section 31 23 23, Fill and Backfill, and as indicated on Drawings.

B. Maintain surface on which GCL is to be placed in firm, clean, dry, and smooth condition during GCL installation.

3.03 GCL TEST PANEL

A. The purpose of the GCL Test Panel is to monitor the amount of hydration that is occurring in the GCL without the confining pressure of the overlying drain sand. This will set the maximum time the Contractor has before the sand drainage layer needs to be placed after deployment of the GCL and overlying HDPE geomembrane liner (see below for maximum permitted GCL moisture content).

B. Build a test panel near the central corridor on subgrade that matches the foundation layer soil conditions of the Project. The test pad shall be no smaller than 10 feet by 10 feet (100 square feet). Coordinate with Engineer for
locating the test pad. Test pad shall be installed before or at the same time as
the first fall production GCL panel is installed.

C. Monitor the test panel daily for visual signs of hydration. Test the panel by
collecting samples every other day and sending to an approved laboratory for
testing. Testing shall be done by measuring the change in weight from the
virgin GCL material. The manufacturer’s quality control (MQC) published
testing results will provide the mass per unit weight and amount of hydration
of the virgin GCL material. Test laboratory shall sample and confirm this for
comparisons. The amount of hydration (by weight) shall not exceed
50 percent for the deployed GCL panels before the full thickness of the
drainage sand layer is placed over the liner.

3.04 PLACEMENT OF GEOSYNTHETIC CLAY LINING

A. Only those GCL panels that can be anchored and covered in the same day
shall be unwrapped and placed in position.

B. Place GCL surface on underlying soil with surface of GCL in contact with soil
as recommended by manufacturer.

C. GCL panels shall not be dragged over surface, except for slight adjustments as
may be necessary for obtaining correct overlap of panels. Rolled-up panels
shall not be allowed to unroll unrestrained down slope.

D. Anchorage for GCL (anchor trench, runout area, etc.) shall be prepared as
shown on Drawings before installation of GCL begins.

E. Panels shall be placed to provide overlap of 6 inches to 9 inches on
longitudinal seams and 24 inches on transverse seams. No lap seams parallel
to slope shall be allowed on slopes steeper than 7H:1V, unless otherwise
approved by Engineer. Such approval will be dependent upon demonstration
by Contractor that sufficient additional overlap will be provided to anchor
GCL and prevent it from moving downslope during and after placement of
overlying materials.

F. GCL panels shall not be installed in standing water, while it is raining, or
when rain may begin before panels can be covered with geomembrane or
temporary plastic cover and protected. GCL shall be “dry” when installed and
“dry” when geomembrane is installed over it.

G. GCL shall be laid smooth without creases or wrinkles and without stretching
material to fit area. GCL shall be free of tension or stress upon completion of
installation.
H. Cover GCL with required geomembrane cover as soon as practicable after it is installed. Exposed GCL is to be completely covered and protected by soil, geomembrane, or other approved cover material at end of each shift or workday. Contractor shall limit amount of exposed GCL to the amount which can be immediately covered in event of rain.

I. Leading edge and panels of GCL left uncovered shall be protected with heavy, waterproof membrane or tarp that is adequately secured and protected with sandbags or other ballast.

3.05 SEAMING GCL PANELS

A. Mark overlaps 6 inches and 9 inches from panel edge longitudinally on GCL to assist in obtaining proper overlap.

B. Prior to lapping, remove dirt, gravel, or other debris from overlap area. Apply 1/4 pound of sealing compound per lineal foot of seam, or as otherwise recommended by manufacturer, whichever represents greatest amount of bentonite. Where soil and sand encroaches lap areas after initial application of bentonite sealant, additional bentonite sealant in amount of 1/4 pound per lineal foot evenly shall be spread across longitudinal seam area.

C. Alternative seaming methods may be used upon successful demonstration to Engineer that alternative method will result in a seam equivalent to seam specified above. Contractor shall strictly adhere to manufacturer’s recommendations and conditions of approval for these alternative seams.

D. Seam overlap on slopes shall be shingled so direction of flow is from top panel onto bottom panel. Overlaps shall be as hereinbefore specified.

E. Hot Weather Installation:

1. Provide compensation for shrinkage when ambient temperatures are greater than 85 degrees F. At minimum, longitudinal overlap should be increased to 12 inches and transverse overlap should be increased to 36 inches.

2. Dimensions to use for overlapping during temperatures greater than 85 degrees F shall be approved by Engineer.

3.06 PATCHING AND REPAIRS

A. Irregular shapes, cuts, or tears in GCL shall be overlapped minimum of 12 inches in all directions from defect with additional layer of GCL material.

B. Patch seams parallel to slope and secure with repair adhesive recommended by manufacturer.
C. Patches and repairs shall not be allowed on slopes greater than 7H:1V.

D. Complete panels shall be removed and replaced with undamaged panels when damage is extensive as determined by Engineer.

3.07 PROTECTION

A. Contractor shall have sole responsibility for protection of the GCL. Any damage to the GCL shall be repaired at Contractor’s expense.

B. Contractor shall ensure that moisture and surface water runoff collected on completed sections of the HDPE geomembrane liner or draining from other areas does not drain or seep under the HDPE geomembrane liner and expose the GCL to moisture at any time. Any GCL exposed to moisture, as determined by Engineer, either covered with HDPE or not, shall be removed and replaced at Contractor’s expense.

C. Any leading edge of panels of GCL left uncovered shall be protected with a heavy, waterproof membrane or tarp that is adequately secured and protected with sandbags or other ballast against uplift from wind and saturation/hydration. Contractor shall protect exposed GCL to the satisfaction of Engineer at all times during execution of the Work.

3.08 PLACEMENT OF OVERLYING MATERIALS

A. Equipment shall not operate directly on GCL, except to minimum extent necessary to deploy specified geosynthetic materials on GCL. Deploy geosynthetic materials with equipment and by methods approved by Engineer.

B. Soil, sand, and aggregate over geosynthetic material shall be install in accordance with cover installation requirements in Section 33 47 13.01, Pond and Reservoir Liners—HDPE.

C. Drain Sand shall be placed over the GCL and HDPE geomembrane as specified in Section 31 23 23, Fill and Backfill, and Section 33 47 13.01, Pond and Reservoir Liners—HDPE. Drain Sand shall be placed over the completed portions of the geomembrane/GCL cover within 10 calendar days of GCL installation. Engineer reserves the right to shorten this time period if premature hydration of the GCL appears to be occurring. Additionally, this time period may be extended if the test results from the test panel indicate that the GCL is not hydrating above 50 percent during this 10-day period.
3.09 PERIODIC HYDRATION

A. Fully hydrate GCL with fresh, clean water after soil cover has been placed. In addition, soak installation for 24 hours minimum once every 6 months until installation is accepted by Owner.

3.10 SUPPLEMENT

A. The supplement listed below, following “End of Section,” is a part of this Specification:

1. GCL Installer’s Certification of Subsurface Acceptability.

END OF SECTION
GCL INSTALLER’S CERTIFICATION
OF
SUBSURFACE ACCEPTABILITY

GCL installer, __________________________
for Kootenai County Central Corridor Landfill hereby certify that supporting surfaces are
acceptable for installation of geomembrane, undersigned having personally inspected
condition of constructed surfaces. This certification is for areas shown on Attachment or
defined as follows:

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

Condition of supporting surfaces in defined area meets or exceeds minimum requirements for
installation of geomembrane.

Signed: __________________________
(Representative of Geomembrane Installer)

(Position)

Date: __________________________

Witness: __________________________
PART 1    GENERAL

1.01 REFERENCES

    A. The following is a list of standards which may be referenced in this section:

    1. American Gas Association (AGA): Orifice Metering of Natural Gas and Other Related Hydrocarbon Fluids.
    3. American Society of Mechanical Engineers (ASME):
    4. American Society of Sanitary Engineers (ASSE): Performance Requirements for Hose Connection Vacuum Breakers.
    5. American Water Works Association (AWWA):
       b. C500, Metal-Seated Gate Valves for Water Supply Service.
       c. C504, Rubber-Seated Butterfly Valves, 3 In. (75 mm) Through 72 In. (1,800 mm).
       d. C508, Swing-Check Valves for Waterworks Service, 2-In. Through 24-In. (50-mm Through 600-mm) NPS.
       e. C509, Resilient-Seated Gate Valves for Water Supply Service.
       f. C510, Double Check Valve Backflow Prevention Assembly.
       g. C511, Reduced-Pressure Principle Backflow Prevention Assembly.
       h. C512, Air-Release, Air/Vacuum, and Combination Air Valves for Waterworks Service.
       i. C515, Reduced-Wall, Resilient-Seated Gate Valves for Water Supply Service.
       j. C541, Hydraulic and Pneumatic Cylinder and Vane-Type Actuators for Valves and Slide Gates.
       l. C550, Protective Interior Coatings for Valves and Hydrants.
       m. C606, Grooved and Shouldered Joints.
       n. C800, Underground Service Line Valves and Fittings.
6. ASTM International (ASTM):
   e. B61, Standard Specification for Steam or Valve Bronze Castings.
   f. B62, Standard Specification for Composition Bronze or Ounce Metal Castings.
   i. B139/B139, Standard Specification for Phosphor Bronze Rod, Bar and Shapes.


9. FM Global (FM).

10. Food and Drug Administration (FDA).

11. International Association of Plumbing and Mechanical Officials (IAPMO).

12. Manufacturers Standardization Society (MSS):
   a. SP-80, Bronze Gate, Globe, Angle, and Check Valves.
   b. SP-81, Stainless Steel, Bonnetless, Flanged Knife Gate Valves.
   c. SP-85, Gray Iron Globe and Angle Valves, Flanged and Threaded Ends.
   d. SP-88, Diaphragm Valves.
   e. SP-110, Ball Valves Threaded, Socket-Welding, Solder Joint, Grooved and Flared Ends.

14. NSF International (NSF):
   a. NSF/ANSI 61, Drinking Water System Components - Health Effects.
   b. NSF/ANSI 372, Drinking Water System Components - Lead Content.

15. UL.

16. USC Foundation for Cross-Connection Control and Hydraulic Research.

1.02 SUBMITTALS

A. Action Submittals:

1. Shop Drawings:
   a. Product data sheets for each make and model. Indicate valve Type Number, applicable Tag Number, and facility name/number or service where used.
   b. Complete catalog information, descriptive literature, specifications, and identification of materials of construction.

B. Informational Submittals:

1. Tests and inspection data.
2. Operation and Maintenance Data as specified in Section 01 78 23, Operation and Maintenance Data.

PART 2 PRODUCTS

2.01 GENERAL

A. Valves to include operator, actuator, handwheel, chain wheel, extension stem, floor stand, operating nut, chain, wrench, and accessories to allow a complete operation from the intended operating level.

B. Valve to be suitable for intended service. Renewable parts not to be of a lower quality than specified.

C. Valve same size as adjoining pipe, unless otherwise called out on Drawings or in Supplements.

D. Valve ends to suit adjacent piping.

E. Resilient seated valves shall have no leakage (drip-tight) in either direction at valve rated design pressure. All other valves shall have no leakage (drip-tight).
in either direction at valve rated design pressure, unless otherwise allowed for in this section or in stated valve standard.

F. Size operators and actuators to operate valve for full range of pressures and velocities.

G. Valve to open by turning counterclockwise, unless otherwise specified.

H. Factory mount operator, actuator, and accessories.

2.02 MATERIALS

A. Bronze and brass valve components and accessories that have surfaces in contact with water to be alloys containing less than 16 percent zinc and 2 percent aluminum.

1. Approved alloys are of the following ASTM designations: B61, B62, B98/B98M (Alloy UNS No. C65100, C65500, or C66100), B139/B139M (Alloy UNS No. C51000), B584 (Alloy UNS No. C90300 or C94700), B164, B194, and B127.

2. Stainless steel Alloy 18-8 may be substituted for bronze.

2.03 FACTORY FINISHING

A. Where epoxy lining and coating are specified, factory finishing shall be as follows:

1. In accordance with AWWA C550.

2. Either two-part liquid material or heat-activated (fusion) material except only heat-activated material if specified as “fusion” or “fusion bonded” epoxy.

3. Minimum 7-mil dry film thickness except where limited by valve operating tolerances.

2.04 VALVES

A. Plug Valves:

1. Type V405 Eccentric Plug Valve 3 Inches to 12 Inches:
   a. Nonlubricated type rated 175 psig CWP, drip-tight shutoff with pressure from either direction, cast-iron body, exposed service flanged ends per ASME B16.1 or grooved ends in accordance with AWWA C606 for rigid joints, buried service mechanical joint ends, unless otherwise shown.
b. Plug cast iron with round or rectangular port of no less than 80 percent of connecting pipe area and coated with Buna-N, seats welded nickel, stem bearings lubricated stainless steel or bronze, stem seal multiple V-rings, or U-cups with O-rings of nitrile rubber, grit seals on both upper and lower bearings.

c. For buried service, provide external epoxy coating.

d. Operators:
   1) 3-Inch to 4-Inch Valves: Wrench lever manual.
   2) 6-Inch to 12-Inch Valves: Totally enclosed, geared, manual operator with handwheel, 2-inch nut or chain wheel. Size operator for 1.5 times maximum operating shutoff pressure differential for direct and reverse pressure, whichever is higher. For buried service, provide completely sealed operator filled with heavy lubricant and 2-inch nut.

e. Manufacturers and Products:
   1) Pratt; Ballcentric.
   2) DeZurik; Style PEC.
   3) Milliken; Millcentric Series 600.

2.05 OPERATORS AND ACTUATORS

A. Manual Operators:

1. General:
   a. For AWWA valves, operator force not to exceed requirements of applicable valve standard. Provide gear reduction operator when force exceeds requirements.
   b. For non-AWWA valves, operator force not to exceed applicable industry standard or 80 pounds, whichever is less, under operating condition, including initial breakaway. Provide gear reduction operator when force exceeds requirements.
   c. Operator self-locking type or equipped with self-locking device.
   d. Position indicator on quarter-turn valves.
   e. Worm and gear operators one-piece design, worm-gears of gear bronze material. Worm of hardened alloy steel with thread ground and polished. Traveling nut type operator’s threaded steel reach rod with internally threaded bronze or ductile iron nut.

2. Exposed Operator:
   a. Galvanized and painted handwheel.
   b. Cranks on gear type operator.
   c. Chain wheel operator with tieback, extension stem, floor stand, and other accessories to permit operation from normal operation level.
   d. Valve handles to take a padlock, and wheels a chain and padlock.
3. Buried Operator:
   a. Buried service operators on valves larger than 2-1/2 inches shall have a 2-inch AWWA operating nut. Buried operators on valves 2 inches and smaller shall have cross handle for operation by forked key. Enclose moving parts of valve and operator in housing to prevent contact with the soil.
   b. Buried service operators to be grease packed and gasketed to withstand submersion in water to 20 feet minimum.
   c. Buried valves shall have extension stems, bonnets, and valve boxes.

2.06 ACCESSORIES

   A. T-Handled Operating Wrench:
      1. One each galvanized operating wrenches, 4 feet long.
      2. Manufacturers and Products:
         b. Clow No.; F-2520.
         c. Mueller; A-20806.

PART 3 EXECUTION

3.01 INSTALLATION

   A. Flange Ends:
      1. Flanged valve bolt holes shall straddle vertical centerline of pipe.
      2. Clean flanged faces, insert gasket and bolts, and tighten nuts progressively and uniformly.

   B. Valve Installation and Orientation:
      1. General:
         a. Install valves so handles operate from fully open to fully closed without encountering obstructions.
         b. Install valves in location for easy access for routine operation and maintenance.
         c. Install valves per manufacturer’s recommendations.
      2. Eccentric Plug Valves:
         a. Unless otherwise restricted or shown on Drawings, install valve as follows:
            1) Liquids with Suspended Solids Service with Horizontal Flow: Install valve with stem in horizontal position with plug up when valve is open. Install valve with seat end upstream (flow to produce unseating pressure).
2) Liquids with Suspended Solids Service with Vertical Flow: Install valve with seat in highest portion of valve (seat up).

3) Clean Liquids and Gas Service: Install valve with seat end downstream of higher pressure when valve is closed (higher pressure forces plug into seat).

C. Locate valve to provide accessibility for control and maintenance. Install access doors in finished walls and plaster ceilings for valve access.

D. Extension Stem for Operator: Where depth of valve operating nut is 3 feet or greater below finish grade, furnish operating extension stem with 2-inch operating nut to bring operating nut to a point within 6 inches of finish grade.

3.02 TESTS AND INSPECTION

A. Valve may be either tested while testing pipelines, or as a separate step.

B. Test that valves open and close smoothly under operating pressure conditions. Test that two-way valves open and close smoothly under operating pressure conditions from both directions.

C. Inspect air and vacuum valves as pipe is being filled to verify venting and seating is fully functional.

D. Count and record number of turns to open and close valve; account for discrepancies with manufacturer’s data.

E. Set, verify, and record set pressures for relief and regulating valves.

F. Automatic valves to be tested in conjunction with control system testing. Set opening and closing speeds, limit switches, as required or recommended by Engineer.

G. Test hydrostatic relief valve seating; record leakage. Adjust and retest to maximum leakage of 0.1 gpm per foot of seat periphery.

END OF SECTION
SECTION 41 14 36.01
COMMERCIAL TRUCK SCALE

PART 1 GENERAL

1.01 SECTION INCLUDES

A. This Section and attached supplements covers the Work necessary to furnish and install, complete and ready for operation, a low-profile commercial truck scale.

B. Refer to other Specification sections or Electrical Drawings for the telecommunication system, power system, and other elements and features of the commercial truck scale system as shown on Drawings.

C. Performance Requirements:

1. Truck scale will be used to weigh commercial vehicles with County-authorized accounts, and waste transfer trailers from County transfer stations or rural sites, bringing waste to the landfill as its primary function. The truck scale will be automated by means of a user-controlled self-service weighing terminal that can support either direct entry or a card-reader system that identifies the account, truck and its gross or tare weight, allows communication with County personnel through vendor-supplied data cable, voice systems, provides a printed receipt of the transaction and the scale for the commercial garbage truck driver.

2. Truck scale will be installed on concrete foundation supports above-grade and will include entry and egress control lights, safety rails, and weighing terminal, as show on Drawings and specified herein.

1.02 QUALITY ASSURANCE

A. Referenced Standards: This Section incorporates by reference the latest revisions of the following documents. They are part of this section insofar as specified and modified herein. In case of conflict between the requirements of this section and the listed documents, the Contractor shall point out the conflict to the project representative; lacking a definitive answer otherwise, the requirements of the contract specifications shall prevail.

<table>
<thead>
<tr>
<th>Reference</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>NIST H-44</td>
<td>National Institute of Standards and Technology Handbook</td>
</tr>
<tr>
<td></td>
<td>H-44 Specifications, Tolerances, and Other Technical Requirements</td>
</tr>
<tr>
<td></td>
<td>for Weighing and Measuring Devices</td>
</tr>
</tbody>
</table>
B. Factory Tests:
   1. Custom-programming in digital scale controller. Provide documentation of custom-designed input screens.
   2. Test assembled control panel. Provide test documentation.

C. Scale Manufacturer: The County has selected Unitec Corporation for manufacturer and installer of the new scale system to be consistent with the scale systems the County is using throughout their solid waste facilities.

D. Scale shall be built in accordance with standards of the American Society of State and Highway Officials and the Scale Manufacturers Association.

E. Performance: The scale, new and adjusted, shall perform automatically as specified, with all components compatible to suit the intended use. The performance requirements and tolerance values shall be as set forth for vehicle scale in the Scale Code of National Bureau of Standards Handbook H-44 and shall be met in every respect. The scale manufacturer shall provide a Certificate of Conformance to the standards. The installation shall be completed and tested under the Contractor’s direction to meet the approval of and to obtain the Seal of Certification from the State of Idaho regarding automatic weight indicators.

F. The scale in its entirety (except for Data Management System) shall be manufacturer’s standard design, without modification for this Project, and shall have been proven in similar installations and shall have NTEP (National Type Evaluation Program) certificate for scale and load cells.

G. Scale foundation and approach slabs shall comply with the requirements set forth for vehicle scales in the Scale Code of National Bureau of Standards Handbook H-44.

1.03 MANUFACTURER’S SERVICES

A. A manufacturer’s representative for the equipment specified shall be present at the Job Site for 2 days for certification of the installation, startup assistance, and training of Owner’s personnel. Travel time shall not be included in the 2 days at the Job Site.

1.04 SUBMITTALS

A. Action Submittals:
   1. Manufacturer provided documentation pertaining to installation and standard setting, and foundation plans.
2. Complete detailed construction drawings for one new concrete platform commercial truck scale, scale foundations, conduit requirements between the scale and the data and electrical interface locations, cabling to be provided between the scale and the data communications, and manufacturer’s brochures for the new scale and associated equipment to be furnished. Contractor must provide above Shop Drawings within 30 days of contract award and must be approved by the Engineer prior to starting scale foundation construction.

3. Complete schematic diagrams and Operating and Maintenance Manuals and Maintenance Summary Sheets for the equipment specified herein shall be furnished.

B. Informational Submittals:
   2. Idaho State Seal of Certification.
   3. O&M Manuals.

1.05 WARRANTY

A. Guarantee in writing the operating performance of the adjusted scale and all related equipment and components for a period of 2 years upon certified completion of the entire Contract (but no sooner than Final Completion). In the event of any defect during this period attributable to workmanship under this Contract, make corrective repairs within 5 days of written notice by the Owner so specifying the nature of the defect.

PART 2 PRODUCTS

2.01 MANUFACTURER

A. Materials, equipment, components and accessories specified in this Section shall be products of Unitec Corp, Tukwila, WA; telephone, (206) 575-1100, or their subcontractor (B-tek).

2.02 SCALE FOUNDATION

A. Low-profile aboveground foundation with 10-foot long approach slab at each end, in compliance with requirements of NBS Handbook H-44.

B. The approach slab shall include concrete 10-foot flared curbs with diamond plate steel curb trim shaped similar to a jersey barrier on the inside of each curb. The height of the curb shall match the height of the weighbridge rails.
C. Concrete for scale foundation shall comply with requirements of Section 31 23 23, Fill and Backfill. Refer also to Drawings. Concrete for the scale deck is as specified by the scale manufacturer and shall be the minimums as specified herein.

2.03 COMMERCIAL TRUCK SCALE

A. General: Contractor shall coordinate with the scale manufacturer for products and materials that the scale manufacturer will provide preassembled, those that will be provided and require Contractor installation, and those that will be provided and installed by the Contractor. This includes, but is not limited to, the scale, all conduits, wires, cables, self-service weighing terminal, and all other ancillaries to provide a complete, fully operational and automated scale system.

B. Concrete platform truck scale, electronic full load cell type, 80 feet long overall, in maximum of three sections and eight load cells by 10 feet wide with a 120,000-pound capacity and designed to support a 60,000-pound dual axle, with axles on 4-foot centers and offset to one side of the module, or worst case loading conditions. Under the specified load, the maximum deflection shall not exceed 1/500th of span and the bending stress in any member shall not exceed 20,000 psi. The deck design shall be for 120 psi minimum tire pressure. Provide scales as shown on Drawings. Details of scale deck and load cell support locations and depth shall be as required by the scale manufacturer.

C. Systems or components that require proprietary/sole source service or maintenance by the manufacturer, or their service division, are not acceptable.

D. The scale shall have the following minimum features and capacities:

1. Fully electronic in design and shall not incorporate any mechanical weighing elements, check rods, or check stays.
2. Designed to perform as single weighing platforms, of low-profile aboveground design. With side rails that are integral with the weighbridge.
3. Junction boxes shall be NEMA 4 rated.
4. Weighbridge, load cells, scale instrument, and associated accessories, shall be furnished by the same supplier to maximize compatibility and availability of components and design.
5. Platforms shall be constructed of steel framing with concrete slab surface and shall be designed and constructed to withstand sudden truck stops. Scale system shall be self-checking without check rods, and scale shall not use load cell as a checking device.
6. Load cells shall be approved by NTEP and meet the specifications as set forth by the National Institute of Standards and Technology Handbook 44 for Class III, 10,000d Devices. A Certificate of Conformance to these standards shall be provided by the Contractor.

7. The scale shall be fully electronic and be equipped with heavy-duty surge voltage protection for the electronic system, and be electrically grounded.

8. Provide T-Grip closure strips between edge of scale and scale pit walls.

9. Metal Parts: All metal parts shall be galvanized or epoxy coated for corrosion protection. The corrosion protection coating of all the steel members shall be prepared and painted in accordance with manufacturer’s requirements. The final color shall be selected by the Owner.

10. Electrical: All wiring and conduits shall be concealed and protected within the scale. All control wiring shall be installed in galvanized steel metal conduits and rated for wet underground conditions. The Contractor shall provide RFI (radio frequency interference) and EMI (electromagnetic interference) protection for weighing instrumentation. Junction boxes shall be mounted by each section, located in an accessible area for inspection and maintenance. The sectional junction boxes shall be rated NEMA 4 and the main junction boxes shall be rated for NEMA 12 suitable for push mounting. All electrical works including wiring, conduits, and panels shall meet the requirements of Division 26, Electrical.

11. Grounding System: Each structural panel shall have all metal parts bonded to one another. A ground rod shall be installed for each panel and bonded to structural steel of the panel. All ground rods shall be bonded together using compression lugs. Ground rods shall be copper, minimum 10 feet long, 3/4-inch in diameter. All grounding shall be in accordance with Article 250 of the National Electrical Code. Minimum ground conductor size shall be No. 1/0 copper. Ground rods shall be mounted near the access plates of each of the structural panels.

12. Environmental Condition: Scale system shall operate satisfactorily over the full range of weather conditions. The scale’s structural members, load cells, and electrical wiring shall not be susceptible to the influence of the extraneous environmental conditions.

13. The deck surface shall be concrete to provide high-impact resistance, high-abrasion resistance, and low permeability from infiltration of water and road salts. Install the deck in accordance with the scale manufacturer’s instructions.

14. The height of the load cell stand shall be such that there will be 8 inches of clearance between the concrete pier and the bottom of the weighbridge for ease of cleanout.

15. Side rails shall be included as the integral part of the weighbridge. Add on side rails will not be accepted. 4-inch rub rails shall be included.
16. Diamond plate steel approach guards installed 4 feet in on each end, of each module on the inside of side rails for tire protection, and to keep trucks centered on scale.

17. Adjustable screw bearings will be located above each load support point to provide vertical adjustment of each module; shimming to elevation is not acceptable.

18. The scale shall be completely self-checking. No check rods shall be used. Scale shall not use the load cell as a checking device.

E. The load cell stands and load cell suspension components shall be designed for the Sensortronics Model 65058-50K, double ended, center loaded, shear beam load cell. Load cell must be available from more than one supplier and must be interchangeable. Load cells shall be mounted no less than 12 inches above concrete pier and shall be mounted outside of the weighbridge for ease of maintenance.

2.04 SCALE INSTRUMENTATION

A. General: The new scale hardware and software shall integrate seamlessly with the County’s software system, including any hardware and/or software upgrades to the County’s current system. Conduits, cables, conductors, etc. shall be furnished and installed to accommodate all necessary telecommunications and electrical systems between the existing connection points and the new commercial truck scale, including, but not limited to, the new self-service weighing terminal.

B. Scale instrument and associated equipment shall be supplied by the scale manufacturer, as approved by Owner.

2.05 SELF-SERVICE WEIGHING TERMINAL

A. The self-service weighing terminal shall be fully functional for inbound scaling of commercial waste trucks and interfaced with the County’s software system. The self-service weighing terminal shall provide for a fully automated weighing operation for either un-tared vehicles (weighed inbound and outbound) whereby commercial waste truck operators can enter account information by hand, or, at County’s discretion, tared vehicles are identified in the system (with tare weights) by scanning a proximity (RFID) card. The self-service weighing terminal shall be housed in a weatherproof enclosure and mounted on a kiosk or pedestal-type arrangement, as approved by the Engineer, with window access by the truck driver in seated position. The kiosk pedestal mount shall be embedded in the ground and concrete, plumb and stable, as approved by the Engineer.
B. The self-service weighing terminal shall include a ticket printer that provides a receipt for the commercial waste hauler’s delivery weight and an intercom system. For un-tared vehicles, the ticket shall identify an account number, vehicle identification code, a waste code, and an initial delivery weight for the vehicle on the inbound trip. For the outbound trip the ticket shall identify similar information with the net weight disposed. For tared accounts, the ticket shall display the account or vehicle identification number, date and time, tare weight, delivery weight, and net weight. The self-service weighing terminal shall include devices required to program reader cards, 50 programmable reader cards, and any required hardware and software upgrades to the County’s system. The ticket printer shall be as provided along with the self-service weighing terminal by the scale manufacturer. The ticket reader shall provide a print speed of three lines per second, bi-directional dot matrix, 40 characters per line at 12 CPI, and a printing width of 3.33 inches.

C. Unitec to provide DD2050 automated weighing terminal to be integrated to process commercial trucks via unattended scaleside kiosk, including all hardware and software for an integrated weighing solution with County’s scale management software.

D. Unitec to coordinate with county IT personnel to integrate scale hardware and County’s existing scale management software.

E. Unitec to provide post installation support at field and factory level.

F. Customer to provide internet access and connection at scale system location for remote support, contractor to terminate connection including conduit, wiring supply and install, Unitec to interface with Contractor’s electrician.

PART 3 EXECUTION

3.01 INSTALLATION

A. General: The scale shall be installed by the Contractor in accordance with the scale manufacturer’s instructions and approved Shop Drawings. Contractor shall cover painted surfaces with tape or other means during concrete placement to avoid damage to paint surface and to minimize touchup requirements.

B. A straight approach of half the scale deck length must be provided with the first 10 feet on both ends of the scale being a concrete apron (pad) level with the deck.
C. Site-Poured Deck: Refer to the scale manufacturer’s instructions and coordinate with the scale manufacturer for products and materials that they will and will not be providing to the Contractor.

D. The scale modules shall be center-supported while pouring the deck.

E. The scale must be installed level, plumb and in a straight line with itself and the foundation.

F. The load cell stands, once leveled, must be grouted using a high quality, nonmetallic, non-shrinking-type grout as approved by the scale manufacturer.

G. The Contractor shall accomplish installation, calibration, and testing under the direction of the scale manufacturer.

H. Contractor shall have scale certified by the State of Idaho.

I. Install self-service weighing terminal for accessibility by driver in a seated position.

3.02 MANUFACTURER’S INSPECTION AND CERTIFICATION

A. Following installation by the Contractor and certification by the State of Washington, a manufacturer’s representative shall inspect and certify that the scale has been installed in full compliance with the manufacturer’s instructions. Furthermore, the manufacturer shall instruct the Owner’s operators in proper operation of the equipment. A minimum of one of the 2 days the manufacturer’s representative is onsite shall be dedicated to training of Owner’s personnel.

3.03 TESTING

A. Preoperational Test Phase: Perform factory tests in accordance with manufacturer’s requirements. Factory tests shall include factory testing of custom-programmed scale controller and testing of inputs for all County provided input fields.

B. Component Test Phase: Test scale controller, self-service weighing terminal, and load cells for proper installation, and interface with the Owner’s software system. Obtain State of Washington Certification of Scale following check-out of equipment and system. Arrange for registration of the scale in accordance with State of Washington requirements. Contractor shall pay all fees for registration.
3.04 SERVICE

A. In addition to the required warranty, the scale manufacturer shall provide complete service of the new scale for a period of 2 years in a manner that keeps the equipment in continuous and legal operation. This shall be accomplished at no additional cost to the Owner.

B. At a minimum provide two inspections and calibrations per year.

3.05 DELIVERY, STORAGE, AND HANDLING

A. Deliver and store materials in manufacturer’s original, unopened, undamaged containers.

B. Handle materials in such a manner as to prevent damage to products or finishes.

3.06 SUPPLEMENTS

A. The supplements listed below, following “End of Section,” are part of this specification.

1. Manufacturer’s Literature:
   a. Unitec Low Profile Scale.
   b. DD 2050 Self-Service Weighing Terminal.
   c. Matko SBL-SG Signal Light Specifications.
   d. Vishay Model 65058 Double-Ended Shear Beam Load Cell.

2. Unitec Drawings:
   a. Unitec Drawing B-1120, 80 x 10 Low Profile Truck Scales.
   b. Unitec Drawing A-1019, Low Profile Truck Scales.
   c. Unitec Drawing B-1130, 80’ Low Profile Truck Scales.

END OF SECTION
UNITEC LOW PROFILE SCALE
LOW PROFILE SCALE

- Outboard mounted load cells provide ease of access.
- Load cell suspension design reduces impact to load cells.
- Bumper bolt system keeps the scale in check.
- Unrestricted access to underside of scale makes cleaning an easy task.
- Cover plates prevent load cell damage from moderate impact.
- Scales available in widths up to 12'.
- Side rails keep trucks on the scale.
- Optional T-Belting helps prevent debris from collecting under the scale.
- Lower initial cost compared to a shallow pit design.
- Lower total cost of ownership due to easy maintenance and readily available parts.

Customer satisfaction, Safety and Integrity are at the core of our values so let our 40+ years experience work for you.
DD 2050 SELF-SERVICE
WEIGHING TERMINAL
Over 95 years of combined manufacturing experience

CUTTING-EDGE TECHNOLOGY

DD 2050
SELF-SERVICE WEIGHING TERMINAL

CUTTING-EDGE TECHNOLOGY
Over 95 years of combined manufacturing experience
Maximum Application Flexibility
The B-TEK DD 2050 outdoor kiosk touch screen weighing terminal provides flexibility and feature-rich functionality. Operator friendly application solutions are possible with touch screen interaction and the unlimited ability to prompt action with color graphics, icons and text.

The DD 2050 is designed to communicate with built-in network adapters for easy connectivity to existing LAN infrastructures and accessory cards are available for interfacing with Profibus and Ethernet/IP networks. The DD Series terminal uses a Windows CE operating system and a Microsoft .NET programming environment that allows standard off-the-shelf PC compatible devices to be directly connected to the weighing terminal. Input or data from Ethernet, USB or serial port connected card readers, scanners, cameras, etc. can be processed within the terminal or passed through to the connected network. Truck scale management software such as Scalesoft.NET can be directly interfaced to the DD 2050 for stand-alone information collection and storage.

Reliable Construction
The B-TEK DD 2050 terminal is a self-contained kiosk designed for outdoor or industrial type environments. The stainless steel enclosure protects the touch sensitive 12.1” color display. The color display in each terminal is designed for extended temperature operation and readability in bright sunlight. The DD 2050 terminal contains a built-in roll tape printer along with a heater and cooling fan for maximum printing reliability.

Truck In/Out
The DD 2050 weighing terminal is the key element of an unmanned, self-service truck scale installation. An unlimited number of transactions can be stored with truck information as well as data from other connected devices such as a video camera and signature pad. Touch screen data entry, optional swipe card or optional RFID scanner will identify the truck and prompt the driver through the weighing process. The DD 2050 weighing terminal can provide the truck driver with graphic and text based operating sequences for loading and/or unloading the truck. It is easy to enter or retrieve product information, enter target set-points and a start / stop process operation of a loading type process. The entered information can be saved locally and then exported into a spreadsheet and retrieved via a USB flash drive or periodically transferred to a central server over the local network. The built-in tape printer can provide a transaction receipt directly to the driver so there is no need to exit the truck.
**Software Applications**

The power of the DD 2050 is in its blank slate approach to software. The DD 2050 gives the customer the ability to customize all aspects of the system. With a 12.1” touch screen, developers can guide operators through the weighing process producing navigation that is not only error free, but easy for the operator to understand. Need even more customization? The speaker included in the terminal can be used to prompt drivers to reduce confusion and/or problems associated with complex weighing routines.

The DD 2050 is built on the Microsoft .NET framework; many customizations and plug-ins are available to tie into 3rd party systems such as: SAP, MS Dynamics, QuickBooks, and other back-end systems. Have a proprietary system? Not a problem, the DD 2050 can easily export information in comma separated format for easy importation.

**Solutions**

The DD 2050 can be part of a larger integrated operation controlling receiving, shipping or storage of material based on product weighments. The DD 2050 can be plugged into your existing local network allowing seamless data transfers to: mobile devices, PC’s, servers and back-end ERP systems. The DD Series terminal can be remotely viewed or administered through a network connection or with the use of VNC software.
DD SERIES OF DIGITAL TERMINALS

B-TEK’s DD Series terminals combine computer programming power and flexibility together with the measuring requirements of a weighing instrument. The ease of use, reliability and flexibility make the DD Series terminals ideal for the following applications:

- Aggregates
- Agriculture
- Chemical
- Dairy
- Food
- Livestock
- Load out
- Manufacturing
- Mining
- Oil & gas
- Recycling/Scrap
- Transfer stations
- Transportation
- Waste
MATKO SBL-SG SIGNAL LIGHT SPECIFICATIONS
**SBL-SG**

The highly visible series of outdoor displays are designed for harsh commercial applications with an integrated traffic light for convenient traffic control and weight display in a single unit. The high intensity LED’s are designed to last 100,000 hours and offer a wide viewing angle that can be read in direct sunlight and are maintenance-free. The ruggedly designed NEMA 4 case and the internal lightning protection circuitry ensure you many years of reliable operation.

2, 4 or 6” Digit Height
NEMA 4 Case
2-Year Warranty
**SBL-SG Specifications**

**Description:**
- Long life LED technology (100,000 hour) viewable in direct sunlight
- No moveable parts = no maintenance
- Internal lighting protection
- "Auto-Learn" feature automatically configures to any data stream
- Swivel mounting bracket (mounts to uneven surfaces and poles)
- Integrated hood
- Maximum decimal displayed .000
- Integrated Data repeater / converter
- Field selectable software options for custom applications
- 2-year warranty against manufacturing defects

**Stoplight Options:**
- The integrated Stoplight allows for convenient traffic control and weight display in a single unit.

**Operation:**
- **Switch**
  - Dry Contact Closure
- **TTL**
  - Single TTL Line / Dual TTL Lines
- **ASCII Control**
  - Customer defined characters in data stream

**Electrical Specs:**
- 110 / 240 VAC @ .22 Amp 50/60 Hz
- 12 or 24VDC @ 2 Amp

**Data Inputs:**
- RS232 (50’ max)
  - 20ma Current Loop (2000’ max)
    - (Active or Passive)
- RS422 (4000’ max)

**Protocol:**
- 8 Data Bits, no Parity
- 7 Data Bits, odd or even Parity

**Baud Rates:**
- 300 to 19200

**Echo Data Outputs:**
- 20 Ma Current Loop
- RS232
- RS422

**Enclosure:**
- Aluminum Extruded Case
- NEMA 4 / IP56

**Options:**
- 12 or 24VDC
- UL Approved Version
- LB / KG Annunciators
- Stainless Steel Enclosure
- Polypropylene Enclosure
- Wireless Interface (up to 20 mile line-of-sight)
VISHAY MODEL 65058
DOUBLE-ENDED SHEAR
BEAM LOAD CELL
Double-Ended Shear Beam Load Cell

**FEATURES**
- Rated capacities of 10,000 to 100,000 pounds
- Center-link loaded
- Integral conduit adaptor
- Trade certified for NTEP Class III: 10000 divisions; Class III: 5000 divisions and OIML R60 3000 divisions in 20,000 to 200,000 pounds range
- Sensorgage™ sealed to IP67 standards
- Factory Mutual System Approved for Classes I, II, III; Divisions 1 and 2; Groups A through G. Also, non-incendive ratings (No barriers!).

**OPTIONAL FEATURES**
- 65058S stainless steel, welded seal version available
- 65058-TSA companion assemblies for vehicle scales
- 65069-TWA companion assemblies for vessel weighing
- Capacities up to 500,000 consult factory

**DESCRIPTION**
The 65058 is a mid to high capacity, nickel plated alloy steel, double ended Shear beam load cell.

This product is designed for use in certified truck and rail scales and is available in capacities ranging from 10K to 200Klbs.

This load cell is rated intrinsically safe by the Factory Mutual System (FM); making it suitable for use in potentially explosive environment.

**APPLICATIONS**
- Truck scales
- Railroad track scales
- Precision tank, bin and silo weighing
- Level and inventory monitoring

**OUTLINE DIMENSIONS in inches**

<table>
<thead>
<tr>
<th>CAPACITY</th>
<th>A1</th>
<th>A2</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>F</th>
<th>G</th>
<th>H</th>
<th>J</th>
<th>K</th>
<th>L</th>
</tr>
</thead>
<tbody>
<tr>
<td>10K - 25K</td>
<td>1.69</td>
<td>1.94</td>
<td>7.75</td>
<td>6.50</td>
<td>1.70</td>
<td>0.68</td>
<td>1.38</td>
<td>0.75</td>
<td>0.90</td>
<td>1.63</td>
<td>1/4 - 18 NPT</td>
</tr>
<tr>
<td>40K</td>
<td>1.94</td>
<td>2.44</td>
<td>10.25</td>
<td>8.50</td>
<td>2.10</td>
<td>0.81</td>
<td>1.93</td>
<td>1.00</td>
<td>1.12</td>
<td>2.00</td>
<td>1/4 - 18 NPT</td>
</tr>
<tr>
<td>50K - 75K</td>
<td>2.44</td>
<td>2.94</td>
<td>10.25</td>
<td>8.50</td>
<td>2.65</td>
<td>1.06</td>
<td>1.93</td>
<td>1.00</td>
<td>1.37</td>
<td>2.54</td>
<td>1/2 - 14 NPT</td>
</tr>
<tr>
<td>100K - 125K</td>
<td>2.90</td>
<td>3.86</td>
<td>15.25</td>
<td>12.75</td>
<td>3.43</td>
<td>1.62</td>
<td>3.13</td>
<td>1.50</td>
<td>1.80</td>
<td>3.30</td>
<td>1/2 - 14 NPT</td>
</tr>
<tr>
<td>150K - 200K</td>
<td>3.80</td>
<td>5.80</td>
<td>19.25</td>
<td>15.25</td>
<td>5.12</td>
<td>1.62</td>
<td>4.00</td>
<td>2.00</td>
<td>2.37</td>
<td>4.44</td>
<td>1/2 - 14 NPT</td>
</tr>
</tbody>
</table>

Capacities are in pounds.
**SPECIFICATIONS**

<table>
<thead>
<tr>
<th>PARAMETER</th>
<th>VALUE</th>
<th>UNIT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rated capacity-R.C. ($E_{max}$)</td>
<td>10K, 25K, 40K, 50K, 60K, 75K, 100K*</td>
<td>lbs</td>
</tr>
<tr>
<td>NTEP/OIML Accuracy class</td>
<td>NTEP III</td>
<td>NTEP IIIL</td>
</tr>
<tr>
<td>Maximum no. of intervals (n)</td>
<td>5000 multiple</td>
<td>10000 multiple</td>
</tr>
<tr>
<td>$Y = E_{max}/V_{min}$</td>
<td>See NTEP cert. 86-046A3</td>
<td></td>
</tr>
<tr>
<td>Rated output-R.O.</td>
<td>3.0</td>
<td>mV/V</td>
</tr>
<tr>
<td>Rated output tolerance</td>
<td>0.25</td>
<td>±% mV/V</td>
</tr>
<tr>
<td>Zero balance</td>
<td>1.0</td>
<td>±% FSO</td>
</tr>
<tr>
<td>Combined error</td>
<td>0.02</td>
<td>0.02</td>
</tr>
<tr>
<td>Non-repeatability</td>
<td>0.01</td>
<td>0.01</td>
</tr>
<tr>
<td>Creep error (30 minutes)</td>
<td>0.025</td>
<td>0.030</td>
</tr>
<tr>
<td>Temperature effect on zero</td>
<td>0.0010</td>
<td>0.0010</td>
</tr>
<tr>
<td>Temperature effect on output</td>
<td>0.0008</td>
<td>0.0008</td>
</tr>
<tr>
<td>Compensated temperature range</td>
<td>14 to 104 (-10 to 40)</td>
<td>°F (°C)</td>
</tr>
<tr>
<td>Operating temperature range</td>
<td>0 to 150 (-18 to 65)</td>
<td>°F (°C)</td>
</tr>
<tr>
<td>Storage temperature range</td>
<td>-60 to 185 (-50 to 85)</td>
<td>°F (°C)</td>
</tr>
<tr>
<td>Sideload rejection ratio</td>
<td>500:1</td>
<td></td>
</tr>
<tr>
<td>Safe sideload</td>
<td>100</td>
<td>% of R.C.</td>
</tr>
<tr>
<td>Maximum safe central overload</td>
<td>150</td>
<td>% of R.C.</td>
</tr>
<tr>
<td>Ultimate central overload</td>
<td>300</td>
<td>% of R.C.</td>
</tr>
<tr>
<td>Excitation, recommended</td>
<td>10</td>
<td>Vdc or Vac rms</td>
</tr>
<tr>
<td>Excitation, maximum</td>
<td>25</td>
<td>Vdc or Vac rms</td>
</tr>
<tr>
<td>Input impedance</td>
<td>686 - 714</td>
<td>Ω</td>
</tr>
<tr>
<td>Output impedance</td>
<td>699 - 707</td>
<td>Ω</td>
</tr>
<tr>
<td>Insulation resistance at 50VDC</td>
<td>&gt;1000</td>
<td>MΩ</td>
</tr>
<tr>
<td>Material</td>
<td>Nickel plated alloy tool steel**</td>
<td></td>
</tr>
<tr>
<td>Environmental protection</td>
<td>IP67</td>
<td></td>
</tr>
</tbody>
</table>

* Consult factory for capacities over 100K
** Stainless steel available - model name is 65058S
FSO - Full Scale Output

All specifications subject to change without notice.

---

**VISHAY TRANSDUCERS (VT) SALES OFFICES**

<table>
<thead>
<tr>
<th>VT Americas</th>
<th>VMG UK</th>
<th>VMG Germany</th>
<th>VMG France</th>
</tr>
</thead>
<tbody>
<tr>
<td>City of Industry, CA</td>
<td>Basingstoke</td>
<td>Heilbronn</td>
<td>Chartres</td>
</tr>
<tr>
<td><a href="mailto:vt.us@vishaymg.com">vt.us@vishaymg.com</a></td>
<td><a href="mailto:vt.uk@vishaymg.com">vt.uk@vishaymg.com</a></td>
<td><a href="mailto:vt.de@vishaymg.com">vt.de@vishaymg.com</a></td>
<td><a href="mailto:vt.fr@vishaymg.com">vt.fr@vishaymg.com</a></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>VT Netherlands</th>
<th>VMG Israel</th>
<th>VT China</th>
<th>VT Taiwan*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Breda</td>
<td>Netanya</td>
<td>Tianjin</td>
<td>Taipei</td>
</tr>
<tr>
<td><a href="mailto:vt.nl@vishaymg.com">vt.nl@vishaymg.com</a></td>
<td><a href="mailto:vt.il@vishaymg.com">vt.il@vishaymg.com</a></td>
<td><a href="mailto:vt.prc@vishaymg.com">vt.prc@vishaymg.com</a></td>
<td><a href="mailto:vt.roc@vishaymg.com">vt.roc@vishaymg.com</a></td>
</tr>
</tbody>
</table>

*Asia except China
Notice

Specifications of the products displayed herein are subject to change without notice. Vishay Intertechnology, Inc., or anyone on its behalf, assumes no responsibility or liability for any errors or inaccuracies.

Information contained herein is intended to provide a product description only. No license, express or implied, by estoppel or otherwise, to any intellectual property rights is granted by this document. Except as provided in Vishay's terms and conditions of sale for such products, Vishay assumes no liability whatsoever, and disclaims any express or implied warranty, relating to sale and/or use of Vishay products including liability or warranties relating to fitness for a particular purpose, merchantability, or infringement of any patent, copyright, or other intellectual property right.

The products shown herein are not designed for use in medical, life-saving, or life-sustaining applications. Customers using or selling these products for use in such applications do so at their own risk and agree to fully indemnify Vishay for any damages resulting from such improper use or sale.
UNITEC DRAWING B-1120,
80 X 10 LOW PROFILE TRUCK SCALES
UNITEC DRAWING A-1019,
TRUCK SCALE ELECTRICAL GENERAL PLANS
NOTES
1. ALL 120 V WIRING TO BE INSTALLED BY CERTIFIED ELECTRICIANS.
2. USE FLEXIBLE CONDUIT FROM BASE TO SCALE-MOUNTED J-BOX.
3. SEE DWG B-1120 FOR MOUNTING OF SCOREBOARD POLE AND KIOSK POLE.
UNITEC DRAWING B-1130,
FOUNDATION PLAN, 80 X 10 LOW PROFILE
TRUCK SCALES
NOTES:
1. Design scale footing width, length and depth to suit local soil bearing capacity and loads shown. Illustrative loads include live and dead loads combined (not including net weight of the piers themselves). Loads are shown above.
2. All footings and piers shall be placed on undisturbed, non-frost susceptible material.
3. Any fill material shall be compacted to 95% of the standard density before concrete is placed.
4. All concrete compressive strength shall be 4000 PSI at 28 days.
5. Reinforced steel shall conform to ASTM A-615, Grade 40.
6. The clearance between the reinforcing steel and the exposed concrete surface shall be 3" minimum.
7. Scale foundation must provide for a straight and level approach of at least half of the overall scale length, with the first 10' next to the scale a concrete apron (as shown).
8. Scale location must be dry, natural or by construction.
9. Provide 1" conduit from scale foundation to indicator location.
10. Scale provided with 4" edge coping in lieu, bumper bolt pads.

SECTION A-A

SECTION B-B
PART 4

DRAWINGS
(BOUND SEPARATELY)