

SUMMIT COUNTY GOVERNMENT

**2026 Summit County Resource Allocation Park (SCRAP)
Fill Area IV, Phases 6 and 7**

Project 2026-001, Project Code 721451-2026



January 9, 2026



January 9, 2026

RE: Invitation to Bid
Construction of Fill Area IV Phases 6 and 7, Summit County Resource
Allocation Park
Dillon, Colorado

Dear Interested Bidders:

You are invited to prepare a bid for the construction of Fill Area IV Phases 6 and 7 at the Summit County Resource Allocation Park located 4.7 miles northwest of Dillon, Colorado. The scope of work for this project, which is described in the enclosed bid package, generally consists of the following, but not limited to, the construction of landfill cells and facility roads, including excavation, general fill, subgrade preparation for geomembrane liner, installation of a geomembrane liner system and the installation of a 12-inch thick operations layer.

A Pre-Bid meeting has been scheduled to familiarize bidders with the site and to address questions concerning the project at **10:00AM MST on January 21, 2026** at the Summit County Resource Allocation Park (see address below). Attendance is **mandatory** for those who intend to submit a bid.

Mr. Daniel Gietzen
Daniel.gietzen@summitcountyco.gov
Summit County Resource Allocation Park
639 Landfill Road
Dillon, Colorado 80435

Any questions after the Pre-Bid Meeting, regarding the bid documents or the project in general must be submitted in writing via email to Daniel Gietzen at the email address above and Jacob Midkiff (jmidkiff@wcgrp.com.com) before **4:00PM MST Thursday, February 5, 2026**. Answers to these written questions will be provided as an addendum to all interested bidders on or before **4:00PM MST Thursday, February 12, 2026**.

Please prepare your bid in accordance with the Bid Package. A copy of the completed Bid Form and a bid bond in the amount of 5% of the bid must be submitted and delivered no later than **12:00 PM Mountain Standard Time (MST) on Wednesday, February 18, 2026**, electronically with an original signed copy to follow by **4:00 PM Friday, February 20, 2026** to the following address:

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Mr. Daniel Gietzen
Daniel.gietzen@summitcountyco.gov
Summit County Resource Allocation Park
639 Landfill Road
Dillon, Colorado 80435

Please write clearly on the outside of the envelope for all submittals the project name **"Summit County Resource Allocation Park – Construction of Fill Area IV Phases 6 and 7"**. Include in the bid package a complete description of the firm/company submitting the bid, including all subcontractors proposed.

The Owner may request that the Bidder be available for interview after the bids are received that would occur at the Owner's discretion to assist with the completion of decision making for award.

Upon complete review and evaluation of the submitted bids, we will notify the successful bidder and issue a Notice of Award. Summit County Resource Allocation Park / Summit County Government, reserves the right to reject any or all bids. It is the contractor's responsibility to have read and understood all terms and conditions stated in this document. The successful bidder will be required to sign a contractual agreement based on the templates included in this document. Any proposed modifications and/or exceptions to the agreement as shown must accompany the bid response.

It is anticipated that the Owner will provide a Notice of Award to the chosen Contractor in a reasonably expeditious manner, and that the Contractor should be prepared to enter into an agreement with the Owner within 21 calendar days after a Notice of Award has been issued. Construction of the project is required to be completed before October 31, 2026.

If you have any questions or comments concerning this project or wish to confirm your attendance at the Pre-Bid meeting, please contact Daniel Gietzen as listed below. Your interest in this work is appreciated, and we look forward to receiving your company's bid.

Respectfully,

Daniel Gietzen

(970) 668-4289

Daniel.gietzen@summitcountyco.gov

Capital Projects Manager

cc: Jacob Midkiff, P.E. – Weaver Consultants Group

SUMMIT COUNTY GOVERNMENT
SCRAP FILL AREA IV Phases 6 and 7
PROJECT 2026-001, PROJECT CODE 721451-2026
January 9, 2026

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ADVERTISEMENT FOR BIDS
SUMMIT COUNTY GOVERNMENT
SUMMIT COUNTY, COLORADO
SUMMIT COUNTY RESOURCE ALLOCATION PARK (SCRAP)
FILL AREA IV PHASES 6 AND 7

General Notice

Summit County Government (Owner) is requesting Bids for the construction of the following Project:

SUMMIT COUNTY RESOURCE ALLOCATION PARK (SCRAP)
FILL AREA IV PHASES 6 AND 7

PROJECT 2026-001, PROJECT CODE 721451-2026

Bids for the construction of the Project will be received at the **Summit County Resource Allocation Park** located at **639 Landfill Road, Dillon, Colorado, 80435** until **12:00 pm MST, Wednesday, February 18, 2026**. At that time the Bids received will be publicly opened and read.

The Project includes, but limited to, the following Work:

- **Excavation of the areas for Fill Area IV Phases 6 and 7 to the grades as shown.**
- **Provide groundwater control and construction of groundwater conveyance trenches and piping from the excavation areas of Fill Area IV Phases 6 and 7.**
- **Exposure of liner system limits for tie in to Fill area IV phases 3, 4 and 5, Fill Area III Phase 4, and the pre 1979 Landfill area. Removal of any waste present at the tie in locations.**
- **Construction of structural fill in Fill Area IV Phases 5 and 6.**
- **Construction of the landfill liner and leachate collection systems within the Fill Area IV Phases 6 and 7 footprint.**
- **Construction of the liner system tie-ins to adjacent Fill Areas as shown.**
- **Construction of the protective cover layer within the Fill Area IV Phases 6 and 7 footprint**
- **Perform all work in accordance with the plans and specifications.**

Obtaining the Bidding Documents

Information and Bidding Documents for the Project can be found at the following designated website:

[www.summitcountyco.gov/how do i/apply for/bid postings.php](http://www.summitcountyco.gov/how_do_i/apply_for/bid_postings.php)

Bidding Documents may be downloaded from the designated website. Prospective Bidders are urged to register with the designated website (email Daniel Gietzen) as a plan holder, even if Bidding Documents are obtained from a plan room or source other than the designated website in either electronic or paper format. The designated website will be updated periodically with addenda, lists of registered plan holders, reports, and other information relevant to submitting a Bid for the Project. All official notifications, addenda, and other Bidding Documents will be offered only through the designated website. Neither Owner nor Engineer will be responsible for Bidding Documents, including addenda, if any, obtained from sources other than the designated website.

The Issuing Office for the Bidding Documents is:

SUMMIT COUNTY GOVERNMENT
Summit County Resource Allocation Park Office
639 Landfill Road, Dillon CO 80435

Prospective Bidders may obtain Bidding Documents including plans, specifications and example contract forms at [www.summitcountyco.gov/how do i/apply for/bid postings.php](http://www.summitcountyco.gov/how_do_i/apply_for/bid_postings.php). Partial sets of Bidding Documents will not be available from the Issuing Office. Neither Owner nor Engineer will be responsible for full or partial sets of Bidding Documents, including addenda, if any, obtained from sources other than the above County web link.

Pre-bid Conference

A pre-bid conference for the Project will be held on **January 21, 2026 from 10:00 a.m. - 12:00 p.m.** at **Summit County Resource Allocation Park** located at **639 Landfill Road, Dillon, Colorado, 80435**. Attendance at the pre-bid conference is mandatory.

Instructions to Bidders.

For all further requirements regarding bid submittal, qualifications, procedures, and contract award, refer to the Instructions to Bidders that are included in the Bidding Documents.

This Advertisement is issued by:

Owner: **SUMMIT COUNTY GOVERNMENT**
By: **SUMMIT COUNTY RESOURCE ALLOCATION PARK**
Title: **Daniel Gietzen, Capital Projects Manager**
Date: **January 9, 2025**

SCRAP FILL AREA IV PHASES 6 AND 7

INSTRUCTIONS TO BIDDERS FOR CONSTRUCTION CONTRACT

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ARTICLE 1—DEFINED TERMS

- 1.01 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:
- A. *Issuing Office*—the office from which the Bidding Documents are to be issued, and which registers plan holders.

ARTICLE 2—BIDDING DOCUMENTS

- 2.01 Bidder shall obtain a complete set of Bidding Requirements and proposed Contract Documents (together, the Bidding Documents). See the Agreement for a list of the Contract Documents. It is Bidder's responsibility to determine that it is using a complete set of documents in the preparation of a Bid. Bidder assumes sole responsibility for errors or misinterpretations resulting from the use of incomplete documents, by Bidder itself or by its prospective Subcontractors and Suppliers.
- 2.02 Bidding Documents are made available for the sole purpose of obtaining Bids for completion of the Project and permission to download or distribution of the Bidding Documents does not confer a license or grant permission or authorization for any other use. Authorization to download documents, or other distribution, includes the right for plan holders to print documents solely for their use, and the use of their prospective Subcontractors and Suppliers, provided the plan holder pays all costs associated with printing or reproduction. Printed documents may not be re-sold under any circumstances.
- 2.03 [not used]
- 2.04 *Electronic Documents*
- A. When the Bidding Requirements indicate that electronic (digital) copies of the Bidding Documents are available, such documents will be made available to the Bidders as Electronic Documents in the manner specified.
1. Bidding Documents will be provided in Adobe PDF (Portable Document Format) (.pdf) that is readable by Adobe Acrobat Reader Version 9 or later. It is the intent of the Engineer and Owner that such Electronic Documents are to be exactly representative of the paper copies of the documents. However, because the Owner and Engineer cannot totally control the transmission and receipt of Electronic Documents nor the Contractor's means of reproduction of such documents, the Owner and Engineer cannot and do not guarantee that Electronic Documents and reproductions prepared from those versions are identical in every manner to the paper copies.
- B. Unless otherwise stated in the Bidding Documents, the Bidder may use and rely upon complete sets of Electronic Documents of the Bidding Documents, described in Paragraph 2.06.A above. However, Bidder assumes all risks associated with differences arising from transmission/receipt of Electronic Documents versions of Bidding Documents and reproductions prepared from those versions and, further, assumes all risks, costs, and responsibility associated with use of the Electronic Documents versions to derive information that is not explicitly contained in printed paper versions of the documents, and for Bidder's reliance upon such derived information.

ARTICLE 3—QUALIFICATIONS OF BIDDERS

- 3.01 To demonstrate Bidder's qualifications to perform the Work, after submitting its Bid and within **ten** days of Owner's request, Bidder must submit the following information:
- A. Written evidence establishing its qualifications such as financial data, previous experience, and present commitments.
 - B. A written statement that Bidder is authorized to do business in the state where the Project is located, or a written certification that Bidder will obtain such authority prior to the Effective Date of the Contract.
 - C. Bidder's state or other contractor license number, if applicable.
 - D. Subcontractor and Supplier qualification information.
 - E. Other required information regarding qualifications.
- 3.02 A Bidder's failure to submit required qualification information within the times indicated may disqualify Bidder from receiving an award of the Contract.
- 3.03 No requirement in this Article 3 to submit information will prejudice the right of Owner to seek additional pertinent information regarding Bidder's qualifications.

ARTICLE 4—PRE-BID CONFERENCE

- 4.01 A mandatory pre-bid conference will be held at the time and location indicated in the Advertisement or invitation to bid. Representatives of Owner and Engineer will be present to discuss the Project. Proposals will not be accepted from Bidders who do not attend the conference. It is each Bidder's responsibility to sign in at the pre-bid conference to verify its participation. Bidders must sign in using the name of the organization that will be submitting a Bid. A list of qualified Bidders that attended the pre-bid conference and are eligible to submit a Bid for this Project will be issued in an Addendum.
- 4.02 Information presented at the pre-Bid conference does not alter the Contract Documents. Owner will issue Addenda to make any changes to the Contract Documents that result from discussions at the pre-Bid conference. Information presented, and statements made at the pre-bid conference will not be binding or legally effective unless incorporated in an Addendum.

ARTICLE 5—SITE AND OTHER AREAS; EXISTING SITE CONDITIONS; EXAMINATION OF SITE; OWNER'S SAFETY PROGRAM; OTHER WORK AT THE SITE

- 5.01 *Site and Other Areas*
- A. The Site is identified in the Bidding Documents. By definition, the Site includes rights-of-way, easements, and other lands furnished by Owner for the use of the Contractor. Any additional lands required for temporary construction facilities, construction equipment, or storage of materials and equipment, and any access needed for such additional lands, are to be obtained and paid for by Contractor.
- 5.02 *Existing Site Conditions*
- A. *Subsurface and Physical Conditions; Hazardous Environmental Conditions*

1. The Supplementary Conditions identify the following regarding existing conditions at or adjacent to the Site: **[no data exists on which Bidders may rely]**
 - a. Those reports of explorations and tests of subsurface conditions at or adjacent to the Site that contain Technical Data.
 - b. Those drawings known to Owner of existing physical conditions at or adjacent to the Site, including those drawings depicting existing surface or subsurface structures at or adjacent to the Site (except Underground Facilities), that contain Technical Data.
 - c. Reports and drawings known to Owner relating to Hazardous Environmental Conditions that have been identified at or adjacent to the Site.
 - d. Technical Data contained in such reports and drawings.
2. Owner will make copies of reports and drawings referenced above available to any Bidder on request. These reports and drawings are not part of the Contract Documents, but the Technical Data contained therein upon whose accuracy Bidder is entitled to rely, as provided in the General Conditions, has been identified and established in 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.
3. If the Supplementary Conditions do not identify Technical Data, the default definition of Technical Data set forth in Article 1 of the General Conditions will apply.
4. *Geotechnical Baseline Report/Geotechnical Data Report*: The Bidding Documents contain a Geotechnical Baseline Report (GBR) and Geotechnical Data Report (GDR).
 - a. As set forth in the Supplementary Conditions, the GBR describes certain select subsurface conditions that are anticipated to be encountered by Contractor during construction in specified locations ("Baseline Conditions"). The GBR is a Contract Document.
 - b. The Baseline Conditions in the GBR are intended to reduce uncertainty and the degree of contingency in submitted Bids. However, Bidders cannot rely solely on the Baseline Conditions. Bids should be based on a comprehensive approach that includes an independent review and analysis of the GBR, all other Contract Documents, Technical Data, other available information, and observable surface conditions. Not all potential subsurface conditions are baselined.
 - c. Nothing in the GBR is intended to relieve Bidders of the responsibility to make their own determinations regarding construction costs, bidding strategies, and Bid prices, nor of the responsibility to select and be responsible for the means, methods, techniques, sequences, and procedures of construction, and for safety precautions and programs incident thereto.
 - d. As set forth in the Supplementary Conditions, the GDR is a Contract Document containing data prepared by or for the Owner in support of the GBR.
- B. *Underground Facilities*: Underground Facilities are shown or indicated on the Drawings, pursuant to Paragraph 5.05 of the General Conditions, and not in the drawings referred to in Paragraph 5.02.A of these Instructions to Bidders. Information and data regarding the

presence or location of Underground Facilities are not intended to be categorized, identified, or defined as Technical Data.

5.03 *Other Site-related Documents*

- A. No other Site-related documents are available.

5.04 *Site Visit and Testing by Bidders*

- A. Bidder is encouraged to visit the Site and conduct a thorough visual examination of the Site and adjacent areas. During the visit the Bidder must not disturb any ongoing operations at the Site.
- B. A Site visit is scheduled following the pre-bid conference. Maps to the Site will be available at the pre-Bid conference.
- C. A Site visit is scheduled for **Wednesday, January 21, 2026 10:00 am - 12:00 pm at the Summit County Resource Allocation Park, 639 Landfill Road, Dillon, Colorado 80435.**
- D. Bidders visiting the Site are required to arrange their own transportation to the Site.
- E. All access to the Site other than during a regularly scheduled Site visit must be coordinated through the following Owner or Engineer contact for visiting the Site: at **email: daniel.gietzen@summitcountyco.gov and phone: 970-668-4289.** Bidder must conduct the required Site visit during normal working hours.
- F. Bidder is not required to conduct any subsurface testing, or exhaustive investigations of Site conditions.
- G. On request, and to the extent Owner has control over the Site, and schedule permitting, the Owner will provide Bidder general access to the Site to conduct such additional examinations, investigations, explorations, tests, and studies as Bidder deems necessary for preparing and submitting a successful Bid. Owner will not have any obligation to grant such access if doing so is not practical because of existing operations, security or safety concerns, or restraints on Owner's authority regarding the Site. Bidder is responsible for establishing access needed to reach specific selected test sites.
- H. Bidder must comply with all applicable Laws and Regulations regarding excavation and location of utilities, obtain all permits, and comply with all terms and conditions established by Owner or by property owners or other entities controlling the Site with respect to schedule, access, existing operations, security, liability insurance, and applicable safety programs.
- I. Bidder must fill all holes and clean up and restore the Site to its former condition upon completion of such explorations, investigations, tests, and studies.

5.05 *Owner's Safety Program*

- A. Site visits and work at the Site may be governed by an Owner safety program. If an Owner safety program exists, it will be noted in the Supplementary Conditions.

5.06 *Other Work at the Site*

- A. Reference is made to Article 8 of the Supplementary Conditions for the identification of the general nature of other work of which Owner is aware (if any) that is to be performed at the

Site by Owner or others (such as utilities and other prime contractors) and relates to the Work contemplated by these Bidding Documents. If Owner is party to a written contract for such other work, then on request, Owner will provide to each Bidder access to examine such contracts (other than portions thereof related to price and other confidential matters), if any.

ARTICLE 6—BIDDER'S REPRESENTATIONS AND CERTIFICATIONS

6.01 *Express Representations and Certifications in Bid Form, Agreement*

- A. The Bid Form that each Bidder will submit contains express representations regarding the Bidder's examination of Project documentation, Site visit, and preparation of the Bid, and certifications regarding lack of collusion or fraud in connection with the Bid. Bidder should review these representations and certifications, and assure that Bidder can make the representations and certifications in good faith, before executing and submitting its Bid.
- B. If Bidder is awarded the Contract, Bidder (as Contractor) will make similar express representations and certifications when it executes the Agreement.

ARTICLE 7—INTERPRETATIONS AND ADDENDA

- 7.01 Owner on its own initiative may issue Addenda to clarify, correct, supplement, or change the Bidding Documents.
- 7.02 Bidder shall submit all questions about the meaning or intent of the Bidding Documents to Engineer and copy the Owner in writing. Contact information and submittal procedures for such questions are as follows:
 - A. Jacob Midkiff, P.E. at Weaver Consultants Group via email jmidkiff@wcgrp.com, and
 - B. Daniel Gietzen for SCRAP via email: daniel.gietzen@summitcountyco.gov.
- 7.03 Interpretations or clarifications considered necessary by Engineer in response to such questions will be issued by Addenda delivered to all registered plan holders. Questions received less than seven days prior to the date for opening of Bids may not be answered.
- 7.04 Only responses set forth in an Addendum will be binding. Oral and other interpretations or clarifications will be without legal effect. Responses to questions are not part of the Contract Documents unless set forth in an Addendum that expressly modifies or supplements the Contract Documents.

ARTICLE 8—BID SECURITY

- 8.01 A Bid must be accompanied by Bid security made payable to Owner in an amount of 5 percent of Bidder's maximum Bid price (determined by adding the base bid and all alternates) and in the form of a Bid bond issued by a surety meeting the requirements of Paragraph 6.01 of the General Conditions. Such Bid bond will be issued in the form included in the Bidding Documents.
- 8.02 The Bid security of the apparent Successful Bidder will be retained until Owner awards the contract to such Bidder, and such Bidder has executed the Contract, furnished the required Contract security, and met the other conditions of the Notice of Award, whereupon the Bid security will be released. If the Successful Bidder fails to execute and deliver the Contract and furnish the required Contract security within 15 days after the Notice of Award, Owner may consider Bidder to be in default, annul the Notice of Award, and the Bid security of that Bidder

will be forfeited, in whole in the case of a penal sum bid bond, and to the extent of Owner's damages in the case of a damages-form bond. Such forfeiture will be Owner's exclusive remedy if Bidder defaults.

- 8.03 The Bid security of other Bidders that Owner believes to have a reasonable chance of receiving the award may be retained by Owner until the earlier of 7 days after the Effective Date of the Contract or 61 days after the Bid opening, whereupon Bid security furnished by such Bidders will be released.
- 8.04 Bid security of other Bidders that Owner believes do not have a reasonable chance of receiving the award will be released within 7 days after the Bid opening.

ARTICLE 9—CONTRACT TIMES

- 9.01 Bidder must set forth in the Bid the time by which Bidder must achieve Substantial Completion, subject to the restrictions established in Paragraph 13.07 of these Instructions. The Owner will take Bidder's time commitment regarding Substantial Completion into consideration during the evaluation of Bids, and it will be necessary for the apparent Successful Bidder to satisfy Owner that it will be able to achieve Substantial Completion within the time such Bidder has designated in the Bid. **Bidder must also set forth in the Bid its commitments regarding the achievement of Milestones and readiness for final payment.** The Successful Bidder's time commitments will be entered into the Agreement or incorporated in the Agreement by reference to the specific terms of the Bid.
- 9.02 Provisions for liquidated damages, if any, for failure to timely attain a Milestone, Substantial Completion, or completion of the Work in readiness for final payment, are set forth in the Agreement.

ARTICLE 10—SUBSTITUTE AND "OR EQUAL" ITEMS

- 10.01 The Contract for the Work, as awarded, will be on the basis of materials and equipment specified or described in the Bidding Documents without consideration during the bidding and Contract award process of possible substitute or "or-equal" items. In cases in which the Contract allows the Contractor to request that Engineer authorize the use of a substitute or "or-equal" item of material or equipment, application for such acceptance may not be made to and will not be considered by Engineer until after the Effective Date of the Contract.
- 10.02 All prices that Bidder sets forth in its Bid will be based on the presumption that the Contractor will furnish the materials and equipment specified or described in the Bidding Documents, as supplemented by Addenda. Any assumptions regarding the possibility of post-Bid approvals of "or-equal" or substitution requests are made at Bidder's sole risk.

ARTICLE 11—SUBCONTRACTORS, SUPPLIERS, AND OTHERS

- 11.01 A Bidder must be prepared to retain specific Subcontractors and Suppliers for the performance of the Work if required to do so by the Bidding Documents or in the Specifications. If a prospective

Bidder objects to retaining any such Subcontractor or Supplier and the concern is not relieved by an Addendum, then the prospective Bidder should refrain from submitting a Bid.

- 11.02 The apparent Successful Bidder, and any other Bidder so requested, must submit to Owner a list of the Subcontractors or Suppliers proposed for the following portions of the Work within five days after Bid opening.
- 11.03 If requested by Owner, such list must be accompanied by an experience statement with pertinent information regarding similar projects and other evidence of qualification for each such Subcontractor or Supplier. If Owner or Engineer, after due investigation, has reasonable objection to any proposed Subcontractor or Supplier, Owner may, before the Notice of Award is given, request apparent Successful Bidder to submit an acceptable substitute, in which case apparent Successful Bidder will submit a substitute, Bidder's Bid price will be increased (or decreased) by the difference in cost occasioned by such substitution, and Owner may consider such price adjustment in evaluating Bids and making the Contract award.
- 11.04 If apparent Successful Bidder declines to make any such substitution, Owner may award the Contract to the next lowest Bidder that proposes to use acceptable Subcontractors and Suppliers. Declining to make requested substitutions will constitute grounds for forfeiture of the Bid security of any Bidder. Any Subcontractor or Supplier, so listed and against which Owner or Engineer makes no written objection prior to the giving of the Notice of Award will be deemed acceptable to Owner and Engineer subject to subsequent revocation of such acceptance as provided in Paragraph 7.07 of the General Conditions.

ARTICLE 12—PREPARATION OF BID

- 12.01 The Bid Form is included with the Bidding Documents.
 - A. All blanks on the Bid Form must be completed in ink and the Bid Form signed in ink. Erasures or alterations must be initialed in ink by the person signing the Bid Form. A Bid price must be indicated for each section, Bid item, alternate, adjustment unit price item, and unit price item listed therein.
 - B. If the Bid Form expressly indicates that submitting pricing on a specific alternate item is optional, and Bidder elects to not furnish pricing for such optional alternate item, then Bidder may enter the words "No Bid" or "Not Applicable."
- 12.02 If Bidder has obtained the Bidding Documents as Electronic Documents, then Bidder shall prepare its Bid on a paper copy of the Bid Form printed from the Electronic Documents version of the Bidding Documents. The printed copy of the Bid Form must be clearly legible, printed on 8½ inch by 11-inch paper and as closely identical in appearance to the Electronic Document version of the Bid Form as may be practical. The Owner reserves the right to accept Bid Forms which nominally vary in appearance from the original paper version of the Bid Form, providing that all required information and submittals are included with the Bid.
- 12.03 A Bid by a corporation must be executed in the corporate name by a corporate officer (whose title must appear under the signature), accompanied by evidence of authority to sign. The corporate address and state of incorporation must be shown.

- 12.04 A Bid by a partnership must 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 must be shown.
- 12.05 A Bid by a limited liability company must be executed in the name of the firm by a member or other authorized person and accompanied by evidence of authority to sign. The state of formation of the firm and the official address of the firm must be shown.
- 12.06 A Bid by an individual must show the Bidder's name and official address.
- 12.07 A Bid by a joint venture must be executed by an authorized representative of each joint venturer in the manner indicated on the Bid Form. The joint venture must have been formally established prior to submittal of a Bid, and the official address of the joint venture must be shown.
- 12.08 All names must be printed in ink below the signatures.
- 12.09 The Bid must contain an acknowledgment of receipt of all Addenda, the numbers of which must be filled in on the Bid Form.
- 12.10 Postal and e-mail addresses and telephone number for communications regarding the Bid must be shown.
- 12.11 The Bid must contain evidence of Bidder's authority to do business in the state where the Project is located, or Bidder must certify in writing that it will obtain such authority within the time for acceptance of Bids and attach such certification to the Bid.
- 12.12 If Bidder is required to be licensed to submit a Bid or perform the Work in the state where the Project is located, the Bid must contain evidence of Bidder's licensure, or Bidder must certify in writing that it will obtain such licensure within the time for acceptance of Bids and attach such certification to the Bid. Bidder's state contractor license number, if any, must also be shown on the Bid Form.

ARTICLE 13—BASIS OF BID

- 13.01 *Unit Price*
 - A. Bidders must submit a Bid on a unit price basis for each item of Work listed in the unit price section of the Bid Form.
 - B. The "Bid Price" (sometimes referred to as the extended price) for each unit price Bid item will be the product of the "Estimated Quantity", which Owner or its representative has set forth in the Bid Form, for the item and the corresponding "Bid Unit Price" offered by the Bidder. The total of all unit price Bid items will be the sum of these "Bid Prices"; such total will be used by Owner for Bid comparison purposes. The final quantities and Contract Price will be determined in accordance with Paragraph 13.03 of the General Conditions.
 - C. 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.

ARTICLE 14—SUBMITTAL OF BID

- 14.01 The Bidding Documents include one separate unbound copy of the Bid Form, and, if required, the Bid Bond Form. The unbound copy of the Bid Form is to be completed and submitted with the Bid

security and the other documents required to be submitted under the terms of Article 2 of the Bid Form.

- 14.02 *A Bid must be received no later than the date and time prescribed and at the place indicated in the Advertisement or invitation to bid and must be enclosed in a plainly marked package with the Project title, the name and address of Bidder, and must be 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 must be enclosed in a separate package plainly marked on the outside with the notation "BID ENCLOSED." A mailed Bid must be addressed to the location designated in the Advertisement.*
- 14.03 *Electronic Bid submittals are acceptable and shall have a cover sheet with the Project title, the name and address of Bidder, and must be accompanied by a PDF copy of the Bid security and other required documents. Electronic submittals shall be provided via email with the following exact text in the subject line: **SCRAP Fill Area IV Phases 6 and 7, and Fill Area VII, Project Number 2026-001**. It is the responsibility of the Bidder to satisfy themselves of the County's secure practices in receiving electronic submittals for secure bids*
- 14.04 Bids received after the date and time prescribed for the opening of bids, or not submitted at the correct location or in the designated manner, will not be accepted and will be returned to the Bidder unopened.

ARTICLE 15—MODIFICATION AND WITHDRAWAL OF BID

- 15.01 An unopened Bid may be 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. Upon receipt of such notice, the unopened Bid will be returned to the Bidder.
- 15.02 If a Bidder wishes to modify its Bid prior to Bid opening, Bidder must withdraw its initial Bid in the manner specified in Paragraph 15.01 and submit a new Bid prior to the date and time for the opening of Bids.
- 15.03 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, the Bidder may withdraw its Bid,

and the Bid security will be returned. Thereafter, if the Work is rebid, the Bidder will be disqualified from further bidding on the Work.

ARTICLE 16—OPENING OF BIDS

- 16.01 Bids will be opened at the time and place indicated in the advertisement or invitation to bid and, unless obviously non-responsive, read aloud publicly. An abstract of the amounts of the base Bids and major alternates, if any, will be made available to Bidders after the opening of Bids.

ARTICLE 17—BIDS TO REMAIN SUBJECT TO ACCEPTANCE

- 17.01 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.

ARTICLE 18—EVALUATION OF BIDS AND AWARD OF CONTRACT

- 18.01 Owner reserves the right to reject any or all Bids, including without limitation, nonconforming, nonresponsive, unbalanced, or conditional Bids. Owner also reserves the right to waive all minor Bid informalities not involving price, time, or changes in the Work.
- 18.02 Owner will reject the Bid of any Bidder that Owner finds, after reasonable inquiry and evaluation, to not be responsible.
- 18.03 If Bidder purports to add terms or conditions to its Bid, takes exception to any provision of the Bidding Documents, or attempts to alter the contents of the Contract Documents for purposes of the Bid, whether in the Bid itself or in a separate communication to Owner or Engineer, then Owner will reject the Bid as nonresponsive.
- 18.04 If Owner awards the contract for the Work, such award will be to the responsible Bidder submitting the lowest responsive Bid, subject to public contracting requirements and preferences as provided for in Colorado State Statute or Owner's policy. Owner at all times retains discretion regarding the ultimate acceptance of a Bid and award of Contract.
- 18.05 *Evaluation of Bids*
- A. In evaluating Bids, Owner will consider whether 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.
 - B. In the comparison of Bids, alternates will be applied in the same order of priority as listed in the Bid Form. To determine the Bid prices for purposes of comparison, Owner will announce to all bidders a "Base Bid plus alternates" budget after receiving all Bids, but prior to opening them. For comparison purposes alternates will be accepted, following the order of priority established in the Bid Form, until doing so would cause the budget to be exceeded. After determination of the Successful Bidder based on this comparative process and on the responsiveness, responsibility, and other factors set forth in these Instructions, the award may be made to said Successful Bidder on its base Bid and any combination of its additive alternate Bids for which Owner determines funds will be available at the time of award.

- C. For determination of the apparent low Bidder(s) when sectional bids are submitted, Bids will be compared on the basis of the aggregate of the Bids for separate sections and the Bids for combined sections that result in the lowest total amount for all of the Work.
 - D. For the determination of the apparent low Bidder when unit price bids are submitted, Bids will be compared on the basis of the total of the products of the estimated quantity of each item and unit price Bid for that item, together with any lump sum items.
 - E. For the determination of the apparent low Bidder when cost-plus-fee bids are submitted, Bids will be compared on the basis of the Guaranteed Maximum Price set forth by Bidder on the Bid Form.
 - F. Bid prices will be compared after adjusting for differences in time of Substantial Completion (total number of calendar days to substantially complete the Work) designated by Bidders. The adjusting amount will be determined at the rate set forth in the Agreement for liquidated damages for failing to achieve Substantial Completion, or such other amount that Owner has designated in the Bid Form.
 - 1. The method for calculating the lowest bid for comparison will be the summation of the Bid price shown in the Bid Form plus the product of the Bidder-specified time of Substantial Completion in calendar days times the rate for liquidated damages in dollars per day.
 - 2. This procedure is only used to determine the lowest bid for comparison and contractor selection purposes. The Contract Price for compensation and payment purposes remains the Bid price shown in the Bid Form.
- 18.06 In evaluating whether a Bidder is responsible, Owner will consider the qualifications of the Bidder and may consider the qualifications and experience of Subcontractors and Suppliers proposed for those portions of the Work for which the identity of Subcontractors and Suppliers must be submitted as provided in the Bidding Documents.
- 18.07 Owner may conduct such investigations as Owner deems necessary to establish the responsibility, qualifications, and financial ability of Bidders and any proposed Subcontractors or Suppliers.

ARTICLE 19—BONDS AND INSURANCE

- 19.01 Article 6 of the General Conditions, as may be modified by the Supplementary Conditions, sets forth Owner's requirements as to performance and payment bonds, other required bonds (if any), and insurance. When the Successful Bidder delivers the executed Agreement to Owner, it must be accompanied by required bonds and insurance documentation.
- 19.02 Article 8, Bid Security, of these Instructions, addresses any requirements for providing bid bonds as part of the bidding process.

ARTICLE 20—SIGNING OF AGREEMENT

- 20.01 When Owner issues a Notice of Award to the Successful Bidder, it will be accompanied by the unexecuted counterparts of the Agreement along with the other Contract Documents as identified in the Agreement. Within 15 days thereafter, Successful Bidder must execute and deliver the required number of counterparts of the Agreement and any bonds and insurance documentation required to be delivered by the Contract Documents to Owner. Within 15 days

thereafter, Owner will deliver one fully executed counterpart of the Agreement to Successful Bidder, together with printed and electronic copies of the Contract Documents as stated in Paragraph 2.02 of the General Conditions.

ARTICLE 21—SALES AND USE TAXES

21.01 Owner is exempt from **COLORADO** state sales and use taxes on materials and equipment to be incorporated in the Work. (Exemption No. **98-03536**). Said taxes must not be included in the Bid. Refer to Paragraph SC-7.10 of the Supplementary Conditions for additional information.

ARTICLE 22—CONTRACTS TO BE ASSIGNED [NONE]

BID FORM FOR CONSTRUCTION CONTRACT

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.

ARTICLE 1—OWNER AND BIDDER

- 1.01 This Bid is submitted to: SUMMIT COUNTY RESOURCE ALLOCATION PARK, 639 Landfill Road, Dillon, Colorado, 80435
- 1.02 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.

ARTICLE 2—ATTACHMENTS TO THIS BID

- 2.01 The following documents are submitted with and made a condition of this Bid:
- A. Required Bid security;
 - B. List of Proposed Subcontractors;
 - C. List of Proposed Suppliers;
 - D. Evidence of authority to do business in the state of the Project; or a written covenant to obtain such authority within the time for acceptance of Bids;
 - E. Contractor's license number as evidence of Bidder's State Contractor's License or a covenant by Bidder to obtain said license within the time for acceptance of Bids;
 - F. Required Bidder Qualification Statement with supporting data; and
 - G. [List other documents and edit above as pertinent].

ARTICLE 3—BASIS OF BID—LUMP SUM BID AND UNIT PRICES

- 3.01 *Unit Price Bids*
- A. Bidder will perform the following Work at the indicated unit prices:

Bid Form - See following pages for Scope of Work / Bid Item Descriptions

SUMMIT COUNTY LANDFILL AREA IV PHASE 6 CONSTRUCTION - BASE BID

Item #	Description	Quantity	Unit		Unit Price	Total Price
1	Mobilization					
a	Mobilization	1	EA			
					Subtotal 1	
2	Area IV Phase 6					
a	Soil Excavation • Infootprint: 52,500 CY • Outside Footprint: 10,300 CY	62,800	CY			
b	Tie-in Waste Removal	15,000	CY			
c	Structural Fill • Infootprint: 7,500 CY • Outside Footprint: 4,300 CY	11,800	CY			
d	Subgrade Preparation for Soil Layer	170,000	Sq. Feet			
e	Foundation Layer Material (Below GCL, See Detail L1)	6,300	CY			
f	Anchor Trench Excavation and Fill • Pre-1979 Landfill Tie-in (See Detail L8): 360 LF • Area III Phase 4 Tie-in (See Detail L9): 300 LF	660	LF			
g	Liner Tie-in - Area IV Phases 4 & 5	570	LF			
h	Leachate Collection Trench • Perforated Pipe With Drainage Stone Wrapped in Geotextile	990	LF			
i.1	Groundwater Interceptor Trench • Perforated Pipe With Drainage Stone Wrapped in Geotextile	1,130	LF			
i.2	Groundwater Interceptor Trench • Solid Wall Pipe to Existing Header	240	LF			
j	60-mil HDPE Textured Geomembrane	210,450	Sq. Feet			
k	Geosynthetic Clay Liner (GCL)	210,450	Sq. Feet			
l	Double Sided Geocomposite (220-2-6)	219,600	Sq. Feet			
m	Operations Layer Material	6,300	CY			
n*	Termination Berm • Berm Facing North: 265 LF • Berm Between Phases 6 & 7: 325 LF*	590	LF			
o	CMP Culvert	50	LF			
p	Aggregate Surfacing	400	LF			
					Subtotal 2	
Total - Phase 6						

* Item (full or partial quantity) with indicator may only be bid if Phases 6 and 7 are constructed in separate events.

SUMMIT COUNTY LANDFILL AREA IV PHASE 7 CONSTRUCTION - FOR ALTERNATE BID

1	Mobilization					
a*	Mobilization	1	EA			
						Subtotal 1
2	Area IV Phase 7	---	---		---	---
a	Soil Excavation • Infootprint: 12,400 CY • Outside Footprint: 8,000 CY	20,400	CY			
b	Bid Item Not Applicable to Area IV Phase 7					
c	Structural Fill • Infootprint: 3,500 CY • Outside Footprint: 0 CY	3,500	CY			
d	Subgrade Preparation for Soil Layer	181,000	Sq. Feet			
e	Foundation Layer Material (Below GCL, See Detail L1)	6,800	CY			
f	Anchor Trench Excavation and Fill (See Detail L4)	185	LF			
g*	Liner Tie-in • Area IV Phase 5: 850 LF • Area IV Phase 6: 325 LF*	1,175	LF			
h	Leachate Collection Trench • Perforated Pipe With Drainage Stone Wrapped in Geotextile	450	LF			
i	Groundwater Interceptor Trench • Perforated Pipe With Drainage Stone Wrapped in Geotextile	860	LF			
j	60-mil HDPE Textured Geomembrane	225,400	Sq. Feet			
k	Geosynthetic Clay Liner (GCL)	225,400	Sq. Feet			
l	Double Sided Geocomposite (220-2-6)	235,200	Sq. Feet			
m	Operations Layer Material	6,800	CY			
n	Termination Berm	1,050	LF			
o	CMP Culvert	150	LF			
p	Bid Item Not Applicable to Area IV Phase 7					
						Subtotal 2
Total - Phase 7						

* Item (full or partial quantity) with indicator may only be bid if Phases 6 and 7 are constructed in separate events.

Base Bid total	Phase 6 only	\$ _____
Alternate Bid total	Both Phase 6 and Phase 7	\$ _____

SCOPE OF WORK

1.1 CONTRACTOR'S SCOPE OF WORK

The CONTRACTOR shall furnish all labor, materials, and equipment for the construction of the work as shown and indicated on the drawings and described in the Technical Specifications. The scope of work covered by this Contract includes, but is not necessarily limited to, the following:

1. **(See Item 1a of Bid Worksheet)** – Furnish all transportation, equipment, and labor required to supply all materials and equipment at the site. CONTRACTOR will be required to unload any geosynthetic materials for cell construction. CONTRACTOR is also responsible for not damaging any geosynthetic materials during the unloading process. The mobilization/demobilization shall not exceed 5% of the total cost. A maximum of 60% of the total mobilization/demobilization cost can be billed with the first application for payment. No more than 10% of the total mobilization/demobilization cost can be billed on subsequent applications for payment. The final 10% of the total mobilization/demobilization cost can not be billed until completion all work items, demobilization of equipment and any unused materials, and leaving allocated work areas, including borrow sources, haul roads and stockpiles, in a satisfactory condition.
2. **(See Item 2a of Bid Worksheet)** – Furnish materials, labor, and equipment necessary to excavate the construction area to the lines and grades specified in the drawings and haul excavated materials to a stockpile location as directed by the OWNER. CONTRACTOR to secure an offsite water source. This item includes the transportation of all water to the site needed for dust control, liner construction, etc.
3. **(See Item 2b of Bid Worksheet)** – Furnish materials, labor, and equipment necessary to relocate any waste encountered during the exposure and preparation of the existing tie-in. CONTRACTOR shall transport the removed waste to the landfill active waste disposal area as designated by the OWNER. CONTRACTOR shall notify site personnel if waste is encountered, and if the waste removal is expected to exceed 15,000 CY. This Item is an estimated quantity. Please provide a unit rate for waste removal. Pay quantities will be verified via survey during construction.
4. **(See Item 2c of Bid Worksheet)** – Furnish materials, labor, and equipment necessary to excavate, haul, place, and compact the structural fill to the lines and grades shown on the drawings and as described and indicated in the Technical Specifications. CONTRACTOR to secure an offsite water source. The OWNER will supply the materials for the structural fill. This item includes the transportation of all water to the site needed for dust control, liner construction, etc.

5. **(See Item 2d of Bid Worksheet)** – Furnish materials, labor, and equipment necessary to coordinate and prepare the top of the subgrade surface for the installation of the soil layer, as described and indicated in the Technical Specifications. The CONTRACTOR shall remove rocks, organic materials, protruding waste, and other deleterious materials from the subgrade as described and indicated in the Technical Specifications. Removed rocks, organic materials, etc., shall be placed in the “active waste disposal area.” The CONTRACTOR shall protect the subgrade from desiccation, flooding, and freezing. Protection, if required, may consist of a thin plastic protective cover (or other material as approved by the OWNER) installed over the completed subgrade until such time as the placement of the subsequent soil layer begins. Subgrades found to have desiccation cracks greater than ½ inch in width or depth, or which exhibit swelling, heaving or other similar conditions shall be replaced or reworked by the CONTRACTOR at no additional cost to the OWNER to remove these defects. CONTRACTOR is to secure an offsite water source. This item includes the transportation of all water to the site needed for dust control, liner construction, etc.
6. **(See Item 2e of Bid Worksheet)** –Furnish materials, labor, and equipment necessary to excavate, haul, place, and compact the foundation layer to the lines and grades shown on the drawings and as described and indicated in the Technical Specifications. The CONTRACTOR shall remove rocks, organic materials, protruding waste, and other deleterious materials from the soil fill layer as described and indicated in the Technical Specifications. Removed rocks, organic materials, etc., shall be placed in the “active waste disposal area.” The CONTRACTOR is responsible for maintaining and repairing the soil fill layer from desiccation, flooding, and freezing. CONTRACTOR is to secure an offsite water source. This item includes the transportation of all water to the site needed for dust control, liner construction, etc.
7. **(See Item 2f of Bid Worksheet)** – Furnish materials, labor, and equipment necessary to excavate the anchor trench, place structural fill in the anchor trench, and prepare the anchor trench subgrade as shown on the drawings and as indicated in the Technical Specifications.
8. **(See Item 2g of Bid Worksheet)** – Furnish materials, labor, and equipment necessary to coordinate and construct the tie-in to the existing adjacent phase liner system. This item is inclusive of the tie-in for the soil layer, Geosynthetic clay liner (GCL), 60-mil high density polyethylene (HDPE) textured geomembrane, geocomposite, and the operations layer, as shown on the drawings and using the methodologies indicated in the Technical Specifications. CONTRACTOR to secure an offsite water source. This item includes the transportation of all water to the site needed for dust control, liner construction, etc.

9. **(See Item 2h of Bid Worksheet)** – Furnish materials, labor, and equipment necessary for the construction and installation of the leachate collection pipe (including welding), the drainage aggregate that surrounds the collection pipe, and the geotextile wrap that encompasses the drainage aggregate around the leachate collection pipe to the lines and grades shown on the drawings and as described and indicated in the Technical Specifications. The CONTRACTOR shall supply all materials. This line item will be paid based on plan quantity, not quantity placed.
10. **(See Item 2i of Bid Worksheet)** – Furnish materials, labor, and equipment necessary to excavate, haul, and wrap the drainage aggregate and groundwater interceptor pipe with geotextile and place the interceptor system as shown on the drawings and as described and indicated in the Technical Specifications. Outside the footprint, this item will only consist of excavation, backfilling, and installation (welding) of solid wall interceptor pipe to gravity feed to the existing header. Item includes the location and tie-in to the existing groundwater header pipe. The CONTRACTOR shall supply all materials. This line item will be paid based on plan quantity, not quantity placed.
11. **(See Item 2j of Bid Worksheet)** – Furnish materials, labor, and equipment necessary for purchase, transportation, storage, and installation of the 60-mil HDPE Textured Geomembrane to construct the phase as shown on the drawings and as described and indicated in the Technical Specifications. This line item will be paid based on plan quantity, not quantity placed. The CONTRACTOR shall be responsible for any defects in the material or defects encountered during placement. CONTRACTOR shall repair or replace any defects at no additional cost to the OWNER.
12. **(See Items 2k of Bid Worksheet)** – Furnish materials, labor, and equipment necessary for purchase, transportation, storage, and installation of the Geosynthetic Clay Liner (GCL) to construct the phase as shown on the drawings and as described and indicated in the Technical Specifications. This line item will be paid based on plan quantity, not quantity placed. The CONTRACTOR shall be responsible for any defects in the material or defects encountered during placement. CONTRACTOR shall repair or replace any defects at no additional cost to the OWNER.
13. **(See Items 2l of Bid Worksheet)** – Furnish materials, labor, and equipment necessary for purchase, transportation, storage, and installation of the double sided geocomposite (220-2-6) for the leachate collection system as shown on the drawings and as described and indicated in the Technical Specifications. The CONTRACTOR shall be responsible for any defects in the material or defects encountered during placement. CONTRACTOR shall repair or replace any defects at no additional cost to the OWNER. This line item will be paid based on plan quantity, not quantity placed.

- 14. (See Items 2m of Bid Worksheet)** – Furnish materials, labor, and equipment necessary to excavate, haul, and place the operations layer material to the lines and grades shown on the drawings and as described and indicated in the Technical Specifications. The OWNER will supply the operations layer soil.
- 15. (See Items 2n of Bid Worksheet)** – Furnish materials, labor, and equipment necessary to excavate, haul, place, and compact the select soil/shale material used for the termination berm to the lines and grades shown on the drawings and as described and indicated in the Technical Specifications. CONTRACTOR to secure an offsite water source. The OWNER will provide a borrow source location to source the fill for the termination berm. This item includes the transportation of all water to the site needed for dust control, liner construction, etc.
- 16. (See Items 2o of Bid Worksheet)** – Furnish materials, labor, and equipment necessary to supply and install the CMP culverts in the locations shown on the drawings.
- 17. (See Items 2p of Bid Worksheet)** – Furnish materials, labor, and equipment necessary to supply and install the aggregate surfacing for the access road and truck pad to the lines and grades as shown on the drawings.

B. Bidder acknowledges that:

1. each Bid Unit Price includes an amount considered by Bidder to be adequate to cover Contractor's overhead and profit for each separately identified item, and
2. estimated quantities are not guaranteed, and are solely for the purpose of comparison of Bids, and final payment for all Unit Price Work will be based on actual quantities, determined as provided in the Contract Documents.

ARTICLE 4—TIME OF COMPLETION

- 4.01 Bidder agrees that the Work 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.
- 4.02 Bidder agrees that the Work will be substantially complete on or before October 15th, 2026 and will be completed and ready for final payment in accordance with Paragraph 15.06 of the General Conditions on or before October 31, 2026

ARTICLE 5—BIDDER'S ACKNOWLEDGEMENTS: ACCEPTANCE PERIOD, INSTRUCTIONS, AND RECEIPT OF ADDENDA

5.01 *Bid Acceptance Period*

- A. 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.

5.02 *Instructions to Bidders*

- A. Bidder accepts all of the terms and conditions of the Instructions to Bidders, including without limitation those dealing with the disposition of Bid security.

5.03 *Receipt of Addenda*

- A. Bidder hereby acknowledges receipt of the following Addenda:

Addendum Number	Addendum Date

ARTICLE 6—BIDDER'S REPRESENTATIONS AND CERTIFICATIONS

6.01 *Bidder's Representations*

- A. In submitting this Bid, Bidder represents the following:
1. Bidder has examined and carefully studied the Bidding Documents, including Addenda.
 2. Bidder has visited the Site, conducted a thorough visual examination of the Site and adjacent areas, and become familiar with the general, local, and Site conditions that may affect cost, progress, and performance of the Work.
 3. Bidder is familiar with all Laws and Regulations that may affect cost, progress, and performance of the Work.
 4. Bidder has carefully studied the reports of explorations and tests of subsurface conditions at or adjacent to the Site and the drawings of physical conditions relating to existing surface or subsurface structures at the Site that have been identified in the Supplementary Conditions, with respect to the Technical Data in such reports and drawings.
 5. Bidder has carefully studied the reports and drawings relating to Hazardous Environmental Conditions, if any, at or adjacent to the Site that have been identified in the Supplementary Conditions, with respect to Technical Data in such reports and drawings.
 6. Bidder has considered the information known to Bidder itself; 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 Technical Data identified in the Supplementary Conditions or by definition, with respect to the effect of such information, observations, and Technical Data on (a) the cost, progress, and performance of the Work; (b) the means, methods, techniques, sequences, and procedures of construction to be employed by Bidder, if selected as Contractor; and (c) Bidder's (Contractor's) safety precautions and programs.

7. Based on the information and observations referred to in the preceding paragraph, Bidder agrees that no 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.
8. 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.
9. Bidder has given Engineer written notice of all conflicts, errors, ambiguities, or discrepancies that Bidder has discovered in the Bidding Documents, and of discrepancies between Site conditions and the Contract Documents, and the written resolution thereof by Engineer is acceptable to Contractor.
10. The Bidding Documents are generally sufficient to indicate and convey understanding of all terms and conditions for performance and furnishing of the Work.
11. The submission of this Bid constitutes an incontrovertible representation by Bidder that without exception the Bid and all prices in the Bid are premised upon performing and furnishing the Work required by the Bidding Documents.

6.02 *Bidder's Certifications*

A. The Bidder certifies the following:

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.
2. Bidder has not directly or indirectly induced or solicited any other Bidder to submit a false or sham Bid.
3. Bidder has not solicited or induced any individual or entity to refrain from bidding.
4. Bidder has not engaged in corrupt, fraudulent, collusive, or coercive practices in competing for the Contract. For the purposes of this Paragraph 8.02.A:
 - a. 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.
 - b. 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 non-competitive levels, or (c) to deprive Owner of the benefits of free and open competition.
 - c. 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, non-competitive levels.
 - d. 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.

BIDDER hereby submits this Bid as set forth above:

Bidder:

(typed or printed name of organization)

By:

(individual's signature)

Name:

(typed or printed)

Title:

(typed or printed)

Date:

(typed or printed)

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

Attest:

(individual's signature)

Name:

(typed or printed)

Title:

(typed or printed)

Date:

(typed or printed)

Address for giving notices:

Bidder's Contact:

Name:

(typed or printed)

Title:

(typed or printed)

Phone:

Email:

Address:

Bidder's Contractor License No.: (if applicable)

NOTICE OF AWARD

Date of Issuance:

Owner: Summit County Resource Allocation Park

Owner's Project No.:

Engineer: Weaver Consultants Group

Engineer's Project No.:

Project: SCRAP Fill Area IV Phases 6 and 7

Contract Name:

Bidder:

Bidder's Address:

You are notified that Owner has accepted your Bid dated [date] for the above Contract, and that you are the Successful Bidder and are awarded a Contract for:

[Describe Work, alternates, or sections of Work awarded]

The Contract Price of the awarded Contract is \$[Contract Price]. Contract Price is subject to adjustment based on the provisions of the Contract, including but not limited to those governing changes, Unit Price Work, and Work performed on a cost-plus-fee basis, as applicable.

[Number of copies sent] unexecuted counterparts of the Agreement accompany this Notice of Award, and one copy of the Contract Documents accompanies this Notice of Award, or has been transmitted or made available to Bidder electronically.

☐ Drawings will be delivered separately from the other Contract Documents.

You must comply with the following conditions precedent within 15 days of the date of receipt of this Notice of Award:

1. Deliver to Owner [number of copies sent] counterparts of the Agreement, signed by Bidder (as Contractor).
2. Deliver with the signed Agreement(s) the Contract security (such as required performance and payment bonds) and insurance documentation, as specified in the Instructions to Bidders and in the General Conditions, Articles 2 and 6.
3. Other conditions precedent (if any): [Describe other conditions that require Successful Bidder's compliance]

Failure to comply with these conditions within the time specified will entitle Owner to consider you in default, annul this Notice of Award, and declare your Bid security forfeited.

Within 10 days after you comply with the above conditions, Owner will return to you one fully signed counterpart of the Agreement, together with any additional copies of the Contract Documents as indicated in Paragraph 2.02 of the General Conditions.

Owner: Summit County Government

By (signature): _____

Name (printed): _____

Title: _____

Copy: Engineer

AGREEMENT BETWEEN OWNER AND CONTRACTOR FOR CONSTRUCTION CONTRACT (STIPULATED PRICE)

This Agreement is by and between **Summit County Government** ("Owner") and **[name of contracting entity]** ("Contractor").

Terms used in this Agreement have the meanings stated in the General Conditions and the Supplementary Conditions.

Owner and Contractor hereby agree as follows:

ARTICLE 1—WORK

- 1.01 Contractor shall complete all Work as specified or indicated in the Contract Documents. The Work is generally described as follows: **[Brief description of Work]**

ARTICLE 2—THE PROJECT

- 2.01 The Project, of which the Work under the Contract Documents is a part, is generally described as follows: **[Brief description of Project]**

ARTICLE 3—ENGINEER

- 3.01 **The County Engineer and/or his or her designee** ("Engineer") is Owner's representative for the purposes of this Agreement, and assumes all duties and responsibilities of Engineer, and have the rights and authority assigned to Engineer in the Contract.
- 3.02 The part of the Project that pertains to the Work has been designed by **[insert "Engineer" if an entity has been identified as such in Paragraph 3.01, and that same entity prepared the design; or indicate by name the entity other than Engineer that prepared the design]**.

Commented [KA1]: This will be project dependent, and may not be a necessary paragraph depending

ARTICLE 4—CONTRACT TIMES

- 4.01 *Time is of the Essence*
- A. All 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.
- 4.02 *Contract Times: Dates*
- A. The Work will be substantially complete on or before **[date]**, and completed and ready for final payment in accordance with Paragraph 15.06 of the General Conditions on or before **[date]**.
- 4.03 *Contract Times: Days*
- A. The Work will be substantially complete within **[number]** days after the date when the Contract Times commence to run as provided in Paragraph 4.01 of the General Conditions, and completed and ready for final payment in accordance with Paragraph 15.06 of the General Conditions within **[number]** days after the date when the Contract Times commence to run.

4.04 Milestones

A. Parts of the Work must be substantially completed on or before the following Milestone(s):

1. Milestone 1 [event & date/days]
2. Milestone 2 [event & date/days]
3. Milestone 3 [event & date/days]

ARTICLE 5—CONTRACT PRICE

5.01 Owner shall pay Contractor for completion of the Work in accordance with the Contract Documents, the amounts that follow, subject to adjustment under the Contract:

A. For all Work, at the prices stated in Contractor's Bid, attached hereto as an exhibit.

ARTICLE 6—PAYMENT PROCEDURES

6.01 Submittal and Processing of Payments

A. 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.

6.02 Progress Payments; Retainage

A. Owner shall make progress payments on the basis of Contractor's Applications for Payment on or about the [ordinal number, such as 5th] day of each month during performance of the Work as provided in Paragraph 6.02.A.1 below, provided that such Applications for Payment have been submitted in a timely manner and otherwise meet the requirements of the Contract. All such payments will be measured by the Schedule of Values established as provided in 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 elsewhere in the Contract.

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 Owner may withhold, including but not limited to liquidated damages, in accordance with the Contract.

a. 95 percent of the value of the Work completed (with the balance being retainage).

b. 95 percent of cost of materials and equipment not incorporated in the Work (with the balance being retainage).

B. Upon Substantial Completion, Owner shall pay an amount sufficient to increase total payments to Contractor to [number] percent of the Work completed, less such amounts set off by Owner pursuant to Paragraph 15.01.E of the General Conditions, and less [number] percent of Engineer's estimate of the value of Work to be completed or corrected as shown on the punch list of items to be completed or corrected prior to final payment.

Commented [KA2]: This is the minimum allowed under state statute, we could do more if we feel it's appropriate

6.03 Final Payment

- A. Upon final completion and acceptance of the Work, Owner shall pay the remainder of the Contract Price in accordance with Paragraph 15.06 of the General Conditions.

6.04 Consent of Surety

- A. Owner will not make final payment, or return or release retainage at Substantial Completion or any other time, unless Contractor submits written consent of the surety to such payment, return, or release.

6.05 Interest

- A. All amounts not paid when due will bear interest at the rate of 15% percent per annum.

ARTICLE 7—CONTRACT DOCUMENTS

7.01 Contents

- A. The Contract Documents consist of all of the following:
 - 1. This Agreement.
 - 2. Bonds:
 - a. Performance bond (together with power of attorney).
 - b. Payment bond (together with power of attorney).
 - 3. General Conditions.
 - 4. Supplementary Conditions.
 - 5. Specifications as listed in the table of contents of the project manual (copy of list attached).
 - 6. Drawings (not attached but incorporated by reference) consisting of [number] sheets with each sheet bearing the following general title: [title on Drawings].
 - 8. Addenda (numbers [number] to [number], inclusive).
 - 9. Exhibits to this Agreement (enumerated as follows):
 - a. [list exhibits]
 - 10. The following which may be delivered or issued on or after the Effective Date of the Contract and are not attached hereto:
 - a. Notice to Proceed.
 - b. Work Change Directives.
 - c. Change Orders.
 - d. Field Orders.
 - e. Warranty Bond, if any.
- B. The Contract Documents listed in Paragraph 7.01.A are attached to this Agreement (except as expressly noted otherwise above).
- C. There are no Contract Documents other than those listed above in this Article 7.

- D. The Contract Documents may only be amended, modified, or supplemented as provided in the Contract.

ARTICLE 8—REPRESENTATIONS, CERTIFICATIONS, AND STIPULATIONS

8.01 Contractor's Representations

- A. In order to induce Owner to enter into this Contract, Contractor makes the following representations:
1. Contractor has examined and carefully studied the Contract Documents, including Addenda.
 2. Contractor has visited the Site, conducted a thorough visual examination of the Site and adjacent areas, and become familiar with the general, local, and Site conditions that may affect cost, progress, and performance of the Work.
 3. Contractor is familiar with all Laws and Regulations that may affect cost, progress, and performance of the Work.
 4. Contractor has carefully studied the reports of explorations and tests of subsurface conditions at or adjacent to the Site and the drawings of physical conditions relating to existing surface or subsurface structures at the Site that have been identified in the Supplementary Conditions, with respect to the Technical Data in such reports and drawings.
 5. Contractor has carefully studied the reports and drawings relating to Hazardous Environmental Conditions, if any, at or adjacent to the Site that have been identified in the Supplementary Conditions, with respect to Technical Data in such reports and drawings.
 6. Contractor has considered the information known to Contractor itself; 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 the Technical Data identified in the Supplementary Conditions or by definition, with respect to the effect of such information, observations, and Technical Data on (a) the cost, progress, and performance of the Work; (b) the means, methods, techniques, sequences, and procedures of construction to be employed by Contractor; and (c) Contractor's safety precautions and programs.
 7. Based on the information and observations referred to in the preceding paragraph, Contractor agrees that no 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.
 8. 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.
 9. Contractor has given Engineer written notice of all conflicts, errors, ambiguities, or discrepancies that Contractor has discovered in the Contract Documents, and of discrepancies between Site conditions and the Contract Documents, and the written resolution thereof by Engineer is acceptable to Contractor.

10. The Contract Documents are generally sufficient to indicate and convey understanding of all terms and conditions for performance and furnishing of the Work.
11. Contractor's entry into this Contract constitutes an incontrovertible representation by Contractor that without exception all prices in the Agreement are premised upon performing and furnishing the Work required by the Contract Documents.

8.02 *Contractor's Certifications*

- A. 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 8.02:
 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 the Contract execution;
 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 prices at artificial non-competitive levels, or (c) to deprive Owner of the benefits of free and open competition;
 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, non-competitive levels; and
 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.

8.03 *Standard General Conditions*

- A. Owner stipulates that if the General Conditions that are made a part of this Contract are EJCDC® C-700, Standard General Conditions for the Construction Contract (2018), published by the Engineers Joint Contract Documents Committee, and if Owner is the party that has furnished said General Conditions, then Owner has plainly shown all modifications to the standard wording of such published document to the Contractor, through a process such as highlighting or "track changes" (redline/strikeout), or in the Supplementary Conditions.

IN WITNESS WHEREOF, Owner and Contractor have signed this Agreement.

This Agreement will be effective on **[indicate date on which Contract becomes effective]** (which is the Effective Date of the Contract).

Owner:

(typed or printed name of organization)

By:

(individual's signature)

Date:

(date signed)

Name:

(typed or printed)

Title:

(typed or printed)

Attest:

(individual's signature)

Title:

(typed or printed)

Address for giving notices:

Designated Representative:

Name:

(typed or printed)

Title:

(typed or printed)

Address:

Phone:

Email:

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

Contractor:

(typed or printed name of organization)

By:

(individual's signature)

Date:

(date signed)

Name:

(typed or printed)

Title:

(typed or printed)

(If [Type of Entity] is a corporation, a partnership, or a joint venture, attach evidence of authority to sign.)

Attest:

(individual's signature)

Title:

(typed or printed)

Address for giving notices:

Designated Representative:

Name:

(typed or printed)

Title:

(typed or printed)

Address:

Phone:

Email:

License No.:

(where applicable)

State:

NOTICE TO PROCEED

Owner: Summit County Government Owner's Project No.: _____
Engineer: Weaver Consultant Group Engineer's Project No.: _____
Contractor: _____ Contractor's Project No.: _____
Project: SCRAP Fill Area IV Phases 6 and 7
Contract Name: _____
Effective Date of Contract: _____

Owner hereby notifies Contractor that the Contract Times under the above Contract will commence to run on **[date Contract Times are to start]** pursuant to Paragraph 4.01 of the General Conditions.

On that date, Contractor shall start performing its obligations under the Contract Documents. No Work will be done at the Site prior to such date.

In accordance with the Agreement: **[Select one of the following two alternatives, insert dates or number of days, and delete the other alternative.]**

The date by which Substantial Completion must be achieved is **[date for Substantial Completion, from Agreement]**, and the date by which readiness for final payment must be achieved is **[date for readiness, from Agreement]**.

[or]

The number of days to achieve Substantial Completion is **[number of days, from Agreement]** from the date stated above for the commencement of the Contract Times, resulting in a date for Substantial Completion of **[date, calculated from commencement date above]**; and the number of days to achieve readiness for final payment is **[number of days, from Agreement]** from the commencement date of the Contract Times, resulting in a date for readiness for final payment of **[date, calculated from commencement date above]**.

Before starting any Work at the Site, Contractor must comply with the following:

[Note any access limitations, security procedures, or other restrictions]

Owner: Summit County Government
By (signature): _____
Name (printed): _____
Title: _____
Date Issued: _____

Copy: Engineer

PERFORMANCE BOND

Contractor Name: [Full formal name of Contractor] Address <i>(principal place of business)</i> : [Address of Contractor's principal place of business]	Surety Name: [Full formal name of Surety] Address <i>(principal place of business)</i> : [Address of Surety's principal place of business]
Owner Name: Summit County Government Mailing address <i>(principal place of business)</i> : P.O. Box 68 Breckenridge, CO 80424	Contract Description <i>(name and location)</i> : [Owner's project/contract name, and location of the project] Contract Price: [Amount from Contract] Effective Date of Contract: [Date from Contract]
Bond Bond Amount: [Amount] Date of Bond: [Date] <i>(Date of Bond cannot be earlier than Effective Date of Contract)</i> Modifications to this Bond form: ☐ None ☐ See Paragraph 16	
Surety and Contractor, intending to be legally bound hereby, subject to the terms set forth in this Performance Bond, do each cause this Performance Bond to be duly executed by an authorized officer, agent, or representative.	
Contractor as Principal <i>(Full formal name of Contractor)</i> By: _____ <i>(Signature)</i> Name: _____ <i>(Printed or typed)</i> Title: _____ Attest: _____ <i>(Signature)</i> Name: _____ <i>(Printed or typed)</i> Title: _____	Surety <i>(Full formal name of Surety) (corporate seal)</i> By: _____ <i>(Signature)(Attach Power of Attorney)</i> Name: _____ <i>(Printed or typed)</i> Title: _____ Attest: _____ <i>(Signature)</i> Name: _____ <i>(Printed or typed)</i> Title: _____
Notes: (1) Provide supplemental execution by any additional parties, such as joint venturers. (2) Any singular reference to Contractor, Surety, Owner, or other party is considered plural where applicable.	

1. The Contractor and Surety, jointly and severally, bind themselves, their heirs, executors, administrators, successors, and assigns to the Owner for the performance of the Construction Contract, which is incorporated herein by reference.
2. If the Contractor performs the Construction Contract, the Surety and the Contractor shall have no obligation under this Bond, except when applicable to participate in a conference as provided in Paragraph 3.
3. If there is no Owner Default under the Construction Contract, the Surety's obligation under this Bond will arise after:
 - 3.1. The Owner first provides notice to the Contractor and the Surety that the Owner is considering declaring a Contractor Default. Such notice may indicate whether the Owner is requesting a conference among the Owner, Contractor, and Surety to discuss the Contractor's performance. If the Owner does not request a conference, the Surety may, within five (5) business days after receipt of the Owner's notice, request such a conference. If the Surety timely requests a conference, the Owner shall attend. Unless the Owner agrees otherwise, any conference requested under this Paragraph 3.1 will be held within ten (10) business days of the Surety's receipt of the Owner's notice. If the Owner, the Contractor, and the Surety agree, the Contractor shall be allowed a reasonable time to perform the Construction Contract, but such an agreement does not waive the Owner's right, if any, subsequently to declare a Contractor Default;
 - 3.2. The Owner declares a Contractor Default, terminates the Construction Contract and notifies the Surety; and
 - 3.3. The Owner has agreed to pay the Balance of the Contract Price in accordance with the terms of the Construction Contract to the Surety or to a contractor selected to perform the Construction Contract.
4. Failure on the part of the Owner to comply with the notice requirement in Paragraph 3.1 does not constitute a failure to comply with a condition precedent to the Surety's obligations, or release the Surety from its obligations, except to the extent the Surety demonstrates actual prejudice.
5. When the Owner has satisfied the conditions of Paragraph 3, the Surety shall promptly and at the Surety's expense take one of the following actions:
 - 5.1. Arrange for the Contractor, with the consent of the Owner, to perform and complete the Construction Contract;
 - 5.2. Undertake to perform and complete the Construction Contract itself, through its agents or independent contractors;
 - 5.3. Obtain bids or negotiated proposals from qualified contractors acceptable to the Owner for a contract for performance and completion of the Construction Contract, arrange for a contract to be prepared for execution by the Owner and a contractor selected with the Owners concurrence, to be secured with performance and payment bonds executed by a qualified surety equivalent to the bonds issued on the Construction Contract, and pay to the Owner the amount of damages as described in Paragraph 7 in excess of the Balance of the Contract Price incurred by the Owner as a result of the Contractor Default; or
 - 5.4. Waive its right to perform and complete, arrange for completion, or obtain a new contractor, and with reasonable promptness under the circumstances:

- 5.4.1 After investigation, determine the amount for which it may be liable to the Owner and, as soon as practicable after the amount is determined, make payment to the Owner; or
 - 5.4.2 Deny liability in whole or in part and notify the Owner, citing the reasons for denial.
- 6. If the Surety does not proceed as provided in Paragraph 5 with reasonable promptness, the Surety shall be deemed to be in default on this Bond seven days after receipt of an additional written notice from the Owner to the Surety demanding that the Surety perform its obligations under this Bond, and the Owner shall be entitled to enforce any remedy available to the Owner. If the Surety proceeds as provided in Paragraph 5.4, and the Owner refuses the payment, or the Surety has denied liability, in whole or in part, without further notice, the Owner shall be entitled to enforce any remedy available to the Owner.
- 7. If the Surety elects to act under Paragraph 5.1, 5.2, or 5.3, then the responsibilities of the Surety to the Owner will not be greater than those of the Contractor under the Construction Contract, and the responsibilities of the Owner to the Surety will not be greater than those of the Owner under the Construction Contract. Subject to the commitment by the Owner to pay the Balance of the Contract Price, the Surety is obligated, without duplication for:
 - 7.1. the responsibilities of the Contractor for correction of defective work and completion of the Construction Contract;
 - 7.2. additional legal, design professional, and delay costs resulting from the Contractor's Default, and resulting from the actions or failure to act of the Surety under Paragraph 5; and
 - 7.3. liquidated damages, or if no liquidated damages are specified in the Construction Contract, actual damages caused by delayed performance or non-performance of the Contractor.
- 8. If the Surety elects to act under Paragraph 5.1, 5.3, or 5.4, the Surety's liability is limited to the amount of this Bond.
- 9. The Surety shall not be liable to the Owner or others for obligations of the Contractor that are unrelated to the Construction Contract, and the Balance of the Contract Price will not be reduced or set off on account of any such unrelated obligations. No right of action will accrue on this Bond to any person or entity other than the Owner or its heirs, executors, administrators, successors, and assigns.
- 10. The Surety hereby waives notice of any change, including changes of time, to the Construction Contract or to related subcontracts, purchase orders, and other obligations.
- 11. Any proceeding, legal or equitable, under this Bond must be instituted in any court of competent jurisdiction in the location in which the work or part of the work is located and must be instituted within two years after a declaration of Contractor Default or within two years after the Contractor ceased working or within two years after the 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 periods of limitations available to sureties as a defense in the jurisdiction of the suit will be applicable.
- 12. Notice to the Surety, the Owner, or the Contractor must be mailed or delivered to the address shown on the page on which their signature appears.
- 13. When this Bond has been furnished to comply with a statutory or other legal requirement in the location where the construction was to be performed, any provision in this Bond conflicting with said statutory or legal requirement will be deemed deleted therefrom and provisions conforming to such

statutory or other legal requirement will be deemed incorporated herein. When so furnished, the intent is that this Bond will be construed as a statutory bond and not as a common law bond.

14. Definitions

- 14.1. *Balance of the Contract Price*—The total amount payable by the Owner to the Contractor under the Construction Contract after all proper adjustments have been made including allowance for the Contractor for any amounts received or to be received by the Owner in settlement of insurance or other claims for damages to which the Contractor is entitled, reduced by all valid and proper payments made to or on behalf of the Contractor under the Construction Contract.
 - 14.2. *Construction Contract*—The agreement between the Owner and Contractor identified on the cover page, including all Contract Documents and changes made to the agreement and the Contract Documents.
 - 14.3. *Contractor Default*—Failure of the Contractor, which has not been remedied or waived, to perform or otherwise to comply with a material term of the Construction Contract.
 - 14.4. *Owner Default*—Failure of the Owner, which has not been remedied or waived, to pay the Contractor as required under the Construction Contract or to perform and complete or comply with the other material terms of the Construction Contract.
 - 14.5. *Contract Documents*—All the documents that comprise the agreement between the Owner and Contractor.
15. If this Bond is issued for an agreement between a contractor and subcontractor, the term Contractor in this Bond will be deemed to be Subcontractor and the term Owner will be deemed to be Contractor.
16. Modifications to this Bond are as follows: **[Describe modification or enter "None"]**

PAYMENT BOND

Contractor Name: [Full formal name of Contractor] Address <i>(principal place of business)</i> : [Address of Contractor's principal place of business]	Surety Name: [Full formal name of Surety] Address <i>(principal place of business)</i> : [Address of Surety's principal place of business]
Owner Name: Summit County Government Mailing address <i>(principal place of business)</i> : P.O. Box 68 Breckenridge, CO 80424	Contract Description <i>(name and location)</i> : [Owner's project/contract name, and location of the project] Contract Price: [Amount, from Contract] Effective Date of Contract: [Date, from Contract]
Bond Bond Amount: [Amount] Date of Bond: [Date] <i>(Date of Bond cannot be earlier than Effective Date of Contract)</i> Modifications to this Bond form: ☐ None ☐ See Paragraph 18	
Surety and Contractor, intending to be legally bound hereby, subject to the terms set forth in this Payment Bond, do each cause this Payment Bond to be duly executed by an authorized officer, agent, or representative.	
Contractor as Principal <i>(Full formal name of Contractor)</i> By: _____ <i>(Signature)</i> Name: _____ <i>(Printed or typed)</i> Title: _____ Attest: _____ <i>(Signature)</i> Name: _____ <i>(Printed or typed)</i> Title: _____	Surety <i>(Full formal name of Surety) (corporate seal)</i> By: _____ <i>(Signature)(Attach Power of Attorney)</i> Name: _____ <i>(Printed or typed)</i> Title: _____ Attest: _____ <i>(Signature)</i> Name: _____ <i>(Printed or typed)</i> Title: _____
Notes: (1) Provide supplemental execution by any additional parties, such as joint venturers. (2) Any singular reference to Contractor, Surety, Owner, or other party is considered plural where applicable.	

1. The Contractor and Surety, jointly and severally, bind themselves, their heirs, executors, administrators, successors, and assigns to the Owner to pay for labor, materials, and equipment furnished for use in the performance of the Construction Contract, which is incorporated herein by reference, subject to the following terms
2. If the Contractor promptly makes payment of all sums due to Claimants, and defends, indemnifies, and holds harmless the Owner from claims, demands, liens, or suits by any person or entity seeking payment for labor, materials, or equipment furnished for use in the performance of the Construction Contract, then the Surety and the Contractor shall have no obligation under this Bond.
3. If there is no Owner Default under the Construction Contract, the Surety's obligation to the Owner under this Bond will arise after the Owner has promptly notified the Contractor and the Surety (at the address described in Paragraph 13) of claims, demands, liens, or suits against the Owner or the Owner's property by any person or entity seeking payment for labor, materials, or equipment furnished for use in the performance of the Construction Contract, and tendered defense of such claims, demands, liens, or suits to the Contractor and the Surety.
4. When the Owner has satisfied the conditions in Paragraph 3, the Surety shall promptly and at the Surety's expense defend, indemnify, and hold harmless the Owner against a duly tendered claim, demand, lien, or suit.
5. The Surety's obligations to a Claimant under this Bond will arise after the following:
 - 5.1. Claimants who do not have a direct contract with the Contractor
 - 5.1.1. have furnished a written notice of non-payment to the Contractor, stating with substantial accuracy the amount claimed and the name of the party to whom the materials were, or equipment was, furnished or supplied or for whom the labor was done or performed, within ninety (90) days after having last performed labor or last furnished materials or equipment included in the Claim; and
 - 5.1.2. have sent a Claim to the Surety (at the address described in Paragraph 13).
 - 5.2. Claimants who are employed by or have a direct contract with the Contractor have sent a Claim to the Surety (at the address described in Paragraph 13).
6. If a notice of non-payment required by Paragraph 5.1.1 is given by the Owner to the Contractor, that is sufficient to satisfy a Claimant's obligation to furnish a written notice of non-payment under Paragraph 5.1.1.
7. When a Claimant has satisfied the conditions of Paragraph 5.1 or 5.2, whichever is applicable, the Surety shall promptly and at the Surety's expense take the following actions:
 - 7.1. Send an answer to the Claimant, with a copy to the Owner, within sixty (60) days after receipt of the Claim, stating the amounts that are undisputed and the basis for challenging any amounts that are disputed; and
 - 7.2. Pay or arrange for payment of any undisputed amounts.
 - 7.3. The Surety's failure to discharge its obligations under Paragraph 7.1 or 7.2 will not be deemed to constitute a waiver of defenses the Surety or Contractor may have or acquire as to a Claim, except as to undisputed amounts for which the Surety and Claimant have reached agreement. If, however, the Surety fails to discharge its obligations under Paragraph 7.1 or 7.2, the Surety shall indemnify the Claimant for the reasonable attorney's fees the Claimant incurs thereafter to recover any sums found to be due and owing to the Claimant.

8. The Surety's total obligation will not exceed the amount of this Bond, plus the amount of reasonable attorney's fees provided under Paragraph 7.3, and the amount of this Bond will be credited for any payments made in good faith by the Surety.
9. Amounts owed by the Owner to the Contractor under the Construction Contract will be used for the performance of the Construction Contract and to satisfy claims, if any, under any construction performance bond. By the Contractor furnishing and the Owner accepting this Bond, they agree that all funds earned by the Contractor in the performance of the Construction Contract are dedicated to satisfying obligations of the Contractor and Surety under this Bond, subject to the Owner's priority to use the funds for the completion of the work.
10. The Surety shall not be liable to the Owner, Claimants, or others for obligations of the Contractor that are unrelated to the Construction Contract. The Owner shall not be liable for the payment of any costs or expenses of any Claimant under this Bond, and shall have under this Bond no obligation to make payments to or give notice on behalf of Claimants, or otherwise have any obligations to Claimants under this Bond.
11. The Surety hereby waives notice of any change, including changes of time, to the Construction Contract or to related subcontracts, purchase orders, and other obligations.
12. No suit or action will be commenced by a Claimant under this Bond other than in a court of competent jurisdiction in the state in which the project that is the subject of the Construction Contract is located or after the expiration of one year from the date (1) on which the Claimant sent a Claim to the Surety pursuant to Paragraph 5.1.2 or 5.2, 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 will be applicable.
13. Notice and Claims to the Surety, the Owner, or the Contractor must be mailed or delivered to the address shown on the page on which their signature appears. Actual receipt of notice or Claims, however accomplished, will be sufficient compliance as of the date received.
14. When this Bond has been furnished to comply with a statutory or other legal requirement in the location where the construction was to be performed, any provision in this Bond conflicting with said statutory or legal requirement will be deemed deleted here from and provisions conforming to such statutory or other legal requirement will be deemed incorporated herein. When so furnished, the intent is that this Bond will be construed as a statutory bond and not as a common law bond.
15. Upon requests by any person or entity appearing to be a potential beneficiary of this Bond, the Contractor and Owner shall promptly furnish a copy of this Bond or shall permit a copy to be made.
16. Definitions
 - 16.1. *Claim*—A written statement by the Claimant including at a minimum:
 - 16.1.1. The name of the Claimant;
 - 16.1.2. The name of the person for whom the labor was done, or materials or equipment furnished;
 - 16.1.3. A copy of the agreement or purchase order pursuant to which labor, materials, or equipment was furnished for use in the performance of the Construction Contract;
 - 16.1.4. A brief description of the labor, materials, or equipment furnished;

- 16.1.5. The date on which the Claimant last performed labor or last furnished materials or equipment for use in the performance of the Construction Contract;
- 16.1.6. The total amount earned by the Claimant for labor, materials, or equipment furnished as of the date of the Claim;
- 16.1.7. The total amount of previous payments received by the Claimant; and
- 16.1.8. The total amount due and unpaid to the Claimant for labor, materials, or equipment furnished as of the date of the Claim.
- 16.2. *Claimant*—An individual or entity having a direct contract with the Contractor or with a subcontractor of the Contractor to furnish labor, materials, or equipment for use in the performance of the Construction Contract. The term Claimant also includes any individual or entity that has rightfully asserted a claim under an applicable mechanic's lien or similar statute against the real property upon which the Project is located. The intent of this Bond is to include without limitation in the terms of "labor, materials, or equipment" that part of the water, gas, power, light, heat, oil, gasoline, telephone service, or rental equipment used in the Construction Contract, architectural and engineering services required for performance of the work of the Contractor and the 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.
- 16.3. *Construction Contract*—The agreement between the Owner and Contractor identified on the cover page, including all Contract Documents and all changes made to the agreement and the Contract Documents.
- 16.4. *Owner Default*—Failure of the Owner, which has not been remedied or waived, to pay the Contractor as required under the Construction Contract or to perform and complete or comply with the other material terms of the Construction Contract.
- 16.5. *Contract Documents*—All the documents that comprise the agreement between the Owner and Contractor.
- 17. If this Bond is issued for an agreement between a contractor and subcontractor, the term Contractor in this Bond will be deemed to be Subcontractor and the term Owner will be deemed to be Contractor.
- 18. Modifications to this Bond are as follows: **[Describe modification or enter "None"]**

CERTIFICATE OF SUBSTANTIAL COMPLETION

Owner:

Engineer:

Contractor:

Project:

Contract Name:

Owner's Project No.:

Engineer's Project No.:

Contractor's Project No.:

This ☐ Preliminary ☐ Final Certificate of Substantial Completion applies to:

☐ All Work ☐ The following specified portions of the Work:

[Describe the portion of the work for which Certificate of Substantial Completion is issued]

Date of Substantial Completion: **[Enter date, as determined by Engineer]**

The Work to which this Certificate applies has been inspected by authorized representatives of Owner, Contractor, and Engineer, and found to be substantially complete. The Date of Substantial Completion of the Work or portion thereof designated above is hereby established, subject to the provisions of the Contract pertaining to Substantial Completion. The date of Substantial Completion in the final Certificate of Substantial Completion marks the commencement of the contractual correction period and applicable warranties required by the Contract.

A punch list of items to be completed or corrected is attached to this Certificate. This list may not be all-inclusive, and the failure to include any items on such list does not alter the responsibility of the Contractor to complete all Work in accordance with the Contract Documents.

Amendments of contractual responsibilities recorded in this Certificate should be the product of mutual agreement of Owner and Contractor; see Paragraph 15.03.D of the General Conditions.

The responsibilities between Owner and Contractor for security, operation, safety, maintenance, heat, utilities, insurance, and warranties upon Owner's use or occupancy of the Work must be as provided in the Contract, except as amended as follows:

Amendments to Owner's Responsibilities: ☐ None ☐ As follows:

[List amendments to Owner's Responsibilities]

Amendments to Contractor's Responsibilities: ☐ None ☐ As follows:

[List amendments to Contractor's Responsibilities]

The following documents are attached to and made a part of this Certificate:

[List attachments such as punch list; other documents]

This Certificate does not constitute an acceptance of Work not in accordance with the Contract Documents, nor is it a release of Contractor's obligation to complete the Work in accordance with the Contract Documents.

Engineer

By (signature):

Name (printed):

Title:

WORK CHANGE DIRECTIVE NO.: [Number of Work Change Directive]

Owner:	Owner's Project No.:
Engineer:	Engineer's Project No.:
Contractor:	Contractor's Project No.:
Project:	
Contract Name:	
Date Issued:	Effective Date of Work Change Directive:

Contractor is directed to proceed promptly with the following change(s):

Description:

[Description of the change to the Work]

Attachments:

[List documents related to the change to the Work]

Purpose for the Work Change Directive:

[Describe the purpose for the change to the Work]

Directive to proceed promptly with the Work described herein, prior to agreeing to change in Contract Price and Contract Time, is issued due to:

Notes to User—Check one or both of the following

☐ Non-agreement on pricing of proposed change. ☐ Necessity to proceed for schedule or other reasons.

Estimated Change in Contract Price and Contract Times (non-binding, preliminary):

Contract Price: \$ _____ **[increase] [decrease] [not yet estimated].**

Contract Time: _____ days **[increase] [decrease] [not yet estimated].**

Basis of estimated change in Contract Price:

☐ Lump Sum ☐ Unit Price ☐ Cost of the Work ☐ Other

Recommended by Engineer

Authorized by Owner

By:

Title:

Date:

_____	_____
_____	_____
_____	_____

CHANGE ORDER NO.: [Number of Change Order]

Owner:

Engineer:

Contractor:

Project:

Contract Name:

Date Issued:

Owner's Project No.:

Engineer's Project No.:

Contractor's Project No.:

Effective Date of Change Order:

The Contract is modified as follows upon execution of this Change Order:

Description:

[Description of the change]

Attachments:

[List documents related to the change]

Change in Contract Price	Change in Contract Times [State Contract Times as either a specific date or a number of days]
Original Contract Price: \$ _____	Original Contract Times: Substantial Completion: _____ Ready for final payment: _____
[Increase] [Decrease] from previously approved Change Orders No. 1 to No. [Number of previous Change Order]: \$ _____	[Increase] [Decrease] from previously approved Change Orders No.1 to No. [Number of previous Change Order]: Substantial Completion: _____ Ready for final payment: _____
Contract Price prior to this Change Order: \$ _____	Contract Times prior to this Change Order: Substantial Completion: _____ Ready for final payment: _____
[Increase] [Decrease] this Change Order: \$ _____	[Increase] [Decrease] this Change Order: Substantial Completion: _____ Ready for final payment: _____
Contract Price incorporating this Change Order: \$ _____	Contract Times with all approved Change Orders: Substantial Completion: _____ Ready for final payment: _____

Recommended by Engineer (if required)

Authorized by Owner

By: _____

Title: _____

Date: _____

Authorized by Owner

Approved by Funding Agency (if applicable)

By: _____

Title: _____

Date: _____

FIELD ORDER NO.: [Number of Field Order]

Owner:

Engineer:

Contractor:

Project:

Contract Name:

Date Issued:

Owner's Project No.:

Engineer's Project No.:

Contractor's Project No.:

Effective Date of Field Order:

Contractor is hereby directed to promptly perform the Work described in this Field Order, issued in accordance with Paragraph 11.04 of the General Conditions, for minor changes in the Work without changes in Contract Price or Contract Times. If Contractor considers that a change in Contract Price or Contract Times is required, submit a Change Proposal before proceeding with this Work.

Reference:

Specification Section(s):

Drawing(s) / Details (s):

Description:

[Description of the change to the Work]

Attachments:

[List documents supporting change]

Issued by Engineer

By: _____

Title: _____

Date: _____

STANDARD GENERAL CONDITIONS OF THE CONSTRUCTION CONTRACT

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STANDARD GENERAL CONDITIONS OF THE CONSTRUCTION CONTRACT

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 document prepared by Contractor, in a form acceptable to Engineer, to request 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; 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; 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.
- 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.
 - c. A demand or assertion by Owner or Contractor, duly submitted in compliance with the procedural requirements set forth herein, made pursuant to Paragraph 12.01.A.4, concerning disputes arising after Engineer has issued a recommendation of final payment.
 - d. 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), lead-based paint (as defined by the HUD/EPA standard), hazardous waste, and any substance, product, waste, or other material of any nature whatsoever that is or becomes listed, regulated, or addressed pursuant to Laws and Regulations 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 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. *Electronic Document*—Any Project-related correspondence, attachments to correspondence, data, documents, drawings, information, or graphics, including but not limited to Shop Drawings and other Submittals, that are in an electronic or digital format.
21. *Electronic Means*—Electronic mail (email), upload/download from a secure Project website, or other communications methods that allow: (a) the transmission or communication of Electronic Documents; (b) the documentation of transmissions, including sending and receipt; (c) printing of the transmitted Electronic Document by the

recipient; (d) the storage and archiving of the Electronic Document by sender and recipient; and (e) the use by recipient of the Electronic Document for purposes permitted by this Contract. Electronic Means does not include the use of text messaging, or of Facebook, Twitter, Instagram, or similar social media services for transmission of Electronic Documents.

22. *Engineer*—The individual or entity named as such in the Agreement.
23. *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.
24. *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.
 - a. The presence at the Site of materials that are necessary for the execution of the Work, or that are to be incorporated into the Work, and that are controlled and contained pursuant to industry practices, Laws and Regulations, and the requirements of the Contract, is not a Hazardous Environmental Condition.
 - b. The presence of Constituents of Concern that are to be removed or remediated as part of the Work is not a Hazardous Environmental Condition.
 - c. The presence of Constituents of Concern as part of the routine, anticipated, and obvious working conditions at the Site, is not a Hazardous Environmental Condition.
25. *Laws and Regulations; Laws or Regulations*—Any and all applicable laws, statutes, rules, regulations, ordinances, codes, and binding decrees, resolutions, and orders of any and all governmental bodies, agencies, authorities, and courts having jurisdiction.
26. *Liens*—Charges, security interests, or encumbrances upon Contract-related funds, real property, or personal property.
27. *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.
28. *Notice of Award*—The written notice by Owner to a Bidder of Owner's acceptance of the Bid.
29. *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.
30. *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.
31. *Progress Schedule*—A schedule, prepared and maintained by Contractor, describing the sequence and duration of the activities comprising Contractor's plan to accomplish the Work within the Contract Times.
32. *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.

33. *Resident Project Representative*—The authorized representative of Engineer assigned to assist Engineer at the Site. As used herein, the term Resident Project Representative (RPR) includes any assistants or field staff of Resident Project Representative.
34. *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.
35. *Schedule of Submittals*—A schedule, prepared and maintained by Contractor, of required submittals and the time requirements for Engineer's review of the submittals.
36. *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.
37. *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.
38. *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 or areas furnished by Owner which are designated for the use of Contractor.
39. *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.
40. *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.
41. *Submittal*—A written or graphic document, prepared by or for Contractor, which the Contract Documents require Contractor to submit to Engineer, or that is indicated as a Submittal in the Schedule of Submittals accepted by Engineer. Submittals may include Shop Drawings and Samples; schedules; product data; Owner-delegated designs; sustainable design information; information on special procedures; testing plans; results of tests and evaluations, source quality-control testing and inspections, and field or Site quality-control testing and inspections; warranties and certifications; Suppliers' instructions and reports; records of delivery of spare parts and tools; operations and maintenance data; Project photographic documentation; record documents; and other such documents required by the Contract Documents. Submittals, whether or not approved or accepted by Engineer, are not Contract Documents. Change Proposals, Change Orders, Claims, notices, Applications for Payment, and requests for interpretation or clarification are not Submittals.
42. *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 of such Work.

43. *Successful Bidder*—The Bidder to which the Owner makes an award of contract.
44. *Supplementary Conditions*—The part of the Contract that amends or supplements these General Conditions.
45. *Supplier*—A manufacturer, fabricator, supplier, distributor, 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.
46. *Technical Data*
- a. Those items expressly identified as Technical Data in the Supplementary Conditions, with respect to either (1) existing subsurface conditions at or adjacent to the Site, or existing physical conditions at or adjacent to the Site including existing surface or subsurface structures (except Underground Facilities) or (2) Hazardous Environmental Conditions at the Site.
 - b. If no such express identifications of Technical Data have been made with respect to conditions at the Site, then Technical Data is defined, with respect to conditions at the Site under Paragraphs 5.03, 5.04, and 5.06, as the data contained in boring logs, recorded measurements of subsurface water levels, assessments of the condition of subsurface facilities, laboratory test results, and other factual, objective information regarding conditions at the Site that are set forth in any geotechnical, environmental, or other Site or facilities conditions report prepared for the Project and made available to Contractor.
 - c. Information and data regarding the presence or location of Underground Facilities are not intended to be categorized, identified, or defined as Technical Data, and instead Underground Facilities are shown or indicated on the Drawings.
47. *Underground Facilities*—All active or not-in-service underground lines, pipelines, conduits, ducts, encasements, cables, wires, manholes, vaults, tanks, tunnels, or other such facilities or systems at the Site, including but not limited to those facilities or systems that produce, transmit, distribute, or convey telephone or other communications, cable television, fiber optic transmissions, power, electricity, light, heat, gases, oil, crude oil products, liquid petroleum products, water, steam, waste, wastewater, storm water, other liquids or chemicals, or traffic or other control systems. An abandoned facility or system is not an Underground Facility.
48. *Unit Price Work*—Work to be paid for on the basis of unit prices.
49. *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.
50. *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 Paragraphs 1.02.B, C, D, and E are not defined terms that require initial capital letters, but, when used in the Bidding Requirements or Contract Documents, have the indicated meaning.
- B. *Intent of Certain Terms or Adjectives:* 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:* The word “day” means a calendar day of 24 hours measured from midnight to the next midnight.
- D. *Defective:* The word “defective,” when modifying the word “Work,” refers to Work that is unsatisfactory, faulty, or deficient in that it:
1. does not conform to the Contract Documents;
 2. does not meet the requirements of any applicable inspection, reference standard, test, or approval referred to in the Contract Documents; or
 3. 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 Paragraph 15.04).
- E. *Furnish, Install, Perform, Provide*
1. The word “furnish,” when used in connection with services, materials, or equipment, means 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, means 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, means 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. *Contract Price or Contract Times*: References to a change in “Contract Price or Contract Times” or “Contract Times or Contract Price” or similar, indicate that such change applies to (1) Contract Price, (2) Contract Times, or (3) both Contract Price and Contract Times, as warranted, even if the term “or both” is not expressed.
- G. 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 Performance and Payment Bonds; Evidence of Insurance*

- A. *Performance and Payment Bonds*: When Contractor delivers the signed counterparts of the Agreement to Owner, Contractor shall also deliver to Owner the performance bond and payment bond (if the Contract requires Contractor to furnish such bonds).
- B. *Evidence of Contractor’s Insurance*: When Contractor delivers the signed counterparts of the Agreement to Owner, Contractor shall also deliver to Owner, with copies to each additional insured (as identified in the Contract), the certificates, endorsements, and other evidence of insurance required to be provided by Contractor in accordance with Article 6, except to the extent the Supplementary Conditions expressly establish other dates for delivery of specific insurance policies.
- C. *Evidence of Owner’s Insurance*: After receipt of the signed counterparts of the Agreement and all required bonds and insurance documentation, Owner shall promptly deliver to Contractor, with copies to each additional insured (as identified in the Contract), 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 signed 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 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 *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 the schedules submitted in accordance with Paragraph 2.03.A. No progress payment will 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.
 - 4. If a schedule is not acceptable, Contractor will have an additional 10 days to revise and resubmit the schedule.

2.06 *Electronic Transmittals*

- A. Except as otherwise stated elsewhere in the Contract, the Owner, Engineer, and Contractor may send, and shall accept, Electronic Documents transmitted by Electronic Means.
- B. If the Contract does not establish protocols for Electronic Means, then Owner, Engineer, and Contractor shall jointly develop such protocols.
- C. Subject to any governing protocols for Electronic Means, when transmitting Electronic Documents by Electronic Means, the transmitting party makes no representations as to long-term compatibility, usability, or readability of the Electronic Documents 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 Electronic Documents.

ARTICLE 3—CONTRACT DOCUMENTS: INTENT, REQUIREMENTS, REUSE

3.01 *Intent*

- A. The Contract Documents are complementary; what is required by one Contract Document 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 versions of the Contract Documents (including any printed copies derived from such electronic versions) and the printed record version, the printed record version will 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.
- F. Any provision or part of the Contract Documents held to be void or unenforceable under any Law or Regulation will be deemed stricken, and all remaining provisions will continue to be valid and binding upon Owner and Contractor, which agree that the Contract Documents will 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.
- G. Nothing in the Contract Documents creates:
 - 1. any contractual relationship between Owner or Engineer and any Subcontractor, Supplier, or other individual or entity performing or furnishing any of the Work, for the benefit of such Subcontractor, Supplier, or other individual or entity; or
 - 2. 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.

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, means 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, and no instruction of a Supplier, will be effective to change the duties or responsibilities of Owner, Contractor, or Engineer 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 or Engineer 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 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 issued pursuant to Paragraph 11.01.
3. Contractor shall not be liable to Owner or Engineer for failure to report any conflict, error, ambiguity, or discrepancy in the Contract Documents unless Contractor had actual knowledge thereof.

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 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 in writing 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.

- 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 notify Owner and Contractor in writing 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 versions, 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 precludes 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 30th 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 60th day after the day of Bid opening or the 30th 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 may 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 must 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 will 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 Contract Price or 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. Such an adjustment will 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 third-party utility owners or other third-party entities (other than those third-party utility owners or other third-party entities performing other work at or adjacent to the Site as arranged by or under contract with Owner, as contemplated in Article 8); and
 - 4. Acts of war or terrorism.

- D. Contractor's entitlement to an adjustment of Contract Times or Contract Price is limited as follows:
1. Contractor's entitlement to an adjustment of the Contract Times is conditioned on the delay, disruption, or interference adversely affecting an activity on the critical path to completion of the Work, as of the time of the delay, disruption, or interference.
 2. Contractor shall not be entitled to an adjustment in Contract Price 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. Such a concurrent delay by Contractor shall not preclude an adjustment of Contract Times to which Contractor is otherwise entitled.
 3. Adjustments of Contract Times or Contract Price are subject to the provisions of Article 11.
- E. Each Contractor request or Change Proposal seeking an increase in Contract Times or Contract Price must be supplemented by supporting data that sets forth in detail the following:
1. The circumstances that form the basis for the requested adjustment;
 2. The date upon which each cause of delay, disruption, or interference began to affect the progress of the Work;
 3. The date upon which each cause of delay, disruption, or interference ceased to affect the progress of the Work;
 4. The number of days' increase in Contract Times claimed as a consequence of each such cause of delay, disruption, or interference; and
 5. The impact on Contract Price, in accordance with the provisions of Paragraph 11.07.
- Contractor shall also furnish such additional supporting documentation as Owner or Engineer may require including, where appropriate, a revised progress schedule indicating all the activities affected by the delay, disruption, or interference, and an explanation of the effect of the delay, disruption, or interference on the critical path to completion of the Work.
- F. 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, together with the provisions of Paragraphs 4.05.D and 4.05.E.
- G. Paragraph 8.03 addresses 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.

ARTICLE 5—SITE; SUBSURFACE AND PHYSICAL CONDITIONS; HAZARDOUS ENVIRONMENTAL CONDITIONS

5.01 *Availability of Lands*

- A. Owner shall furnish the Site. Owner shall notify Contractor in writing 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, or to improvements, structures, utilities, or similar facilities located at such adjacent lands 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 7.13, 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 in a court of competent jurisdiction; 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 will 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 of explorations and tests of subsurface conditions at or adjacent to the Site that contain Technical Data;
 2. Those drawings of existing physical conditions at or adjacent to the Site, including those drawings depicting existing surface or subsurface structures at or adjacent to the Site (except Underground Facilities), that contain Technical Data; and
 3. Technical Data contained in such reports and drawings.
- B. *Underground Facilities*: Underground Facilities are shown or indicated on the Drawings, pursuant to Paragraph 5.05, and not in the drawings referred to in Paragraph 5.03.A. Information and data regarding the presence or location of Underground Facilities are not intended to be categorized, identified, or defined as Technical Data.
- C. *Reliance by Contractor on Technical Data*: 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 Paragraph 1.01.A.46.b.
- D. *Limitations of Other Data and 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:
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;
 2. other data, interpretations, opinions, and information contained in such reports or shown or indicated in such drawings;
 3. the contents of other Site-related documents made available to Contractor, such as record drawings from other projects at or adjacent to the Site, or Owner's archival documents concerning the Site; or
 4. 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:

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;
2. is of such a nature as to require a change in the Drawings or Specifications;
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 whether it is necessary for Owner to obtain 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; 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. *Early Resumption of Work:* If at any time Engineer determines that Work in connection with the subsurface or physical condition in question may resume prior to completion of Engineer's review or Owner's issuance of its statement to Contractor, because the condition in question has been adequately documented, and analyzed on a preliminary basis, then the Engineer may at its discretion instruct Contractor to resume such Work.

E. *Possible Price and Times Adjustments*

1. Contractor shall be entitled to an equitable adjustment in Contract Price or Contract Times, 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,
 - c. Contractor's entitlement to an adjustment of the Contract Times is subject to the provisions of Paragraphs 4.05.D and 4.05.E.
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;
 - 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 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, then any such adjustment will 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, 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.
- F. *Underground Facilities; Hazardous Environmental Conditions:* Paragraph 5.05 governs rights and responsibilities regarding the presence or location of Underground Facilities. Paragraph 5.06 governs rights and responsibilities regarding Hazardous Environmental Conditions. The provisions of Paragraphs 5.03 and 5.04 are not applicable to the presence or location of Underground Facilities, or to Hazardous Environmental Conditions.

5.05 *Underground Facilities*

- A. *Contractor's Responsibilities:* Unless it is otherwise expressly provided in the Supplementary Conditions, the cost of all of the following are included in the Contract Price, and Contractor shall have full responsibility for:
1. reviewing and checking all information and data regarding existing Underground Facilities at the Site;
 2. complying with applicable state and local utility damage prevention Laws and Regulations;

3. verifying the actual location of those Underground Facilities shown or indicated in the Contract Documents as being within the area affected by the Work, by exposing such Underground Facilities during the course of construction;
 4. coordination of the Work with the owners (including Owner) of such Underground Facilities, during construction; and
 5. 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 on the Drawings, or was not shown or indicated on the Drawings 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), notify Owner and Engineer in writing regarding such Underground Facility.
- C. *Engineer's Review:* Engineer will:
1. promptly review the Underground Facility and conclude whether such Underground Facility was not shown or indicated on the Drawings, or was not shown or indicated with reasonable accuracy;
 2. identify and communicate with the owner of the Underground Facility; prepare recommendations to Owner (and if necessary issue any preliminary instructions to Contractor) regarding the Contractor's resumption of Work in connection with the Underground Facility in question;
 3. obtain any pertinent cost or schedule information from Contractor; 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
 4. 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. *Early Resumption of Work:* If at any time Engineer determines that Work in connection with the Underground Facility may resume prior to completion of Engineer's review or Owner's issuance of its statement to Contractor, because the Underground Facility in question and conditions affected by its presence have been adequately documented, and analyzed on a preliminary basis, then the Engineer may at its discretion instruct Contractor to resume such Work.
- F. *Possible Price and Times Adjustments*
1. Contractor shall be entitled to an equitable adjustment in the Contract Price or Contract Times, to the extent that any existing Underground Facility at the Site that was not shown

or indicated on the Drawings, 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. 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;
 - b. Contractor's entitlement to an adjustment of the Contract Times is subject to the provisions of Paragraphs 4.05.D and 4.05.E; and
 - c. 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, then any such adjustment will 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, no later than 30 days after Owner's issuance of the Owner's written statement to Contractor regarding the Underground Facility in question.
 4. The information and data shown or indicated on the Drawings with respect to existing Underground Facilities at the Site is based on information and data (a) furnished by the owners of such Underground Facilities, or by others, (b) obtained from available records, or (c) gathered in an investigation conducted in accordance with the current edition of ASCE 38, Standard Guideline for the Collection and Depiction of Existing Subsurface Utility Data, by the American Society of Civil Engineers. If such information or data is incorrect or incomplete, Contractor's remedies are limited to those set forth in this Paragraph 5.05.F.

5.06 *Hazardous Environmental Conditions at Site*

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

1. those reports known to Owner relating to Hazardous Environmental Conditions that have been identified at or adjacent to the Site;
2. drawings known to Owner relating to Hazardous Environmental Conditions that have been identified at or adjacent to the Site; 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 on the accuracy of the Technical Data as defined in Paragraph 1.01.A.46.b. 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;
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, as a result of such Work stoppage, such special conditions under which Work is agreed to be resumed by Contractor, or any costs or expenses incurred in response to the Hazardous Environmental Condition, 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. Entitlement to any such adjustment is subject to the provisions of Paragraphs 4.05.D, 4.05.E, 11.07, and 11.08.
- 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, 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 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.I obligates 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 obligates 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 Contractor's obligations under the Contract. These bonds must 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 terms of a prescribed bond form, the Supplementary Conditions, or other provisions of the Contract.
- B. Contractor shall also furnish such other bonds (if any) as are required by the Supplementary Conditions or other provisions of the Contract.
- C. All bonds must be in the form included in the Bidding Documents or otherwise specified by Owner prior to execution of the Contract, except as provided otherwise by Laws or

Regulations, and must be issued and signed by a surety named in "Companies Holding Certificates of Authority as Acceptable Sureties on Federal Bonds and as Acceptable Reinsuring Companies" as published in Department Circular 570 (as amended and supplemented) by the Bureau of the Fiscal Service, 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 must show that it is effective on the date the agent or attorney-in-fact signed the accompanying bond.

- D. Contractor shall obtain the required bonds from surety companies that are duly licensed or authorized, in the state or jurisdiction in which the Project is located, to issue bonds in the required amounts.
- E. If the surety on a bond furnished by Contractor is declared bankrupt or becomes insolvent, or the surety ceases to meet the requirements above, then Contractor shall promptly notify Owner and Engineer in writing and shall, within 20 days after the event giving rise to such notification, provide another bond and surety, both of which must comply with the bond and surety requirements above.
- F. 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.
- G. Upon request to Owner from any Subcontractor, Supplier, or other person or entity claiming to have furnished labor, services, materials, or equipment used in the performance of the Work, Owner shall provide a copy of the payment bond to such person or entity.
- H. Upon request to Contractor from any Subcontractor, Supplier, or other person or entity claiming to have furnished labor, services, materials, or equipment used in the performance of the Work, Contractor shall provide a copy of the payment bond to such person or entity.

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. Alternative forms of insurance coverage, including but not limited to self-insurance and "Occupational Accident and Excess Employer's Indemnity Policies," are not sufficient to meet the insurance requirements of this Contract, unless expressly allowed in the Supplementary Conditions.
- D. Contractor shall deliver to Owner, with copies to each additional insured identified in the Contract, certificates of insurance and endorsements establishing that Contractor has obtained and is maintaining the policies and coverages 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, documentation of applicable self-insured retentions (if allowed) and deductibles, full disclosure of all relevant exclusions, and evidence of insurance required to be purchased and maintained by

Subcontractors or Suppliers. In any documentation furnished under this provision, Contractor, Subcontractors, and Suppliers may block out (redact) (1) any confidential premium or pricing information and (2) any wording specific to a project or jurisdiction other than those applicable to this Contract.

- E. Owner shall deliver to Contractor, with copies to each additional insured identified in the Contract, certificates of insurance and endorsements establishing that Owner has obtained and is maintaining the policies and coverages 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, documentation of applicable self-insured retentions (if allowed) and deductibles, and full disclosure of all relevant exclusions. In any documentation furnished under this provision, Owner may block out (redact) (1) any confidential premium or pricing information and (2) any wording specific to a project or jurisdiction other than those relevant to this Contract.
- F. 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, will not be construed as a waiver of the other party's obligation to obtain and maintain such insurance.
- G. In addition to the liability insurance required to be provided by Contractor, the Owner, at Owner's option, may purchase and maintain Owner's own liability insurance. 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.
- H. Contractor shall require:
 - 1. Subcontractors to purchase and maintain worker's compensation, commercial general liability, and other insurance that is appropriate for their participation in the Project, and to name as additional insureds Owner and Engineer (and any other individuals or entities identified in the Supplementary Conditions as additional insureds on Contractor's liability policies) on each Subcontractor's commercial general liability insurance policy; and
 - 2. Suppliers to purchase and maintain insurance that is appropriate for their participation in the Project.
- I. If either party does not purchase or maintain 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.
- J. If Contractor has failed to obtain and maintain required insurance, Contractor's entitlement to enter or remain at the Site will end immediately, and Owner may impose an appropriate set-off against payment for any associated costs (including but not limited to the cost of purchasing necessary insurance coverage), and exercise Owner's termination rights under Article 16.
- K. Without prejudice to any other right or remedy, if a party has failed to obtain required insurance, the other party may elect (but is in no way obligated) 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 will be adjusted accordingly.

- L. Owner does not represent that insurance coverage and limits established in this Contract necessarily will be adequate to protect Contractor or Contractor's interests. Contractor is responsible for determining whether such coverage and limits are adequate to protect its interests, and for obtaining and maintaining any additional insurance that Contractor deems necessary.
- M. The insurance and insurance limits required herein will not be deemed as a limitation on Contractor's liability, or that of its Subcontractors or Suppliers, under the indemnities granted to Owner and other individuals and entities in the Contract or otherwise.
- N. All the policies of insurance required to be purchased and maintained under this Contract will contain a provision or endorsement that the coverage afforded will not be canceled, 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 and Engineer.

6.03 *Contractor's Insurance*

- A. *Required Insurance:* Contractor shall purchase and maintain Worker's Compensation, Commercial General Liability, and other insurance pursuant to the specific requirements of the Supplementary Conditions.
- B. *General Provisions:* The policies of insurance required by this Paragraph 6.03 as supplemented must:
 - 1. include at least the specific coverages required;
 - 2. be written for not less than the limits provided, or those required by Laws or Regulations, whichever is greater;
 - 3. remain in effect at least until the Work is complete (as set forth in Paragraph 15.06.D), and longer if expressly required elsewhere in this Contract, 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;
 - 4. apply with respect to the performance of the Work, whether such performance is 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; and
 - 5. include all necessary endorsements to support the stated requirements.
- C. *Additional Insureds:* The Contractor's commercial general liability, automobile liability, employer's liability, umbrella or excess, pollution liability, and unmanned aerial vehicle liability policies, if required by this Contract, must:
 - 1. include and list as additional insureds Owner and Engineer, and any individuals or entities identified as additional insureds in the Supplementary Conditions;
 - 2. include coverage for the respective officers, directors, members, partners, employees, and consultants of all such additional insureds;
 - 3. afford primary coverage to these additional insureds for all claims covered thereby (including as applicable those arising from both ongoing and completed operations);

4. not seek contribution from insurance maintained by the additional insured; and
5. as to commercial general liability insurance, apply to additional insureds with respect to liability caused in whole or in part by Contractor's acts or omissions, or the acts and omissions of those working on Contractor's behalf, in the performance of Contractor's operations.

6.04 *Builder's Risk and Other 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 Work's full insurable replacement cost (subject to such deductible amounts as may be provided in the Supplementary Conditions or required by Laws and Regulations). The specific requirements applicable to the builder's risk insurance are set forth in the Supplementary Conditions.
- B. *Property Insurance for Facilities of Owner Where Work Will Occur*: Owner is responsible for obtaining and maintaining property insurance covering each existing structure, building, or facility in which any part of the Work will occur, or to which any part of the Work will attach or be adjoined. Such property insurance will be written on a special perils (all-risk) form, on a replacement cost basis, providing coverage consistent with that required for the builder's risk insurance, and will be maintained until the Work is complete, as set forth in Paragraph 15.06.D.
- C. *Property Insurance for Substantially Complete Facilities*: Promptly after Substantial Completion, and before actual occupancy or use of the substantially completed Work, Owner will obtain property insurance for such substantially completed Work, and maintain such property insurance at least until the Work is complete, as set forth in Paragraph 15.06.D. Such property insurance will be written on a special perils (all-risk) form, on a replacement cost basis, and provide coverage consistent with that required for the builder's risk insurance. The builder's risk insurance may terminate upon written confirmation of Owner's procurement of such property insurance.
- D. *Partial Occupancy 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 advance notice of such occupancy or use to the builder's risk insurer, and obtain an endorsement consenting to the continuation of coverage prior to commencing such partial occupancy or use.
- E. *Insurance of Other Property; Additional Insurance*: If the express insurance provisions of the Contract do not require or address the insurance of a property item or interest, then the entity or individual owning such property item will be responsible for insuring it. 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 6.04, it may do so at Contractor's expense.

6.05 *Property Losses; Subrogation*

- A. The builder's risk insurance policy purchased and maintained in accordance with Paragraph 6.04 (or an installation floater policy if authorized by the Supplementary Conditions), will contain provisions to the effect that in the event of payment of any loss or damage the insurer 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.

1. 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, risks, 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 individuals or entities identified in the Supplementary Conditions as builder's risk or installation floater 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.
 2. None of the above waivers extends 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. Any property insurance policy maintained by Owner covering any loss, damage, or consequential loss to Owner's existing structures, buildings, or facilities in which any part of the Work will occur, or to which any part of the Work will attach or adjoin; to adjacent structures, buildings, or facilities of Owner; or to part or all of the completed or substantially completed Work, 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, will contain provisions to the effect that in the event of payment of any loss or damage the insurer will have no rights of recovery against any insureds thereunder, or against Contractor, Subcontractors, or Engineer, or the officers, directors, members, partners, employees, agents, consultants, or subcontractors of each and any of them, and that the insured is allowed to waive the insurer's rights of subrogation in a written contract executed prior to the loss, damage, or consequential loss.
1. 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 all losses and damages caused by, arising out of, or resulting from fire or any of the perils, risks, or causes of loss covered by such policies.
- C. The waivers in this Paragraph 6.05 include the waiver of rights 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 insured peril, risk, or cause of loss.
- D. Contractor shall be responsible for assuring that each Subcontract 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 fire or other peril, risk, or cause of loss covered by builder's risk insurance, installation floater, and any other property insurance applicable to the Work.

6.06 *Receipt and Application of Property Insurance Proceeds*

- A. Any insured loss under the builder's risk and other policies of property insurance required by Paragraph 6.04 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 6.04 shall maintain such proceeds in a segregated account, and 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, Contractor shall repair or replace the damaged Work, using allocated insurance proceeds.

ARTICLE 7—CONTRACTOR'S RESPONSIBILITIES

7.01 *Contractor's Means and Methods of Construction*

- A. Contractor shall be solely responsible for the means, methods, techniques, sequences, and procedures of construction.
- B. If the Contract Documents note, or Contractor determines, that professional engineering or other design services are needed to carry out Contractor's responsibilities for construction means, methods, techniques, sequences, and procedures, or for Site safety, then Contractor shall cause such services to be provided by a properly licensed design professional, at Contractor's expense. Such services are not Owner-delegated professional design services under this Contract, and neither Owner nor Engineer has any responsibility with respect to (1) Contractor's determination of the need for such services, (2) the qualifications or licensing of the design professionals retained or employed by Contractor, (3) the performance of such services, or (4) any errors, omissions, or defects in such services.

7.02 *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.
- B. At all times during the progress of the Work, Contractor shall assign a competent resident superintendent who will not be replaced without written notice to Owner and Engineer except under extraordinary circumstances.

7.03 *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 maintain good discipline and order at the Site.

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

7.04 *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 must be new and of good quality, except as otherwise provided in the Contract Documents. All special warranties and guarantees required by the Specifications will 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 must 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.

7.05 *"Or Equals"*

- A. *Contractor's Request; Governing Criteria:* Whenever an item of equipment or material is specified or described in the Contract Documents by using the names of one or more proprietary items or specific Suppliers, 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 equipment or material, or items from other proposed Suppliers, under the circumstances described below.
 - 1. If Engineer in its sole discretion determines that an item of equipment or material proposed by Contractor is functionally equal to that named and sufficiently similar so that no change in related Work will be required, Engineer will deem it an "or equal" item. For the purposes of this paragraph, a proposed item of equipment or material will be considered functionally equal to an item so named if:
 - a. in the exercise of reasonable judgment Engineer determines that the proposed item:
 - 1) is at least equal in materials of construction, quality, durability, appearance, strength, and design characteristics;

- 2) 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) has a proven record of performance and availability of responsive service; and
 - 4) is not objectionable to Owner.
- b. Contractor certifies that, if the proposed item is approved and incorporated into the Work:
- 1) there will be no increase in cost to the Owner or increase in Contract Times; and
 - 2) the item 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 will result in any change in Contract Price. The Engineer's denial of an "or-equal" request will be final and binding, and may not be reversed through an appeal under any provision of the Contract.
- E. *Treatment as a Substitution Request*: If Engineer determines that an item of equipment or material proposed by Contractor does not qualify as an "or-equal" item, Contractor may request that Engineer consider the item a proposed substitute pursuant to Paragraph 7.06.

7.06 Substitutes

- A. *Contractor's Request; Governing Criteria*: Unless the specification or description of an item of equipment or material 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 equipment or material under the circumstances described below. To the extent possible such requests must 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 equipment or material from anyone other than Contractor.
 2. The requirements for review by Engineer will be as set forth in Paragraph 7.06.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 equipment or material that Contractor seeks to furnish or use. The application:
 - a. will 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 the item specified; and
 - 3) be suited to the same use as the item 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 the item specified; and
 - 2) available engineering, sales, maintenance, repair, and replacement services.
 - d. will 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 will be final and binding, and may not be reversed through an appeal under any provision of the Contract. Contractor may challenge the scope of reimbursement costs imposed under Paragraph 7.06.D, by timely submittal of a Change Proposal.

7.07 *Concerning Subcontractors and Suppliers*

- A. Contractor may retain Subcontractors and Suppliers for the performance of parts of the Work. Such Subcontractors and Suppliers must be acceptable to Owner. The Contractor's retention of a Subcontractor or Supplier for the performance of parts of the Work will not relieve Contractor's obligation to Owner to perform and complete the Work in accordance with the Contract Documents.
- B. Contractor shall retain specific Subcontractors and Suppliers 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 or Supplier 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 5 days.
- E. Owner may require the replacement of any Subcontractor or Supplier. 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 or Suppliers 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 or Supplier so identified solely on the basis of substantive, reasonable objection after due investigation. Contractor shall submit an acceptable replacement for the rejected Subcontractor or Supplier.
- F. If Owner requires the replacement of any Subcontractor or Supplier retained by Contractor to perform any part of the Work, then Contractor shall be entitled to an adjustment in Contract Price or Contract Times, 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 or Supplier, whether initially or as a replacement, will 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 solely responsible for scheduling and coordinating the work of Subcontractors and Suppliers.
- J. The divisions and sections of the Specifications and the identifications of any Drawings do not control Contractor in dividing the Work among Subcontractors or Suppliers, or in delineating the Work to be performed by any specific trade.
- K. All Work performed for Contractor by a Subcontractor or Supplier must be pursuant to an appropriate contractual agreement that specifically binds the Subcontractor or Supplier to the applicable terms and conditions of the Contract for the benefit of Owner and Engineer.
- L. Owner may furnish to any Subcontractor or Supplier, to the extent practicable, information about amounts paid to Contractor for Work performed for Contractor by the Subcontractor or Supplier.
- M. Contractor shall restrict all Subcontractors and Suppliers from communicating with Engineer or Owner, except through Contractor or in case of an emergency, or as otherwise expressly allowed in this Contract.

7.08 *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 an 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 will be disclosed 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.

7.09 *Permits*

- A. Unless otherwise provided in the Contract Documents, Contractor shall obtain and pay for all construction permits, licenses, and certificates of occupancy. 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.

7.10 *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 of the place of the Project which are applicable during the performance of the Work.

7.11 *Laws and Regulations*

- A. Contractor shall give all notices required by and shall comply with all Laws and Regulations applicable to the performance of the Work. 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 is not Contractor's responsibility to make certain that the Work described in the Contract Documents is in accordance with Laws and Regulations, but this does not relieve Contractor of its obligations under Paragraph 3.03.
- C. Owner or Contractor may give written 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 written notice Contractor may submit a Change Proposal, or Owner may initiate a Claim.

7.12 *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.

7.13 *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.
- B. Contractor shall designate a qualified and experienced safety representative whose duties and responsibilities are the prevention of Work-related accidents and the maintenance and supervision of safety precautions and programs.
- C. 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.
- D. All damage, injury, or loss to any property referred to in Paragraph 7.13.C.2 or 7.13.C.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).
- E. 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.
- F. Contractor shall notify Owner; the owners of adjacent property; the owners of Underground Facilities and other utilities (if the identity of such owners is known to Contractor); and other contractors and utility owners performing work at or adjacent to the Site, in writing, when Contractor knows that 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.
- G. Contractor shall comply with the applicable requirements of Owner's safety programs, if any. Any Owner's safety programs that are applicable to the Work are identified or included in the Supplementary Conditions or Specifications.
- H. 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.

- I. Contractor's duties and responsibilities for safety and protection will continue until all the Work is completed, Engineer has issued a written notice to Owner and Contractor in accordance with Paragraph 15.06.C that the Work is acceptable, and Contractor has left the Site (except as otherwise expressly provided in connection with Substantial Completion).
- J. Contractor's duties and responsibilities for safety and protection will 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.

7.14 *Hazard Communication Programs*

- A. Contractor shall be responsible for coordinating any exchange of safety data sheets (formerly known as 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 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 by an emergency, or are required as a result of Contractor's response to an emergency. If Engineer determines that a change in the Contract Documents is required because of an emergency or Contractor's response, a Work Change Directive or Change Order will be issued.

7.16 *Submittals*

A. *Shop Drawing and Sample Requirements*

- 1. Before submitting a Shop Drawing or Sample, Contractor shall:
 - a. review and coordinate the Shop Drawing or Sample with other Shop Drawings and Samples and with the requirements of the Work and the Contract Documents;
 - b. determine and verify:
 - 1) all field measurements, quantities, dimensions, specified performance and design criteria, installation requirements, materials, catalog numbers, and similar information with respect to the Submittal;
 - 2) 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
 - 3) all information relative to Contractor's responsibilities for means, methods, techniques, sequences, and procedures of construction, and safety precautions and programs incident thereto;
 - c. confirm that the Submittal is complete with respect to all related data included in the Submittal.
- 2. Each Shop Drawing or Sample must 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 Shop Drawing or Sample, Contractor shall give Engineer specific written notice of any variations that the Submittal may have from the requirements of the Contract Documents. This notice must be set forth in a written communication separate from the Submittal; and, in addition, in the case of a Shop Drawing by a specific notation made on the Shop Drawing itself.
- B. *Submittal Procedures for Shop Drawings and Samples:* Contractor shall label and submit Shop Drawings and Samples to Engineer for review and approval in accordance with the accepted Schedule of Submittals.
1. *Shop Drawings*
 - a. Contractor shall submit the number of copies required in the Specifications.
 - b. Data shown on the Shop Drawings must 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.C.
 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.C.
 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. *Engineer's Review of Shop Drawings and Samples*
1. Engineer will provide timely review of Shop Drawings and Samples in accordance with the accepted Schedule of Submittals. 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, comply with the requirements of 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 will 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 or other appropriate Contract modification.

5. Engineer's review and approval of a Shop Drawing or Sample will not relieve Contractor from responsibility for complying with the requirements of Paragraphs 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, will 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 or Sample will 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.C.4.

D. Resubmittal Procedures for Shop Drawings and Samples

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 Shop Drawing and Sample submittals with sufficient information and accuracy to obtain required approval of an item with no more than two resubmittals. Engineer will record Engineer's time for reviewing a third or subsequent resubmittal of a Shop Drawing or Sample, and Contractor shall be responsible for Engineer's charges to Owner for such time. Owner may impose a set-off against payments due Contractor to secure reimbursement for such charges.
3. If Contractor requests a change of a previously approved Shop Drawing or Sample, Contractor shall be responsible for Engineer's charges to Owner for its review time, and Owner may impose a set-off against payments due Contractor to secure reimbursement for such charges, unless the need for such change is beyond the control of Contractor.

E. Submittals Other than Shop Drawings, Samples, and Owner-Delegated Designs

1. The following provisions apply to all Submittals other than Shop Drawings, Samples, and Owner-delegated designs:
 - a. Contractor shall submit all such Submittals to the Engineer in accordance with the Schedule of Submittals and pursuant to the applicable terms of the Contract Documents.
 - b. Engineer will provide timely review of all such Submittals in accordance with the Schedule of Submittals and return such Submittals with a notation of either Accepted or Not Accepted. Any such Submittal that is not returned within the time established in the Schedule of Submittals will be deemed accepted.
 - c. Engineer's review will be only to determine if the Submittal is acceptable under the requirements of the Contract Documents as to general form and content of the Submittal.

- d. If any such Submittal is not accepted, Contractor shall confer with Engineer regarding the reason for the non-acceptance, and resubmit an acceptable document.
- 2. Procedures for the submittal and acceptance of the Progress Schedule, the Schedule of Submittals, and the Schedule of Values are set forth in Paragraphs 2.03, 2.04, and 2.05.
- F. Owner-delegated Designs: Submittals pursuant to Owner-delegated designs are governed by the provisions of Paragraph 7.19.

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 is entitled to rely on Contractor's warranty and guarantee.
- B. Owner's rights under this warranty and guarantee are in addition to, and are not limited by, Owner's rights under the correction period provisions of Paragraph 15.08. The time in which Owner may enforce its warranty and guarantee rights under this Paragraph 7.17 is limited only by applicable Laws and Regulations restricting actions to enforce such rights; provided, however, that after the end of the correction period under Paragraph 15.08:
 - 1. Owner shall give Contractor written notice of any defective Work within 60 days of the discovery that such Work is defective; and
 - 2. Such notice will be deemed the start of an event giving rise to a Claim under Paragraph 12.01.B, such that any related Claim must be brought within 30 days of the notice.
- C. Contractor's warranty and guarantee hereunder excludes defects or damage caused by:
 - 1. abuse, or improper modification, 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.
- D. Contractor's obligation to perform and complete the Work in accordance with the Contract Documents is absolute. None of the following will constitute an acceptance of Work that is not in accordance with the Contract Documents, a release of Contractor's obligation to perform the Work in accordance with the Contract Documents, or a release of Owner's warranty and guarantee rights under this Paragraph 7.17:
 - 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. The end of the correction period established in Paragraph 15.08;
 - 8. Any inspection, test, or approval by others; or

9. Any correction of defective Work by Owner.

- E. 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 will 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 losses, damages, costs, and judgments (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 from third-party claims or actions relating to or resulting from the performance or furnishing of the Work, provided that any such claim, action, loss, cost, judgment or damage is attributable to bodily injury, sickness, disease, or death, or to damage 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 will 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.

7.19 *Delegation of Professional Design Services*

- A. Owner may require Contractor to provide professional design services for a portion of the Work by express delegation in the Contract Documents. Such delegation will specify the performance and design criteria that such services must satisfy, and the Submittals that Contractor must furnish to Engineer with respect to the Owner-delegated design.
- B. Contractor shall cause such Owner-delegated professional design services to be provided pursuant to the professional standard of care by a properly licensed design professional, whose signature and seal must appear on all drawings, calculations, specifications, certifications, and Submittals prepared by such design professional. Such design professional must issue all certifications of design required by Laws and Regulations.
- C. If a Shop Drawing or other Submittal related to the Owner-delegated design is prepared by Contractor, a Subcontractor, or others for submittal to Engineer, then such Shop Drawing or other Submittal must bear the written approval of Contractor's design professional when submitted by Contractor to Engineer.

- D. Owner and Engineer shall be entitled to rely upon the adequacy, accuracy, and completeness of the services, certifications, and approvals performed or provided by the design professionals retained or employed by Contractor under an Owner-delegated design, subject to the professional standard of care and the performance and design criteria stated in the Contract Documents.
- E. Pursuant to this Paragraph 7.19, Engineer's review, approval, and other determinations regarding design drawings, calculations, specifications, certifications, and other Submittals furnished by Contractor pursuant to an Owner-delegated design will be only for the following limited purposes:
 - 1. Checking for conformance with the requirements of this Paragraph 7.19;
 - 2. Confirming that Contractor (through its design professionals) has used the performance and design criteria specified in the Contract Documents; and
 - 3. Establishing that the design furnished by Contractor is consistent with the design concept expressed in the Contract Documents.
- F. Contractor shall not be responsible for the adequacy of performance or design criteria specified by Owner or Engineer.
- G. Contractor is not required to provide professional services in violation of applicable Laws and Regulations.

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 third-party utility work that Owner has arranged to take place at or adjacent to the Site, Owner shall provide such information to Contractor.
- C. Contractor shall afford proper and safe access to the Site to each contractor that performs such other work, each utility owner performing other work, and Owner, if Owner is performing other work with Owner's employees, and provide a reasonable opportunity for the introduction and storage of materials and equipment and the execution of such other work.
- D. 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.

- E. If the proper execution or results of any part of Contractor's Work depends upon work performed by others, 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.
- F. The provisions of this article are not applicable to work that is performed by third-party utilities or other third-party entities without a contract with Owner, or that is performed without having been arranged by Owner. If such work occurs, then any related delay, disruption, or interference incurred by Contractor is governed by the provisions of Paragraph 4.05.C.3.

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 for Owner at or adjacent to the Site, the Owner's employees, any other contractor working for Owner, or any utility owner that Owner has arranged to perform work, 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. 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 will 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, and any remedies available to Contractor under Laws or Regulations concerning utility action or inaction. When applicable, any such equitable adjustment in Contract Price will 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 or Contract Price is subject to the provisions of Paragraphs 4.05.D and 4.05.E.

- 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.
1. 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 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 8.03.B.
 2. 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 Contractor.
- C. 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 will 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 (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 10.07. 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 *Resident 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 the Supplementary Conditions and in Paragraph 10.07.
- B. If Owner designates an individual or entity who is not Engineer's consultant, agent, or employee to represent Owner at the Site, then the responsibilities and authority of such individual or entity will be as provided in the Supplementary Conditions.

10.04 *Engineer's Authority*

- A. Engineer has the authority to reject Work in accordance with Article 14.
- B. Engineer's authority as to Submittals is set forth in Paragraph 7.16.
- C. Engineer's authority as to design drawings, calculations, specifications, certifications and other Submittals from Contractor in response to Owner's delegation (if any) to Contractor of professional design services, is set forth in Paragraph 7.19.
- D. Engineer's authority as to changes in the Work is set forth in Article 11.

E. Engineer's authority as to Applications for Payment is set forth in Article 15.

10.05 *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.

10.06 *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.

10.07 *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, will 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 Contractor under 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 10.07 also apply to the Resident Project Representative, if any.

10.08 *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 of which Engineer has been informed.

ARTICLE 11—CHANGES TO THE CONTRACT

11.01 *Amending and Supplementing the Contract*

- A. The Contract may be amended or supplemented by a Change Order, a Work Change Directive, or a Field Order.
- B. If an amendment or supplement to the Contract includes a change in the Contract Price or the Contract Times, such amendment or supplement must be set forth in a Change Order.
- C. All changes to the Contract that 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, must be supported by Engineer's recommendation. Owner and Contractor may amend other terms and conditions of the Contract without the recommendation of the Engineer.

11.02 *Change Orders*

- A. Owner and Contractor shall execute appropriate Change Orders covering:
 - 1. Changes in 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 11.05, (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 that embody the substance of any final and binding results under: Paragraph 11.03.B, resolving the impact of a Work Change Directive; Paragraph 11.09, concerning Change Proposals; Article 12, Claims; Paragraph 13.02.D, final adjustments resulting from allowances; Paragraph 13.03.D, final adjustments relating to determination of quantities for Unit Price Work; and similar provisions.
- B. If Owner or Contractor refuses to execute a Change Order that is required to be executed under the terms of Paragraph 11.02.A, it will be deemed to be of full force and effect, as if fully executed.

11.03 *Work Change Directives*

- A. 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 11.07 regarding change of Contract Price.

B. If Owner has issued a Work Change Directive and:

1. Contractor believes that an adjustment in Contract Times or Contract Price is necessary, then Contractor shall submit any Change Proposal seeking such an adjustment no later than 30 days after the completion of the Work set out in the Work Change Directive.
2. Owner believes that an adjustment in Contract Times or Contract Price is necessary, then Owner shall submit any Claim seeking such an adjustment no later than 60 days after issuance of the Work Change Directive.

11.04 *Field Orders*

- A. 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.
- B. If Contractor believes that a Field Order justifies an adjustment in the Contract Price or Contract Times, then before proceeding with the Work at issue, Contractor shall submit a Change Proposal as provided herein.

11.05 *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. Changes involving the design (as set forth in the Drawings, Specifications, or otherwise) or other engineering or technical matters will be supported by Engineer's recommendation.
- B. Such changes in the Work 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 must be performed under the applicable conditions of the Contract Documents.
- C. Nothing in this Paragraph 11.05 obligates 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.

11.06 *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.C.2.

11.07 *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 must comply with the provisions of Paragraph 11.09. Any Claim for an adjustment of Contract Price must 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);
 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 11.07.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 11.07.C).
- C. *Contractor's Fee:* When applicable, the Contractor's fee for overhead and profit will 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 will be 15 percent;
 - b. For costs incurred under Paragraph 13.01.B.3, the Contractor's fee will be 5 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 11.07.C.2.a and 11.07.C.2.b is that the Contractor's fee will be based on: (1) a fee of 15 percent of the costs incurred under Paragraphs 13.01.B.1 and 13.01.B.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 5 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 will be no greater than 27 percent of the costs incurred by the Subcontractor that actually performs the Work;
 - d. No fee will 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 of the Work will be the amount of the actual net decrease in Cost of the Work and a deduction of an additional amount equal to 5 percent of such actual net decrease in Cost of the Work; and
 - f. When both additions and credits are involved in any one change or Change Proposal, the adjustment in Contractor's fee will be computed by determining the sum of the costs in each of the cost categories in Paragraph 13.01.B (specifically, payroll costs, Paragraph 13.01.B.1; incorporated materials and equipment costs, Paragraph 13.01.B.2; Subcontract costs, Paragraph 13.01.B.3; special consultants costs, Paragraph 13.01.B.4; and other costs, Paragraph 13.01.B.5) and applying to each such cost category sum the appropriate fee from Paragraphs 11.07.C.2.a through 11.07.C.2.e, inclusive.

11.08 *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 must comply with the provisions of Paragraph 11.09. Any Claim for an adjustment in the Contract Times must comply with the provisions of Article 12.
- B. Delay, disruption, and interference in the Work, and any related changes in Contract Times, are addressed in and governed by Paragraph 4.05.

11.09 *Change Proposals*

- A. *Purpose and Content:* Contractor shall submit a Change Proposal to Engineer to request an adjustment in the Contract Times or Contract Price; contest an initial decision by Engineer concerning the requirements of the Contract Documents or relating to the acceptability of the Work under the Contract Documents; challenge a set-off against payment due; or seek other relief under the Contract. The Change Proposal will specify any proposed change in Contract Times or Contract Price, or other proposed relief, and explain the reason for the proposed change, with citations to any governing or applicable provisions of the Contract Documents. Each Change Proposal will address only one issue, or a set of closely related issues.

B. *Change Proposal Procedures*

- 1. *Submittal:* Contractor shall submit each Change Proposal to Engineer within 30 days after the start of the event giving rise thereto, or after such initial decision.
- 2. *Supporting Data:* The Contractor shall submit supporting data, including the proposed change in Contract Price or Contract Time (if any), to the Engineer and Owner within 15 days after the submittal of the Change Proposal.
 - a. Change Proposals based on or related to delay, interruption, or interference must comply with the provisions of Paragraphs 4.05.D and 4.05.E.
 - b. Change proposals related to a change of Contract Price must include full and detailed accounts of materials incorporated into the Work and labor and equipment used for the subject Work.

The supporting data must be accompanied by a written statement that the supporting data are accurate and complete, and that any requested time or price adjustment is the entire adjustment to which Contractor believes it is entitled as a result of said event.

- 3. *Engineer's Initial Review:* Engineer will advise Owner regarding the Change Proposal, and consider any comments or response from Owner regarding the Change Proposal. If in its discretion Engineer concludes that additional supporting data is needed before conducting a full review and making a decision regarding the Change Proposal, then Engineer may request that Contractor submit such additional supporting data by a date specified by Engineer, prior to Engineer beginning its full review of the Change Proposal.
- 4. *Engineer's Full Review and Action on the Change Proposal:* Upon receipt of Contractor's supporting data (including any additional data requested by Engineer), Engineer will conduct a full review of each Change Proposal and, within 30 days after such receipt of the Contractor's supporting data, either approve the Change Proposal in whole, deny it in whole, or approve it in part and deny it in part. Such actions must be in writing, with a copy provided to Owner and Contractor. If Engineer does not take action on the Change

Proposal within 30 days, then either Owner or Contractor may at any time thereafter submit a letter to the other party indicating that as a result of Engineer's inaction the Change Proposal is deemed denied, thereby commencing the time for appeal of the denial under Article 12.

- 5. *Binding Decision*: Engineer's decision is final and binding upon Owner and Contractor, unless Owner or Contractor appeals the decision by filing a Claim under Article 12.
- C. *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 in writing that the Engineer is unable to resolve the Change Proposal. For purposes of further resolution of such a Change Proposal, such notice will be deemed a denial, and Contractor may choose to seek resolution under the terms of Article 12.
- D. *Post-Completion*: Contractor shall not submit any Change Proposals after Engineer issues a written recommendation of final payment pursuant to Paragraph 15.06.B.

11.10 *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 are subject 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;
 - 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; and
 - 4. Subject to the waiver provisions of Paragraph 15.07, any dispute arising after Engineer has issued a written recommendation of final payment pursuant to Paragraph 15.06.B.
- 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 rests with the party making the Claim. In the case of a Claim by Contractor seeking an increase in the Contract Times or Contract Price, 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 will 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 will 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 will 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 will 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 will 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 will 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 will be incorporated in a Change Order or other written document 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. When needed 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 will be in amounts no higher than those commonly incurred in the locality of the Project, will not include any of the costs itemized in Paragraph 13.01.C, and will 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 in advance of the subject Work. Such employees include, without limitation, superintendents, foremen, safety managers, safety representatives, and other personnel employed full time on the Work. Payroll costs for employees not employed full time on the Work will be apportioned on the basis of their time spent on the Work. Payroll costs include, but are not limited to, salaries and wages plus the cost of fringe benefits, which include social security contributions, unemployment, excise, and payroll taxes, workers' compensation, health and retirement benefits, 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, will 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 accrue to Contractor unless Owner deposits funds with Contractor with which to make payments, in which case the cash discounts will accrue to Owner. All trade discounts, rebates, and refunds and returns from sale of surplus materials and equipment will 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, which 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 will 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 or retained for services specifically related to the Work.
 5. Other costs consisting of 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, 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.

- 1) In establishing included costs for materials such as scaffolding, plating, or sheeting, consideration will be given to the actual or the estimated life of the material for use on other projects; or rental rates may be established on the basis of purchase or salvage value of such items, whichever is less. Contractor will not be eligible for compensation for such items in an amount that exceeds the purchase cost of such item.

c. *Construction Equipment Rental*

- 1) Rentals of all construction equipment and machinery, and the parts thereof, in accordance with rental agreements approved by Owner as to price (including any surcharge or special rates applicable to overtime use of the construction equipment or machinery), and the costs of transportation, loading, unloading, assembly, dismantling, and removal thereof. All such costs will be in accordance with the terms of said rental agreements. The rental of any such equipment, machinery, or parts must cease when the use thereof is no longer necessary for the Work.
 - 2) Costs for equipment and machinery owned by Contractor or a Contractor-related entity will be paid at a rate shown for such equipment in the equipment rental rate book specified in the Supplementary Conditions. An hourly rate will be computed by dividing the monthly rates by 176. These computed rates will include all operating costs.
 - 3) With respect to Work that is the result of a Change Order, Change Proposal, Claim, set-off, or other adjustment in Contract Price ("changed Work"), included costs will be based on 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 any such equipment or machinery, or parts thereof, must cease to accrue when the use thereof is no longer necessary for the changed 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 builder's risk or other property insurance established in accordance with Paragraph 6.04), 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 include settlements made with the written consent and approval of Owner. No such losses, damages, and expenses will 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 does not include any of the following items:

- 1. Payroll costs and other compensation of Contractor's officers, executives, principals, general managers, engineers, architects, estimators, attorneys, auditors, accountants, purchasing and contracting agents, expeditors, 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. The cost of purchasing, renting, or furnishing small tools and hand tools.
- 3. Expenses of Contractor's principal and branch offices other than Contractor's office at the Site.
- 4. Any part of Contractor's capital expenses, including interest on Contractor's capital employed for the Work and charges against Contractor for delinquent payments.
- 5. 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.
- 6. Expenses incurred in preparing and advancing Claims.
- 7. 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*

- 1. When the Work as a whole is performed on the basis of cost-plus-a-fee, then:
 - a. Contractor's fee for the Work set forth in the Contract Documents as of the Effective Date of the Contract will be determined as set forth in the Agreement.
 - b. for any Work covered by a Change Order, Change Proposal, Claim, set-off, or other adjustment in Contract Price on the basis of Cost of the Work, Contractor's fee will be determined as follows:
 - 1) When the fee for the Work as a whole is a percentage of the Cost of the Work, the fee will automatically adjust as the Cost of the Work changes.
 - 2) When the fee for the Work as a whole is a fixed fee, the fee for any additions or deletions will be determined in accordance with Paragraph 11.07.C.2.
- 2. When the Work as a whole is performed on the basis of a stipulated sum, or any other basis other than cost-plus-a-fee, then Contractor's fee for any Work covered by a Change

Order, Change Proposal, Claim, set-off, or other adjustment in Contract Price on the basis of Cost of the Work will be determined in accordance with Paragraph 11.07.C.2.

- E. *Documentation and Audit*: Whenever the Cost of the Work for any purpose is to be determined pursuant to this Article 13, Contractor and pertinent Subcontractors will establish and maintain records of the costs in accordance with generally accepted accounting practices. Subject to prior written notice, Owner will be afforded reasonable access, during normal business hours, to all Contractor's accounts, records, books, correspondence, instructions, drawings, receipts, vouchers, memoranda, and similar data relating to the Cost of the Work and Contractor's fee. Contractor shall preserve all such documents for a period of three years after the final payment by Owner. Pertinent Subcontractors will afford such access to Owner, and preserve such documents, to the same extent required of Contractor.

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 for any of the foregoing will be valid.
- C. *Owner's Contingency Allowance*: Contractor agrees that an Owner's 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 for Work covered by allowances, and the Contract Price will 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, and the final adjustment of Contract Price will be set forth in a Change Order, subject to the provisions of the following paragraph.

E. *Adjustments in Unit Price*

1. Contractor or Owner shall be entitled to an adjustment in the unit price with respect to an item of Unit Price Work if:
 - a. the quantity of the item of Unit Price Work performed by Contractor differs materially and significantly from the estimated quantity of such item indicated in the Agreement; and
 - b. Contractor's unit costs to perform the item of Unit Price Work have changed materially and significantly as a result of the quantity change.
2. The adjustment in unit price will account for and be coordinated with any related changes in quantities of other items of Work, and in Contractor's costs to perform such other Work, such that the resulting overall change in Contract Price is equitable to Owner and Contractor.
3. Adjusted unit prices will apply to all units of that item.

ARTICLE 14—TESTS AND INSPECTIONS; CORRECTION, REMOVAL, OR ACCEPTANCE OF DEFECTIVE WORK

14.01 *Access to Work*

- A. Owner, Engineer, their consultants and other representatives and personnel of Owner, independent testing laboratories, and authorities having jurisdiction have access to the Site and the Work at reasonable 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 with such procedures and programs as applicable.

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 will 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 prior to Contractor's purchase thereof for incorporation in the Work.

Such inspections and tests will 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 will 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 written 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 will 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 additional 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, 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 will 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 defective Work as required by Engineer, then Owner may, after 7 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 for 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.
 - 2. 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 must also be accompanied by: (a) a bill of sale, invoice, copies of subcontract or purchase order payments, or other documentation

establishing full payment by Contractor for the materials and equipment; (b) at Owner's request, documentation warranting that Owner has received the materials and equipment free and clear of all Liens; and (c) 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.

3. Beginning with the second Application for Payment, each Application must include an affidavit of Contractor stating that all previous progress payments received by Contractor have been applied to discharge Contractor's legitimate obligations associated with prior Applications for Payment.
4. 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;
 - b. for the means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto;
 - c. for Contractor's failure to comply with Laws and Regulations applicable to Contractor's performance of the Work;
 - d. to make any examination to ascertain how or for what purposes Contractor has used the money paid by Owner; 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 based on Contractor's conduct in the performance or furnishing of the Work, or Owner has incurred costs, losses, or damages resulting from 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 has occurred that would constitute a default by Contractor and therefore justify a termination for cause;
 - j. Liquidated or other 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; or
 - l. Other items entitle 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 will 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 will be treated as an amount due as determined by Paragraph 15.01.D.1 and subject to interest as provided in the Agreement.

15.02 *Contractor's Warranty of Title*

- A. Contractor warrants and guarantees that title to all Work, materials, and equipment furnished under the Contract will pass to Owner free and clear of (1) all Liens and other title defects, and (2) all patent, licensing, copyright, or royalty obligations, no later than 7 days after the time of payment by Owner.

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 will 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 7 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, then Engineer will, within said 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 15.03.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 6.04 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 7.12), and other documents, Contractor may make application for final payment.
2. The final Application for Payment must 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 duly pending Change Proposals and Claims; 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 Final Application and Recommendation of Payment:* 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 10 days after receipt of the final Application for Payment, indicate in writing Engineer's recommendation of final payment and present the final Application for Payment to Owner for payment. Such recommendation will 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. 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. *Notice of Acceptability:* In support of its recommendation of payment of the final Application for Payment, Engineer will also give written notice to Owner and Contractor that the Work is acceptable, subject to stated limitations in the notice and to the provisions of Paragraph 15.07.
- D. *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 and issuance of notice of the acceptability of the Work.
- E. *Final Payment Becomes Due:* Upon receipt from Engineer of the final Application for Payment and accompanying documentation, Owner shall set off against the amount recommended by Engineer for final payment any further sum to which Owner is entitled, including but not limited to set-offs for liquidated damages and set-offs allowed under the provisions of this Contract with respect to progress payments. Owner shall pay the resulting balance due to Contractor within 30 days of Owner's receipt of the final Application for Payment from Engineer.

15.07 *Waiver of Claims*

- A. By making final payment, Owner waives its claim or right to liquidated damages or other damages for late completion by Contractor, except as set forth in an outstanding Claim,

appeal under the provisions of Article 17, set-off, or express reservation of rights by Owner. Owner reserves all other claims or rights after final payment.

- 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 as a Claim, 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 Supplementary Conditions or the terms of any applicable special guarantee required by the Contract Documents), Owner gives Contractor written notice that any Work has been found to be defective, or that Contractor's repair of any damages to the Site or adjacent areas has been found to be defective, then after receipt of such notice of defect 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 adjacent areas;
 - 2. correct such defective Work;
 - 3. remove the defective Work from the Project and replace it with Work that is not defective, if the defective Work has been rejected by Owner, 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 from the corrective measures.
- B. Owner shall give any such notice of defect within 60 days of the discovery that such Work or repairs is defective. If such notice is given within such 60 days but after the end of the correction period, the notice will be deemed a notice of defective Work under Paragraph 7.17.B.
- C. If, after receipt of a notice of defect within 60 days and within the correction period, 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 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). Contractor's failure to pay such costs, losses, and damages within 10 days of invoice from Owner will be deemed the start of an event giving rise to a Claim under Paragraph 12.01.B, such that any related Claim must be brought within 30 days of the failure to pay.
- D. 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.
- E. 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.

- F. Contractor's obligations under this paragraph are in addition to all other obligations and warranties. The provisions of this paragraph are not to 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 directly attributable to any such suspension. Any Change Proposal seeking such adjustments must 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) 10 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) written 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 7 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 will govern over any inconsistent provisions of Paragraphs 16.02.B and 16.02.D.

16.03 *Owner May Terminate for Convenience*

- A. Upon 7 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 for any loss of anticipated profits or revenue, post-termination overhead costs, 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 7 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, 7 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, pursuant to Article 12; and
 - 2. Disputes between Owner and Contractor concerning the Work, or obligations under the Contract Documents, that arise 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;
 - 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 requires the giving of written notice to Owner, Engineer, or Contractor, it will be deemed to have been validly given only if delivered:
 - 1. in person, by a commercial courier service or otherwise, to the recipient's place of business;
 - 2. by registered or certified mail, postage prepaid, to the recipient's place of business; or
 - 3. by e-mail to the recipient, with the words "Formal Notice" or similar in the e-mail's subject line.

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 will not constitute a waiver of that provision, nor will 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 of the Contract or 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 *Assignment of Contract*

- A. Unless expressly agreed to elsewhere in the Contract, no assignment by a party to this Contract of any rights under or interests in the Contract will be binding on the other party without the written consent of the party sought to be bound; and, specifically but without limitation, money that may become due and money that is 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 will release or discharge the assignor from any duty or responsibility under the Contract.

18.09 *Successors and Assigns*

- A. Owner and Contractor each binds itself, its successors, assigns, and legal representatives to the other party hereto, its successors, assigns, and legal representatives in respect to all covenants, agreements, and obligations contained in the Contract Documents.

18.10 *Headings*

- A. Article and paragraph headings are inserted for convenience only and do not constitute parts of these General Conditions.

SUPPLEMENTARY CONDITIONS OF THE CONSTRUCTION CONTRACT

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SUPPLEMENTARY CONDITIONS OF THE CONSTRUCTION CONTRACT

These Supplementary Conditions amend or supplement EJCDC® C-700, Standard General Conditions of the Construction Contract (2018). The General Conditions remain in full force and effect except as amended.

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—for example, "Paragraph SC-4.05."

ARTICLE 1—DEFINITIONS AND TERMINOLOGY

30. Add following language to definition of *Owner*:

Owner is a governmental entity organized and authorized pursuant to the laws of the State of Colorado. For purposes of this Agreement and Contract, all references to Owner include the Board of County Commissioner's duly appointed representative(s) and/or designee(s), such as the County Manager, Assistant County Manager, Public Works Director, or County Engineer.

31. Add the following language to definition of *Engineer*:

Engineer is an employee of Owner and for purposes of this Agreement and Contract duly authorized to act in the capacity of both Owner and Engineer as necessary.

ARTICLE 2—PRELIMINARY MATTERS

2.01 *Delivery of Bonds and Evidence of Insurance*

2.02 *Copies of Documents*

SC-2.02 Delete Paragraph 2.02.A in its entirety and insert the following new paragraph in its place:

- A. Owner shall furnish to Contractor **One** printed copies of conformed Contract Documents incorporating and integrating all Addenda and any amendments negotiated prior to the Effective Date of the Contract (including one fully signed counterpart of the Agreement), 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.

2.06 *Electronic Transmittals*

SC-2.06 Supplement Paragraph 2.06 of the General Conditions by adding the following paragraph:

- D. *Requests by Contractor for Electronic Documents in Other Formats*
1. Release of any Electronic Document versions of the Project documents in formats other than those identified in the Electronic Documents Protocol (if any) or elsewhere in the Contract will be at the sole discretion of the Owner.
 2. To extent determined by Owner, in its sole discretion, to be prudent and necessary, release of Electronic Documents versions of Project documents and other Project

Exhibit A—Software Requirements for Electronic Document Exchange.

EJCDC® C-800, Supplementary Conditions of the Construction Contract.

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information requested by Contractor ("Request") in formats other than those identified in the Electronic Documents Protocol (if any) or elsewhere in the Contract will be subject to the provisions of the Owner's response to the Request, and to the following conditions to which Contractor agrees:

- a. The content included in the Electronic Documents created by Engineer and covered by the Request was prepared by Engineer as an internal working document for Engineer's purposes solely, and is being provided to Contractor on an "AS IS" basis without any warranties of any kind, including, but not limited to any implied warranties of fitness for any purpose. As such, Contractor is advised and acknowledges that the content may not be suitable for Contractor's application, or may require substantial modification and independent verification by Contractor. The content may include limited resolution of models, not-to-scale schematic representations and symbols, use of notes to convey design concepts in lieu of accurate graphics, approximations, graphical simplifications, undocumented intermediate revisions, and other devices that may affect subsequent reuse.
 - b. Electronic Documents containing text, graphics, metadata, or other types of data that are provided by Engineer to Contractor under the request are only for convenience of Contractor. Any conclusion or information obtained or derived from such data will be at the Contractor's sole risk and the Contractor waives any claims against Engineer or Owner arising from use of data in Electronic Documents covered by the Request.
 - c. Contractor shall indemnify and hold harmless Owner and Engineer and their subconsultants from all claims, damages, losses, and expenses, including attorneys' fees and defense costs arising out of or resulting from Contractor's use, adaptation, or distribution of any Electronic Documents provided under the Request.
 - d. Contractor agrees not to sell, copy, transfer, forward, give away or otherwise distribute this information (in source or modified file format) to any third party without the direct written authorization of Engineer, unless such distribution is specifically identified in the Request and is limited to Contractor's subcontractors. Contractor warrants that subsequent use by Contractor's subcontractors complies with all terms of the Contract Documents and Owner's response to Request.
3. In the event that Owner elects to provide or directs the Engineer to provide to Contractor any Contractor-requested Electronic Document versions of Project information that is not explicitly identified in the Contract Documents as being available to Contractor, the Owner shall be reimbursed by Contractor for any engineering costs necessary to create or otherwise prepare the data in a manner deemed appropriate by Engineer.

ARTICLE 3—CONTRACT DOCUMENTS: INTENT, REQUIREMENTS, REUSE

No Supplementary Conditions in this Article.

ARTICLE 4—COMMENCEMENT AND PROGRESS OF THE WORK

4.01 Commencement of Contract Times; Notice to Proceed

Add the following language to 4.01 A.

Contract Times may commence to run at any other time provided the Owner and Contractor so agree in writing.

4.05 Delays in Contractor's Progress

No Supplementary Condition

ARTICLE 5—SITE, SUBSURFACE AND PHYSICAL CONDITIONS, HAZARDOUS ENVIRONMENTAL CONDITIONS

5.03 Subsurface and Physical Conditions

SC-5.03 Add the following new paragraphs immediately after Paragraph 5.03.D:

- E. The following table lists the reports of explorations and tests of subsurface conditions at or adjacent to the Site that contain Technical Data, and specifically identifies the Technical Data in the report upon which Contractor may rely: **[If there are no such reports, so indicate in the table.]**

Report Title	Date of Report	Technical Data
		[Identify Technical Data]

- F. The following table lists the drawings of existing physical conditions at or adjacent to the Site, including those drawings depicting existing surface or subsurface structures at or adjacent to the Site (except Underground Facilities), that contain Technical Data, and specifically identifies the Technical Data upon which Contractor may rely: **[If there are no such drawings, so indicate in the table.]**

Drawings Title	Date of Drawings	Technical Data
		[Identify Technical Data]

- G. Contractor may examine copies of reports and drawings identified in SC-5.03.E and SC-5.03.F that were not included with the Bidding Documents at **0037 Peak One Drive, Frisco CO 80443** during regular business hours, or may request copies from Engineer.

5.06 Hazardous Environmental Conditions

SC-5.06 Add the following new paragraphs immediately after Paragraph 5.06.A.3:

4. The following table lists the reports known to Owner relating to Hazardous Environmental Conditions at or adjacent to the Site, and the Technical Data (if any) upon which Contractor may rely: **[If there are no such reports, so indicate in the table]**

Report Title	Date of Report	Technical Data
		[Identify Technical Data]

5. The following table lists the drawings known to Owner relating to Hazardous Environmental Conditions at or adjacent to the Site, and Technical Data (if any) contained in such Drawings upon which Contractor may rely: **[If there are no such drawings, so indicate in the table]**

Drawings Title	Date of Drawings	Technical Data
		[Identify Technical Data]

ARTICLE 6—BONDS AND INSURANCE

6.01 Performance, Payment, and Other Bonds

SC-6.01 Add the following paragraphs immediately after Paragraph 6.01.A:

1. *Required Performance Bond Form:* The performance bond that Contractor furnishes will be in the form of EJCDC® C-610, Performance Bond (2010, 2013, or 2018 edition).
2. *Required Payment Bond Form:* The payment bond that Contractor furnishes will be in the form of EJCDC® C-615, Payment Bond (2010, 2013, or 2018 edition).

6.02 Insurance—General Provisions

SC-6.02 Add the following paragraph immediately after Paragraph 6.02.B:

1. Contractor may obtain worker's compensation insurance from an insurance company that has not been rated by A.M. Best, provided that such company (a) is domiciled in the state in which the Project is located, (b) is certified or authorized as a worker's compensation insurance provider by the appropriate state agency, and (c) has been accepted to provide worker's compensation insurance for similar projects by the state within the last 12 months.

SC-6.02 Add the following paragraph immediately after Paragraph 6.02.H.2 of the General Conditions:

3. For the following Subcontractors, Suppliers, or categories of Subcontractor or Supplier, Contractor shall require the following specified insurance, with policy limits as stated: **[Identify Subcontractors, Suppliers, or categories of same, and insert specific insurance requirements and policy limits]**

6.03 *Contractor's Insurance*

SC-6.03 Supplement Paragraph 6.03 with the following provisions after Paragraph 6.03.C:

- D. *Other Additional Insureds*: As a supplement to the provisions of Paragraph 6.03.C of the General Conditions, the commercial general liability, automobile liability, umbrella or excess, pollution liability, and unmanned aerial vehicle liability policies must include as additional insureds (in addition to Owner and Engineer) the following: **[Here list by legal name (not category, role, or classification) other persons or entities to be included as additional insureds. See GC-6.03.C.]**
- E. *Workers' Compensation and Employer's Liability*: Contractor shall purchase and maintain standard workers' compensation as required by law in the State of Colorado, as follows: **[Include if Applicable]**.
- F. *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 claims for:
 - 1. damages because of bodily injury, sickness or disease, or death of any person other than Contractor's employees,
 - 2. damages insured by reasonably available personal injury liability coverage, and
 - 3. damages because of injury to or destruction of tangible property wherever located, including loss of use resulting therefrom.
- G. *Commercial General Liability—Form and Content*: Contractor's commercial liability policy must be written on a 1996 (or later) Insurance Services Organization, Inc. (ISO) commercial general liability form (occurrence form) and include the following coverages and endorsements:
 - 1. Products and completed operations coverage.
 - a. Such insurance must 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, including but not limited to coverage of Contractor's contractual indemnity obligations in Paragraph 7.18.
 - 3. Severability of interests and no insured-versus-insured or cross-liability exclusions.
 - 4. Underground, explosion, and collapse coverage.
 - 5. Personal injury coverage.
 - 6. 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). If Contractor demonstrates to Owner that the specified ISO endorsements are not commercially available, then Contractor may satisfy this requirement by providing equivalent endorsements.

7. 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.
- H. *Commercial General Liability—Excluded Content:* The commercial general liability insurance policy, including its coverages, endorsements, and incorporated provisions, must not include any of the following:
1. Any modification of the standard definition of "insured contract" (except to delete the railroad protective liability exclusion if Contractor is required to indemnify a railroad or others with respect to Work within 50 feet of railroad property).
 2. Any exclusion for water intrusion or water damage.
 3. Any provisions resulting in the erosion of insurance limits by defense costs other than those already incorporated in ISO form CG 00 01.
 4. Any exclusion of coverage relating to earth subsidence or movement.
 5. Any exclusion for the insured's vicarious liability, strict liability, or statutory liability (other than worker's compensation).
 6. Any limitation or exclusion based on the nature of Contractor's work.
 7. Any professional liability exclusion broader in effect than the most recent edition of ISO form CG 22 79.
- I. *Commercial General Liability—Minimum Policy Limits*

Commercial General Liability	Policy limits of not less than:
General Aggregate	\$2 million
Personal Injury Each Occurrence	\$1 million
Bodily Injury and Property Damage—Each Occurrence	\$1 million

- J. *Automobile Liability:* Contractor shall purchase and maintain automobile liability insurance 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 must be written on an occurrence basis.

Automobile Liability	Policy limits of not less than:
Bodily Injury	
Each Person	\$1 million
Each Accident	\$1 million
Property Damage	
Each Accident	\$1 million

- K. *Umbrella or Excess Liability:* Contractor may 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. The coverage afforded must be at least as broad as that of each and every one of the underlying policies.

- L. *Using Umbrella or Excess Liability Insurance to Meet CGL and Other Policy Limit Requirements:* Contractor may meet the policy limits specified for employer's liability, commercial general liability, and automobile liability through the primary policies alone, or through combinations of the primary insurance policy's policy limits and partial attribution of the policy limits of an umbrella or excess liability policy that is at least as broad in coverage as that of the underlying policy, as specified herein.
- M. *Contractor's Pollution Liability Insurance:* Contractor shall purchase and maintain a policy covering third-party injury and property damage, including cleanup costs, as a result of pollution conditions arising from Contractor's operations and completed operations. This insurance must be maintained for no less than three years after final completion.
- N. *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 must cover negligent acts, errors, or omissions in the performance of professional design or related services by the insured or others for whom the insured is legally liable. The insurance must be maintained throughout the duration of the Contract and for a minimum of two years after Substantial Completion. The retroactive date on the policy must pre-date the commencement of furnishing services on the Project.
- O. *Railroad Protective Liability Insurance:* Prior to commencing any Work within 50 feet of railroad-owned and controlled property, Contractor shall (1) endorse its commercial general liability policy with ISO CG 24 17, removing the contractual liability exclusion for work within 50 feet of a railroad, (2) purchase and maintain railroad protective liability insurance meeting the following requirements, (3) furnish a copy of the endorsement to Owner, and (4) submit a copy of the railroad protective policy and other railroad-required documentation to the railroad, and notify Owner of such submittal.
- P. *Unmanned Aerial Vehicle Liability Insurance:* If Contractor uses unmanned aerial vehicles (UAV—commonly referred to as drones) at the Site or in support of any aspect of the Work, Contractor shall obtain UAV liability insurance in the amounts stated; name Owner, Engineer, and all individuals and entities identified in the Supplementary Conditions as additional insureds; and provide a certificate to Owner confirming Contractor's compliance with this requirement. Such insurance will provide coverage for property damage, bodily injury or death, and invasion of privacy.
- Q. *Other Required Insurance:* [Here list additional types and amounts of insurance that Contractor is required to carry.]

6.04 *Builder's Risk and Other Property Insurance*

SC-6.04 Supplement Paragraph 6.04 of the General Conditions with the following provision:

- G. *Coverage for Completion Delays:* The builder's risk policy will include, for the benefit of Owner, loss of revenue and soft cost coverage for losses arising from delays in completion that result from covered physical losses or damage. Such coverage will include, without limitation, fixed expenses and debt service for a minimum of 12 months with a maximum deductible of 30 days, compensation for loss of net revenues, rental costs, and attorneys' fees and engineering or other consultants' fees, if not otherwise covered.

SC-6.04 Supplement Paragraph 6.04 of the General Conditions with the following provisions:

- H. *Builder's Risk and Other Property Insurance Deductibles:* The purchaser of any required builder's risk, installation floater, or other property insurance will be responsible for costs not covered because of the application of a policy deductible.
1. The builder's risk policy (or if applicable the installation floater) will be subject to a deductible amount of no more than **\$[number]** for direct physical loss in any one occurrence.

ARTICLE 7—CONTRACTOR'S RESPONSIBILITIES

7.03 *Labor; Working Hours*

SC-7.03 Add the following new subparagraphs immediately after Paragraph 7.03.C:

1. Regular working hours will be **7AM to 7PM**
2. Owner's legal holidays are:

New Year's Day, Memorial Day, Independence Day, Labor Day, Veteran's Day, Thanksgiving Day, Day after Thanksgiving, Christmas Eve and Christmas Day.

SC-7.03 Amend the first and second sentences of Paragraph 7.03.C to state "...all Work at the Site must be performed during regular working hours, **Monday** through **Saturday**. Contractor will not perform Work on a **Sunday**, or any legal holiday listed."

SC-7.03 Add the following new paragraph immediately after Paragraph 7.03.C:

- D. **[Owner]** 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.

7.10 Taxes

SC-7.10 Add a new paragraph immediately after Paragraph 7.10.A:

- A. Owner is exempt from payment of sales and compensating use taxes of the State of **Colorado** and of cities and counties thereof on all materials to be incorporated into the Work.
 - 1. Owner will furnish the required certificates of tax exemption to Contractor for use in the purchase of supplies and materials to be incorporated into the Work.
 - 2. Owner's exemption does not apply to construction tools, machinery, equipment, or other property purchased by or leased by Contractor, or to supplies or materials not incorporated into the Work.

7.13 Safety and Protection

No Supplementary Condition

ARTICLE 8—OTHER WORK AT THE SITE

8.02 Coordination

[No Supplementary Condition] [Or describe coordination required]

SC-8.02 Add the following new Paragraph 8.02.C immediately after Paragraph 8.02.B:

- C. Owner intends to contract with others for the performance of other work at or adjacent to the Site.
 - 1. **[Here identify individual or entirety]** shall have authority and responsibility for coordination of the various contractors and work forces at the Site;
 - 2. The following specific matters are to be covered by such authority and responsibility: **[Here itemize such matters];**
 - 3. The extent of such authority and responsibilities is: **[Here provide the extent].**

ARTICLE 9—OWNER'S RESPONSIBILITIES

9.13 Owner's Site Representative

No Supplementary Condition

ARTICLE 10—ENGINEER'S STATUS DURING CONSTRUCTION

10.03 Resident Project Representative

SC-10.03 Add the following new subparagraph immediately after Paragraph 10.03.A:

- 1. On this Project, by agreement with the Owner, the Engineer will not furnish a Resident Project Representative to represent Engineer at the Site or assist Engineer in observing the progress and quality of the Work.

ARTICLE 11—CHANGES TO THE CONTRACT

No Supplementary Conditions in this Article.

ARTICLE 12—CLAIMS

No Supplementary Conditions in this Article.

ARTICLE 13—COST OF WORK; ALLOWANCES, UNIT PRICE WORK

13.01 *Cost of the Work*

SC-13.01 Supplement Paragraph 13.01.C.2 by adding the following definition of small tools and hand tools:

- a. For purposes of this paragraph, “small tools and hand tools” means any tool or equipment whose current price if it were purchased new at retail would be less than \$500. **[or insert other threshold price.]**

ARTICLE 14—SC-13.03 TESTS AND INSPECTIONS; CORRECTION, REMOVAL, OR ACCEPTANCE OF DEFECTIVE WORK

No Supplementary Conditions in this Article.

ARTICLE 15—PAYMENTS TO CONTRACTOR, SET OFFS; COMPLETIONS; CORRECTION PERIOD

Insert Entire New Paragraph:

15.00 *Appropriation*

This Agreement and Contract is subject to the provisions of C.R.S. §29-1-110(1), and Contractor acknowledges that neither Owner, Engineer, nor any employee or agent thereof is authorized to expend or contract for the expenditure of any funds in excess of those appropriated by the Owner for the payment of the Contract. The Owner acknowledges and agrees that sufficient funds have been appropriated to pay the Contract Price, but Contractor shall not rely upon the appropriation of any money or other funds in addition to those already appropriated unless and until the same are lawfully appropriated by the Owner in the manner provided by law. As required by Article X, Section 20 of the Colorado Constitution, any obligation of the Owner not performed in the current fiscal year shall be subject to annual appropriation of funds by the Board of County Commissioners. Should sufficient funds not be appropriated for the Owner’s performance in future fiscal years, this agreement shall terminate and be of no further force and effect.

15.01 *Progress Payments*

Insert new subparagraph B.1.:

At least 30 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.

15.01.C Review of Applications

Insert new subparagraph 1.

Engineer will, within 14 working 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.

15.01.D Payment becomes Due

Insert new subparagraph 1.

30 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.

15.03 Substantial Completion

SC-15.03 Add the following new subparagraph to Paragraph 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, will 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 this Article 15.

15.06 Final Payment

SC- 15.06.F Add the following new subparagraph after 15.06.E.

Final payment shall be subject to the provisions and requirements of C.R.S. § 38-26-107.

15.08 Correction Period

No Supplementary Condition

ARTICLE 16—SUSPENSION OF WORK AND TERMINATION

No Supplementary Conditions in this Article.

ARTICLE 17—FINAL RESOLUTIONS OF DISPUTES

17.02 Arbitration

SC-17.02 Add the following new paragraph immediately after Paragraph 17.01.

17.02 Arbitration and Mediation

- A. All matters subject to final resolution under this Article may be settled by arbitration administered by the American Arbitration Association in accordance with its Construction Industry Arbitration Rules, or any other proceeding as agreed to by the parties. Any controversy or claim in the amount of \$100,000 or less may be settled in accordance with the American Arbitration Association's supplemental rules for Fixed Time and Cost Construction Arbitration.
- B. The request for arbitration or mediation will be filed in writing with the other party to the Contract, and a copy will be sent to Engineer for information. The request for arbitration or mediation will be made within the specific time required in Article 17, or if no specified time is applicable within a reasonable time after the matter in question has arisen, and in no event will any such demand be made after the date when institution of legal or equitable proceedings based on such matter in question would be barred by the applicable statute of limitations.

17.03 *Attorneys' Fees*

SC-17.03 Add the following new paragraph immediately after Paragraph 17.02.

17.03 *Attorneys' Fees*

- A. For any matter subject to final resolution under this Article, the prevailing party shall be entitled to an award of its attorneys' fees incurred in the final resolution proceedings, in an equitable amount to be determined in the discretion of the court, or other arbitrator, arbitration panel, or mediator, taking into account the parties' initial demand or defense positions in comparison with the final result.

ARTICLE 18—MISCELLANEOUS

18.08 *Assignment of Contract*

No Supplementary Condition

SC-18.1103 Add the following new paragraph immediately after Paragraph 18.10

18.11 *Governmental Immunity Act*

Owner does not intend to waive by any provision of this Agreement and Contract the monetary limits and any other rights, immunities, and protections provided by the Colorado Governmental Immunity Act, Section 24-10-101 et seq., C.R.S., or any other provision of law.

EXHIBIT A—SOFTWARE REQUIREMENTS FOR ELECTRONIC DOCUMENT EXCHANGE

Item	Electronic Documents	Transmittal Means	Data Format	Note (1)
a.1	General communications, transmittal covers, meeting notices and responses to general information requests for which there is no specific prescribed form.	Email	Email	
a.2	Meeting agendas, meeting minutes, RFI's and responses to RFI's, and Contract forms.	Email w/ Attachment	PDF	(2)
a.3	Contractors Submittals (Shop Drawings, "or equal" requests, substitution requests, documentation accompanying Sample submittals and other submittals) to Owner and Engineer, and Owner's and Engineer's responses to Contractor's Submittals, Shop Drawings, correspondence, and Applications for Payment.	Email w/ Attachment	PDF	
a.4	Correspondence; milestone and final version Submittals of reports, layouts, Drawings, maps, calculations and spreadsheets, Specifications, Drawings and other Submittals from Contractor to Owner or Engineer and for responses from Engineer and Owner to Contractor regarding Submittals.	Email w/ Attachment or LFE	PDF	
a.5	Layouts and drawings to be submitted to Owner for future use and modification.	Email w/ Attachment or LFE	DWG	
a.6	Correspondence, reports and Specifications to be submitted to Owner for future word processing use and modification.	Email w/ Attachment or LFE	DOC	
a.7	Spreadsheets and data to be submitted to Owner for future data processing use and modification.	Email w/ Attachment or LFE	EXC	
a.8	Database files and data to be submitted to Owner for future data processing use and modification.	Email w/ Attachment or LFE	DB	
Notes				
(1)	All exchanges and uses of transmitted data are subject to the appropriate provisions of Contract Documents.			
(2)	Transmittal of written notices is governed by Paragraph 18.01 of the General Conditions.			
Key				
Email	Standard Email formats (.htm, .rtf, or .txt). Do not use stationery formatting or other features that impair legibility of content on screen or in printed copies			
LFE	Agreed upon Large File Exchange method (FTP, CD, DVD, hard drive) FTP			
PDF	Portable Document Format readable by Adobe® Acrobat Reader Version 9 or later			
DWG	Autodesk® AutoCAD .dwg format Version 2016			
DOC	Microsoft® Word .docx format Version 2016			
EXC	Microsoft® Excel .xls or .xml format Version 2016			
DB	Microsoft® Access .mdb format Version 2016			

EXHIBIT B—FORESEEABLE BAD WEATHER DAYS

No Supplementary Condition

EXHIBIT C—GEOTECHNICAL BASELINE REPORT SUPPLEMENT TO THE SUPPLEMENTARY CONDITIONS

No Supplementary Condition



PROJECT PLANS

(To be provided in separate PDF)



TECHNICAL SPECIFICATIONS

TECHNICAL SPECIFICATIONS

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SECTION 01010
SUMMARY OF WORK

PART 1 GENERAL

1.1 SUMMARY

The work to be performed under this project consists of providing the labor, equipment, materials, and ancillary construction to access and construct Fill Area IV Phases 5 and 6 at the Summit County Resource Allocation Park, as shown on the Construction Drawings, CQA Plan, and these Technical Specifications.

1.2 DEFINITIONS

OWNER – Summit County

CONTRACTOR – Any and all parties performing the work as described in these Technical Specifications, excluding work to be performed by the INSTALLER.

INSTALLER – Any and all parties performing geosynthetics installation.

ENGINEER – Weaver Consultants Group

CQAE – Construction Quality Assurance Engineer, and/or construction quality assurance/quality control consultant, and/or Weaver Consultants Group

1.3 LOCATIONS

The following locations will be utilized in the submittal of bids:

Facility:

639 Landfill Road
Dillon, CO 80435

Submission of Bids:

Mr. Aaron Byrne
639 Landfill Road
Dillon, CO 80435
Aaron.byrne@summitcountyco.gov

1.4 INTENT OF THE CONTRACT

The intent of the Contract is to provide for construction and completion of the work in accordance with the Contract drawings and specifications, using a standard of care consistent in the solid waste construction management industry, consistent with the General and Special Conditions, and other requirements contained herein. Unless otherwise specified, the CONTRACTOR will furnish all labor, materials, tools, equipment, and incidentals that are

necessary to complete the work in a proper, complete, and acceptable manner, in accordance with the drawings and specifications.

Given the nature of this project, some field revisions to the Technical Specifications and Drawings are possible. The OWNER or its Representative(s) and the CONTRACTOR will work together to resolve field issues in a timely and cost-effective manner. The Technical Specifications, Drawings, Description of Work, and field coordination will ensure all work is completed, at minimum, in accordance with the manufacturer's specifications, good practice, and local, state, and federal regulations. Each section of the Technical Specifications provides detailed guidance to the materials and methods to be used in the construction work, and the testing and approval of the work.

1.5 SUMMARY OF WORK TO BE DONE BY CONTRACTOR

- A. Management of surface waters into and from the construction area during construction.
- B. Stripping and stockpiling of topsoil and other soils from the surface of areas to be excavated and filled.
- C. Removal and stockpiling of soils from the excavated areas to achieve design grade elevations.
- D. Construction of the groundwater interception system
- E. Construction of berms to form the perimeter of Fill Area IV Phases 6 and 7
- F. Construction of floor and sideslopes of Fill Area IV Phases 6 and 7
- G. Preparation and maintenance of the subgrade soils for construction of the liner system (by others) over the floor and sideslopes of the cells.
- H. Placement of the 1-foot thick foundation layer
- I. Installation of the GCL, Geomembrane, and Geocomposite layers
- J. Preparation and backfilling of geosynthetics anchor trenches, in coordination with the INSTALLER.
- K. Placement of the 1-foot thick operations layer.

1.6 CONTRACTOR RESPONSIBILITIES

- A. Requirements of the Work. The CONTRACTOR will be responsible for knowing and understanding the requirements of the work, including these Technical Specifications and the Drawings. The OWNER or its Representative(s) will assist the CONTRACTOR with following and meeting the requirements of these documents, but the OWNER or

its Representative(s) will not be responsible for informing the CONTRACTOR of the requirements.

- B. Health and Safety. The CONTRACTOR will have sole responsibility for the health and safety of its employees and completing the work in accordance with all local, state, and federal requirements.
- C. The CONTRACTOR will provide all equipment, personnel, and materials to complete the work to the line, grade, and requirements included in this description, the Technical Specifications, and the Drawings.
- D. The CONTRACTOR will provide all temporary facilities (office, phone, power, sanitary, eyewash stations, etc.) required for its work. If the CONTRACTOR provides an office facility, space for a desk and table, with electrical power suitable for light and computer, CONTRACTOR will make it available to the OWNER or its Representative(s).
- E. Protection of Existing Facilities. The CONTRACTOR will protect existing vegetation, structures, equipment, utilities, pavement, and improvements. Any damage caused by the CONTRACTOR or its subcontractors will be repaired or replaced equal to existing work, at the expense of the CONTRACTOR.
- F. No work will be done by the CONTRACTOR without personnel from the OWNER or its Representative(s) at the site, unless previously approved by the OWNER or its Representative(s).
- G. Surveying. Except as noted below, the OWNER or their Representative(s) will provide surveying for as-built construction and for determining construction quantities. The CONTRACTOR, at their own expense, will be responsible for any additional construction or check surveying.
 - 1. The CONTRACTOR will be responsible for maintaining staking and control points provided by the OWNER or their Representative(s). Replacing these, except where removal is necessary to completing the Work, will be at the expense of the CONTRACTOR.
- H. Permits and Permissions. The CONTRACTOR will be responsible for obtaining all permits and permissions necessary to begin and complete the Work. The contractor may operate under the Summit County Landfill's Stormwater Permit.
- I. Environmental Controls. The CONTRACTOR will be responsible for temporary environmental controls associated with the construction work, including, but not limited to, dust suppression, drainage control, stormwater control, storage and control of petroleum products, and hazardous materials and wastes.
- J. All work must be carried out and maintained per the drawings and specifications subject to the approval of the Design Engineer and Construction Quality Assurance

Engineer (CQAE). Any materials found to be outside of the tolerances identified in the drawings and specifications must be reworked, or removed and replaced, to meet the approval of the CQAE and at no additional cost to the OWNER.

- K. CONTRACTOR will be responsible for any damage their operations cause to any portion of the Work, regardless of the circumstances, and will repair this damage to the approval of the CQAE and at no additional cost to the OWNER.
- L. CONTRACTOR will be responsible for all dewatering and repairs required due to rain or freezing; associated costs are to be included in unit prices. The CONTRACTOR will also be responsible for dust control and maintaining all required haul roads during construction.

1.7 SUMMARY OF WORK TO BE DONE BY GEOSYNTHETICS CONTRACTOR

The INSTALLER's services will be retained under the CONTRACTOR. CONTRACTOR should allow for the following activities when scheduling his work:

- A. Inspection of materials placed by the CONTRACTOR prior to geosynthetics placement.
- B. Preparation of reports and other documents describing acceptability of subgrade work completed by the CONTRACTOR.
- C. Installation of the disposal cell base liner system.
- D. Preparation of as-built panel layout drawing for each geomembrane layer.

1.8 OWNER RESPONSIBILITIES

1.8.1 OWNER-Supplied Material

For the purpose of this Contract, the OWNER will provide the following:

- All soil material, including topsoil, structural fill, and general fill material. However, CONTRACTOR will be responsible for excavating and transporting the soil material from the soil borrow and/or stockpile area.

The CONTRACTOR will supply all other construction materials required for this project. However, OWNER may request the CONTRACTOR to supply other material at the unit cost listed on the Bid Worksheet.

1.8.2 OWNER-Supplied Services

Services to be provided by the OWNER for this project include:

- OWNER will provide an adequate storage area and equipment parking area in the vicinity of the actual construction area.

- OWNER will provide a Site Manager to interface with CONTRACTORS working at the site.
- OWNER (through the CQAE) will provide as-built drawings as applicable.
- The OWNER will also provide any required Contract quantity verification surveys.
- OWNER will provide a disposal area for any existing non-hazardous waste or deleterious materials that are excavated and removed by the CONTRACTOR during the project.
- OWNER will provide a source of water for soil moisturizing.
- OWNER will provide approval of work.

The CONTRACTOR will provide equipment and services necessary for on-site disposal of waste generated by the CONTRACTOR and GEOSYNTHETICS CONTRACTOR during construction.

1.9 CQAE RESPONSIBILITIES

The CQAE will be retained under a separate contract to the OWNER.

- A. The OWNER or its Representative will provide construction quality assurance/quality control (CQA/QC). This will include testing equipment, supplies, and personnel for testing earth construction (moisture/density testing), observing and documenting synthetic liner construction, and observing and documenting all other construction.
- B. The CQAE will be a Representative of the OWNER.
- C. The CQAE must have experience in constructing prepared subgrades, synthetic liners, and earthwork.
- D. The CQAE will appoint an Inspector who will be responsible for documenting field construction and the compliance of the finished product with the requirements of the Technical Specifications and Drawings, good practice, and the local, state, and federal laws and regulations governing their construction.
- E. The CQAE will have a Professional Engineer, licensed in Colorado, on their staff with suitable experience for certifying that the facility has been constructed in compliance with the requirements of these Technical Specifications and Drawings, good practice, and the local, state, and federal laws and regulations governing their construction.

1.10 COORDINATION BETWEEN CONTRACTORS

Before any work begins, each CONTRACTOR will carefully check all plans and specifications for each trade and job condition. Any lack of coordination between CONTRACTOR'S work, other Contractors, plans, specifications, or job conditions will be immediately reported to OWNER, in writing. If CONTRACTOR fails to call such conflict or lack of coordination between other Contractors, plans, specifications, or job conditions to the OWNER's attention before any work is done, it will be assumed that no conflict or lack of coordination exists, and that all specified milestones contained in the approved baseline schedule will be met.

CONTRACTOR will coordinate all geosynthetic and certification survey scheduling through the CQAE to ensure well-coordinated operations and construction activities during the project.

END OF SECTION

SECTION 01310
SUBMITTALS, INSPECTIONS, TESTS AND REPORTS

PART 1 GENERAL

1.1 SUMMARY

The work to be performed under this project consists of providing the labor, equipment, and materials as required by these Technical Specifications. A summary of the submittals, inspections, tests, and reports required for each section of these Technical Specifications is provided below. The CONTRACTOR will confirm that the summary matches the requirements of each section and the individual section summaries include all of the required items. The CONTRACTOR will promptly notify the Construction Quality Assurance Engineer (CQAE) of any differences. In the case of a conflict, the more stringent requirement will apply.

1.2 PROCEDURES FOR SUBMITTALS

A. Reviewing, Certifying, Approving Authority

1. The CQAE will be responsible for reviewing and certifying that submittals are in compliance with Contract requirements.
2. Approving authority on submittals is the CQAE Professional Engineer, unless otherwise specified for a specific submittal.

B. Constraints

1. Complete submittals for each definable feature of work. Components of definable features interrelated as a system will be submitted at the same time.
2. When acceptability of a submittal is dependent on conditions, items, or materials included in separate subsequent submittals, submittal will be returned without review.
3. Approval of a separate material, product, or component does not imply approval of assembly in which item functions.

C. Scheduling

1. Coordinate scheduling, sequencing, preparing, and processing of submittals with performance of work so that work will not be delayed by submittal processing. Allow for potential requirements to resubmit.
2. Except as specified otherwise, allow a review period, beginning with receipt by approving authority, which includes at least five working days for submittals for CQAE approval, unless otherwise noted or agreed in writing.
4. Period of review for each resubmittal is the same as for initial submittal.

D. Variations. Variations from contract requirements require approval prior to their construction.

1. Considering Variations. Discussion with CQAE before submission will help ensure functional and quality requirements are met and will minimize rejections and resubmittals.
2. Proposing Variations.
 - a. When proposing a variation, deliver a written request to the CQAE with documentation of the nature and features of the variation and why the variation is desirable and beneficial.
 - b. If lower cost is a benefit, also include an estimate of the cost savings.
 - c. In addition to documentation required for a variation, include the submittals required for the item. Clearly mark the proposed variation in all documentation.
3. Warranting that Variations are Compatible.
 - a. When delivering a variation for approval, CONTRACTOR warrants this contract has been reviewed to establish that the variation, if incorporated, is equal to or better than the specified item.
 - b. When delivering a variation for approval, CONTRACTOR warrants this contract has been reviewed to establish that the variation, if incorporated, will be compatible with other elements of work.
4. Review Schedule is Modified. In addition to the normal submittal review period, a period of 10 working days will be allowed for consideration of submittals with variations (a total review period of 15 working days).

1.3 CONTRACTOR RESPONSIBILITIES

- A. Determine and verify field measurements, materials, field construction criteria. Review each submittal and check and coordinate each submittal with requirements of the work and Contract Documents.
- B. Transmit submittals to CQAE to prevent delays in the work, delays to the OWNER, or delays to separate contractors.
- C. Advise OWNER and its Representative(s) of variations, as required by paragraph entitled "Variations".
- D. Correct and resubmit submittal as directed by approving authority.
 1. When resubmitting disapproved transmittals or transmittals noted for resubmittal, the CONTRACTOR will provide a copy of that previously submitted transmittal, including all reviewer comments for use by approving authority.

- 2. Direct specific attention, in writing or on resubmitted submittal, to revisions not requested by approving authority on previous submissions.
- E. Furnish additional copies of submittal when requested by CQAE, up to five copies per submittal.
- F. Complete work on schedule to allow timely completion of a submittal that describes the work.
- G. Ensure no work has begun until submittals for that work have been returned as "approved" or "approved as noted", except to the extent that a portion of work must be accomplished as basis of submittal.

1.4 CQAE RESPONSIBILITIES

- A. Note date on which submittal was received from CONTRACTOR on each submittal.
- B. Review each submittal and check and coordinate each submittal with requirements of work and Contract Documents.
- C. Review submittals for conformance with project design concepts and compliance with Contract Documents.
- D. Act on submittals, determining appropriate action based on CQAE's review of submittal.
- E. Ensure that material is clearly legible.
- F. Stamp each sheet of each submittal with CQAE certifying statement or approving statement, except that data submitted in bound volume or one sheet printed on two sides may be stamped on the front of the first sheet only.
- G. Sign certifying statement or approval statement. The person signing certifying statements will be the CQAE Professional Engineer. The signatures will be in original ink; stamped signatures are not acceptable.
- H. Establish and update a submittal register as submittal actions occur, and maintain the submittal register at project site until final acceptance of all work.
- I. Retain a copy of approved submittals at project site, including CONTRACTOR'S copy of approved samples.

1.5 SUMMARY BY SECTION

A. Section 02300 – Earthwork

1. Submittals

a. Qualifications

(1) CONTRACTOR

- (a) Documentation of the CONTRACTOR'S experience with projects of similar scope and size (**Section 02300, Part 1.7.A** of these Technical Specifications).
- (b) Documentation of the CONTRACTOR'S ability to provide equipment appropriate to the work in order to complete the work in a timely manner.
- (c) Documentation of the experience of the CONTRACTOR'S Superintendent on projects of similar scope and size.

(2) CQAE

- (a) Documentation of the CQAE'S experience with projects of similar size and scope.
- (b) Documentation of the CQAE'S ability to provide testing services required by this project. These services may be provided by a subcontractor to the CQAE or the CONTRACTOR, provided the CQAE'S onsite person has at least two years of experience with projects of similar size and scope.

- b. Alternate Materials and Methods proposed by the CONTRACTOR for earthwork must be submitted and approved before their use.

2. Inspections, Tests, and Reports

- a. Documentation of the weather conditions by the CQAE (**Section 02300, Part 1.9.C** of these Technical Specifications).
- b. Foundation inspections, surface inspections, panel deployment drawings, etc., as required by these Technical Specifications for liner systems.
- c. Density testing results, as required by **Section 02300, Part 3.5** of these Technical Specifications.
- d. As-built drawings (**Section 02300, Part 3.6** of these Technical Specifications).

B. Section 02513 – HDPE Liners

1. Submittals

- a. Before delivery of any geomembrane rolls to the site, the Manufacturer will provide the CQAE with the following information:
 - (1) The resin supplier, supplier location, and brand name.
 - (2) Any test results conducted by the geomembrane and/or resin manufacturer to document the quality of the resin used in the membrane fabrication.
 - (3) Information showing the liner materials and manufacturing meet the requirements of **Section 02513, Part 2.1** of these Technical Specifications.

- b. Before delivery of any geomembrane rolls to the site and beginning liner installation, the CONTRACTOR will provide information showing the Manufacturer, Fabricator (if different than the Manufacturer), and INSTALLER meet the requirements of **Section 02513, Part 1.6** of these Technical Specifications, including qualifications of the INSTALLER's seamer.
 - c. At least three days before beginning liner installation, the INSTALLER will provide the CQAE with seam layout drawings for each panel, showing each expected seam. The CQAE will review the seam layout drawing and document that it is consistent with accepted practice and the design plans and drawings. No seaming will be performed without the CQAE'S written approval.
 - (1) In general, seams should be oriented parallel to the line of maximum slope, so they are oriented along, not across, the slope.
 - (2) In corners and at other odd geometric intersections, the number of seams should be minimized.
 - (3) All horizontal seams across the slope must be approved by the CQAE. Only end-of-panel seams are eligible for approval.
 - (4) A seam numbering system that is compatible with the geomembrane roll numbering system will be agreed upon by the INSTALLER and the CQAE.
 - d. Information regarding the quality of extrudate used in the welding apparatus (see **Section 02513, Part 1.9.E** of the Technical Specifications).
 - e. Proposed alternate seaming processes (see **Section 02513, Part 1.9.B.4** of these Technical Specifications).
2. Inspections, Tests, and Reports
- a. Materials inspections upon delivery of materials (see **Section 02513, Part 1.7** of these Technical Specifications).
 - b. Seaming quality control records (see **Section 02513, Part 1.9.C.2** of these Technical Specifications).
 - c. Documentation of weather conditions (see **Section 02513, Part 1.8.D** of these Technical Specifications).
 - d. Inspections and approval of the surface upon which liner will be placed (see **Section 02513, Part 3.1.A.4** of these Technical Specifications).
 - e. Inspections of the liner deployment (see **Section 02513, Part 3.2.H** of these Technical Specifications).
 - f. Information regarding trial seams (see **Section 02513, Part 3.3.A** of these Technical Specifications).
 - g. Collection and testing of materials samples from each roll (see **Section 02513, Parts 3.4 and 3.5** of these Technical Specifications).

- h. Documentation of capping (see **Section 02513, Part 3.3.B.6** of these Technical Specifications).
- i. Non-destructive and destructive testing of field seams (see **Section 02513, Parts 3.5.B and C** of these Technical Specifications).
- j. Visual inspection of the liner prior to covering (see **Section 02513, Part 3.7** of these Technical Specifications).

C. Section 02515 – GCL Liner

1. Submittals

- a. Before delivery of any GCL rolls to the site, the Manufacturer will provide the CQAE with the following information:
 - (1) The supplier, supplier location, and brand name.
 - (2) Any test results conducted by the manufacturer to document the quality of the material used in fabrication.
 - (3) Information showing the GCL materials and manufacturing meet the requirements of **Section 02515, Part 2.1** of these Technical Specifications.
- b. Before delivery of any GCL rolls to the site and beginning liner installation, the CONTRACTOR will provide information showing the Manufacturer, Fabricator (if different than the Manufacturer), and INSTALLER meet the requirements of **Section 02515, Part 1.6** of these Technical Specifications, including qualifications of the INSTALLER's seamer.
- c. At least three days before beginning liner installation, the INSTALLER will provide the CQAE with seam layout drawings for each panel, showing each expected seam. The CQAE will review the seam layout drawing and document that it is consistent with accepted practice and the design plans and drawings. No seaming will be performed without the CQAE'S written approval.

2. Inspections, Tests, and Reports

- a. Materials inspections upon delivery of materials (see **Section 02515, Part 1.7** of these Technical Specifications).
- b. Documentation of weather conditions (see **Section 02515, Part 1.8** of these Technical Specifications).
- c. Inspections and approval of the surface upon which liner will be placed (see **Section 02515, Part 3.1.A.4** of these Technical Specifications).
- d. Inspections of the liner deployment (see **Section 02515, Part 3.2.I** of these Technical Specifications).
- e. Collection and testing of materials samples from each roll (see **Section 02515, Parts 3.4 and 3.5** of these Technical Specifications).

- f. Visual inspection of the liner prior to covering (see **Section 02515, Part 3.6** of these Technical Specifications).

END OF SECTION

SECTION 01560
PROTECTION OF ENVIRONMENT

PART 1 **GENERAL**

1.1 SUMMARY

- A. CONTRACTOR, in executing Work, will maintain Work areas on and off site free from environmental pollution that would be in violation of federal, state, or local regulations.

1.2 PROTECTION OF WATERWAYS

- A. Observe rules and regulations of the State of Colorado and agencies of the U.S. Government prohibiting pollution of lakes, streams, rivers, or wetlands by dumping of refuse, rubbish, dredge material, or debris.
- B. Provide holding ponds or other approved method which will divert flows, including storm flows and flows created by construction activity, to prevent excessive silting of waterways or flooding damage to property.
- C. Comply with procedures outlined in U.S. Environmental Protection Agency (EPA) manuals entitled, "Guidelines for Erosion and Sedimentation Control Planning and Implementation," Manual EPA 72-015 and "Processes, Procedures, and Methods to Control Pollution Resulting from All Construction Activity," Manual EPA 43019-73-007.

1.3 EROSION AND SEDIMENT CONTROL

- A. CONTRACTOR will obtain all required local, state, and federal permits prior to commencement of construction.
- B. Comply with site surface water management practices and requirements for stormwater discharge.
- C. Apply appropriate soil conservation measures to protect project area and adjacent lands. These measures may include filter barriers, sediment traps, and basins.
- D. Select methods of erosion and sediment control for specific job site.
 - 1. Adjust sediment control measures in field to meet conditions encountered.
- E. Provide erosion control measures in place before commencing Work on project site.
 - 1. Maintain erosion control measures during course of construction.

2. Remove erosion control measures upon establishment of permanent, surface stabilization.

1.4 PROTECTION OF AIR QUALITY

- A. Minimize air pollution by requiring use of properly operating combustion emission control devices on construction vehicles and equipment, and encourage shutdown of motorized equipment not in use.
- B. Do not burn trash on construction site.
- C. If temporary heating devices are necessary for protection of Work, they must not cause air pollution.

1.5 USE OF CHEMICALS

- A. Chemicals used during project construction or furnished for project operation, whether herbicide, pesticide, disinfectant, polymer, reactant or of other classification, must be approved by U.S. EPA or U.S. Department of Agriculture or any other applicable regulatory agency.
- B. Use and disposal of chemicals and residues must comply with manufacturer's instructions.
- C. OWNER will be notified in writing before chemicals are delivered to or stored at facility.

1.6 NOISE CONTROL

- A. Conduct operations to cause least annoyance to residents in vicinity of Work, and comply with applicable local ordinances.
- B. Equip compressors, hoists, and other apparatus with mechanical devices necessary to minimize noise and dust. Equip compressors with silencers on intake lines.
- C. Equip gasoline or oil-operated equipment with silencers or mufflers on intake and exhaust lines.
- D. Conduct operation of dumping rock and of carrying rock away in trucks so as to minimize noise and dust.

1.7 DUST CONTROL

- A. Provide and maintain temporary site roadways, OWNER'S existing roads, and public roads used during construction operations in clean, dust free condition.

- B. Comply with state and local environmental regulations for dust control and directions of OWNER. If CONTRACTOR'S dust control measures are considered inadequate by OWNER, OWNER will require CONTRACTOR to take additional dust control measures.
- C. CONTRACTOR will supply water truck(s) for dust control.
- D. Conduct operation of dumping rock and of carrying rock away in trucks so as to minimize noise and dust.

1.8 FUELS AND LUBRICANTS

- A. CONTRACTOR to comply with all local, state, and federal regulations concerning transportation and storage of fuels and lubricants.
- B. Fuel storage area and equipment will be approved by OWNER before installation. Containment requirements will be submitted by CONTRACTOR for approval in writing by OWNER.
- C. All spills or leakage will be reported to OWNER, and cleanup is required.
- D. OWNER will reserve the right to order damaged or leaking equipment off-site.

END OF SECTION

SECTION 02300 **EARTHWORK**

PART 1 **GENERAL**

1.1 SUMMARY

- A. The work to be performed under this project consists of providing the labor, equipment, and materials and ancillary construction to access and construct structural earthwork. Structural earthwork includes the structural fill, and termination berms for the disposal cell.

1.2 DESCRIPTION OF THE WORK

- A. Construction will be done in accordance with these Technical Specifications and the Drawings. This will ensure all work is completed, at minimum, in accordance with manufacturer's specifications, good practice, and local, state, and federal regulations.

B. Summary of the Work

The proposed project site will include Fill Area IV Phases 6 and 7

Structural earthwork for this project includes the following:

- Excavation of the Fill Areas
- Structural fill for the Fill Areas termination berms
- Structural fill for Fill Area IV Phases 6 and 7.

All excavations will be sloped or shored as required by site conditions to meet Occupational Safety and Health Association (OSHA) regulations.

1. Grading for Fill Area IV Phases 6 and 7 – Phases 6 and 7 will be graded in accordance with the specifications and drawings. Phases 6 and 7 will tie into existing adjacent cells or terminate in a temporary berm with a liner flap on the Phase 7 to Phase 8 boundary as shown in the drawings .
2. Groundwater Interception Trenches. Groundwater Interception Trenches will be excavated at an approximate 1% slope into a header trench, witch slopes with the grade of the cell. Trenches will be approximately 6 feet deep and 2 feet wide.

3. Structural Fill

The phases bottoms will be brought to grade using structural fill. The structural fill will be placed in approximately 8-inch loose lifts and compacted to greater than 92% of modified proctor ASTM D1557 maximum dry density. Compacted lifts shall not exceed 6 inches. Nuclear density testing shall be done to confirm soils have been properly compacted.

Termination Berms - Berms will be constructed around the disposal cell for two reasons; first, to prevent surface runoff from flowing into the cell, and second, to provide containment above ground level.

Soils suitable for fill, as determined by onsite investigations, will be used to construct the berms (see **Part 2.1.B.** of this Section of these Technical Specifications). Material exceeding 2 inches in diameter will not be used as structural fill.

Soils containing organic or other unsuitable materials will be stripped from the surface of the existing ground within the limits of the berm fill. Soils containing organic materials will be stockpiled for reuse in revegetating fill slopes and reclamation of the site.

Soils suitable for fill will be placed in approximately 8-inch loose lifts and then compacted to a minimum of 95% of Standard Proctor (ASTM D698) maximum dry density. Compacted lifts shall not exceed 6 inches. Nuclear density testing will be done to confirm soils have been properly compacted.

1.3 SUBSURFACE CONDITIONS

A. Site Investigations

Available site investigation is provided in the permit documents for the Summit County Resource Allocation Park

B. Soils

1. The preliminary subsurface investigation of the site indicates that all soils sampled onsite will meet the required specifications.

C. Utilities

1. Subsurface utilities (power, water, sewer, and gas) may exist at this site. A utility clearance must be completed for this site.
2. Before beginning work, the CONTRACTOR will confirm the clearance obtained by the CONTRACTOR. This confirmation will be provided in writing to the OWNER or its Representative before beginning work.

D. Groundwater

1. Routine groundwater monitoring is performed at the site, including groundwater level measurements. Subsurface water is expected to be well below the limits of the excavation.
2. Should subsurface waters be encountered during construction in sufficient quantity to affect construction, this will be considered a change of conditions.

1.4 SUBMITTALS

A. Qualifications

1. CONTRACTOR

- a. Documentation of the CONTRACTOR'S experience with projects of similar scope and size (see **Part 1.7.A** of this Section of these Technical Specifications).
- b. Documentation of the CONTRACTOR'S ability to provide equipment appropriate to the work in order to complete the work in a timely manner.
- c. Documentation of the experience of the CONTRACTOR'S Superintendent on projects of similar scope and size.
- d. Construction Quality Assurance Engineer (CQAE).
- a. Documentation of the CQAE's experience with projects of similar size and scope.
- b. Documentation of the CQAE's ability to provide testing services required by this project. These services may be provided by a subcontractor to the CQAE or the CONTRACTOR, provided the CQAE's onsite person has at least two years of experience with projects of similar size and scope.

- B. Alternate Materials and Methods proposed by the CONTRACTOR for earthwork must be submitted and approved before their use.

1.5 INSPECTIONS, TESTS, AND REPORTS

- A. Documentation of the weather conditions by the CQAE (see **Part 1.9.C** of this Section of these Technical Specifications).
- B. Foundation inspections, surface inspections, panel deployment drawings, etc., as required by these Technical Specifications for liner systems used in constructing the pond/cell.
- C. Density testing results, as required by **Part 3.5** of this Section of these Technical Specifications.
- D. As-built drawings, as required by **Part 3.6** of this Section of these Technical Specifications.

1.6 REFERENCES

The publications listed below form a part of this Technical Specification to the extent referenced. The publications are referred to within the text by the basic designation only. Consult only the most up to date versions of each publication referenced.

ASTM INTERNATIONAL (ASTM)

ASTM D6913	Sieve analysis of fine grained soils
ASTM D698	Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/cu. ft. (600 kN-m/cu. m.))
ASTM D1557	Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/cu. ft. (2,700 kN-m/cu. m.))
ASTM D5084	Hydraulic conductivity of Soils (Constant Head)
ASTM D2487	Soils for Engineering Purposes (Unified Soil Classification System)
ASTM D2922	Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth)
ASTM D3017	Water Content of Soil and Rock in Place by Nuclear Methods (Shallow Depth)
ASTM D4318	Liquid Limit, Plastic Limit, and Plasticity Index of Soils

1.7 QUALIFICATIONS

A. CONTRACTOR

1. The CONTRACTOR is responsible for removing, processing, and replacing soils as required by these Technical Specifications and the drawings.
2. The CONTRACTOR and its Superintendent must have experience in excavating and replacing soils on projects of similar requirements and size.
3. The CONTRACTOR will have, or be able to provide, equipment appropriate to the work, and in capacity and number to complete the work in a timely fashion.

B. CQAE

1. The CQAE will be a representative of the OWNER.
2. The CQAE will have experience in constructing structural fill, synthetic liners, compacted clay liners, geosyntheticss, and earthwork.
3. The CQAE will appoint an Inspector who will be responsible for documenting that field construction and the finished product complies with the requirements of these Technical Specifications and Drawings, good practice, and the local, state, and federal laws and regulations governing their construction.
4. The CQAE will have a Professional Engineer(s) registered in Colorado and with suitable experience that will be responsible for certifying that the facility has been constructed in compliance with the requirements of these Technical Specifications and Drawings, good practice, and the local, state, and federal laws and regulations governing their construction.

1.8 DELIVERY, STORAGE, AND HANDLING

Materials and supplies for the work described in this Section will be delivered, stored, and handled as required by this or other Sections of the Technical Specifications. Sections related to this Section include **02513 – HDPE Liners**

1.9 WEATHER LIMITATION

- A. Moisture and Wind. Backfilling and compaction will not be done in the presence of excess moisture (i.e., rain or snow) or in areas of ponded water, unless approved in writing by the OWNER or its Representative.
- B. Temperature. Backfilling, moisture conditioning, and compaction will not be done when the temperature is below freezing, or when the material contains frozen soils.
- C. The CQAE will document that these requirements are met by the CONTRACTOR and will document the actual weather conditions during construction.

1.10 EQUIPMENT

The equipment to be used by the CONTRACTOR will be appropriate to the work and of number and capacity to complete the work in a timely manner.

PART 2 PRODUCTS

2.1 SOILS

A. Structural/Select Material

1. Class 1

- a. Provide materials classified as GW, GP, SW, PS, or SM by ASTM D2487 where indicated.
- b. The liquid limit of such material shall not exceed 35% when tested in accordance with ASTM D4318.
- c. The plasticity index shall not be greater than 12% when tested in accordance with ASTM D4318
- d. The combined material will conform to the following sieve analysis:

Sieve Size	Percent Passing by Weight
2 ½ inches	100
No. 4	40-85
No. 10	20-80
No. 40	10-60
No. 200	5-30

2. Class II

- a. Class II structural backfill shall be composed of suitable materials developed on or from the project. To be suitable for use under this classification, backfill shall be free of frozen lumps, wood, or other organic material, and shall be acceptable to the soils engineer.
- b. The liquid limit of such material shall not exceed 35% when tested in accordance with ASTM D4318
- c. The plasticity index shall not be greater than 12 % when tested in accordance with ASTM D4318

B. Foundation Layer Material

- a. Foundation layer materials shall consist of soils that have a USCS Classification of CL or CH

- C. Topsoil. Natural soil representative of productive soils in the area, free of stumps, toxic substances, and other material detrimental to plant growth.

PART 3 EXECUTION

3.1 PREPARATION

A. Slope staking will be the responsibility of the CONTRACTOR.

B. Clearing, Grubbing, and Topsoil Removal

1. Before beginning any excavation or fill, remove topsoil within the limits of the work.
2. Topsoil will be removed to a minimum depth of 6 inches.
3. Spread topsoil on areas already graded and prepared for topsoil or transport and deposit topsoil to areas that are to receive application of the topsoil (berm surfaces, etc.).
4. Keep topsoil separate from other excavated materials, brush, litter, and other materials that would interfere with planting and maintenance operations.
5. Stockpile, in locations indicated by the OWNER or its Representative(s), any surplus of topsoil from excavations and grading.

C. Drainage

1. Provide for the collection and disposal of surface and subsurface water encountered during construction.
2. Completely drain construction site during periods of construction to keep soil materials sufficiently dry.
3. Construct storm drainage features (ponds/basins) at the earliest stages of site development and throughout construction, grade the construction area to provide positive surface water runoff away from the construction activity, and provide temporary ditches, swales, and other drainage features and equipment, as required, to maintain dry soils.
4. When unsuitable working platforms for equipment operation and unsuitable soil support for subsequent construction features develop, remove unsuitable material and provide new soil material as specified herein.
5. It is the responsibility of the CONTRACTOR to assess the soil conditions presented by the plans and Technical Specifications, and to employ necessary measures to permit construction to proceed.

3.2 GENERAL EXCAVATION

- A. Perform excavation of every type of material encountered within the limits of the project to the lines, grades, and elevations indicated and as specified.
- B. Perform the grading in accordance with the typical sections shown and the tolerances specified.
- C. The CONTRACTOR will plan his work to use direct transport of satisfactory excavated materials to fills or embankments within the limits of the work, as much as possible.

- D. Excavate unsatisfactory materials encountered within the limits of the work below grade and replace with satisfactory materials as directed. Include such excavated material and the satisfactory material ordered as replacement in excavation.
- E. Dispose surplus satisfactory excavated material not required for immediate fill or embankment in areas approved for surplus material storage or designated waste areas.
- F. Dispose unsatisfactory excavated material in designated waste or spoil areas.
- G. During construction, perform excavation and fill in a manner and sequence that will provide proper drainage at all times.
- H. Excavate material required for fill or embankment in excess of that produced by excavation within the grading limits from the borrow areas indicated or from other approved areas.

3.3 FILLING AND COMPACTION FOR STRUCTURES

A. Subgrade Preparation

1. Construction

- a. Shape subgrade to line, grade, and cross sections, and compact as specified. Include plowing, discing, and any moistening or aerating required to obtain specified compaction for this operation.
- b. Remove soft or otherwise unsatisfactory material and replace with satisfactory excavated material or other approved material as directed.

2. Proof Rolling

- a. Proof-roll the subgrade of the access road, truck off-loading area, and berms after the subgrade has been prepared, as required by these Technical Specifications.
- b. Finish proof rolling on an exposed subgrade, free of surface water (wet conditions resulting from rainfall), which would promote degradation of an otherwise acceptable subgrade.
- c. Proof-roll the subgrade of the access road and truck off-loading area and berms with at least one pass of a 10-CY loaded dump truck, a Caterpillar 950 front-end loader with a loaded bucket, or equivalent.
- d. Operate the equipment in a systematic manner to ensure the number of passes and full coverage over all areas and at speeds between 2-1/2 to 3-1/2 mph.
- e. Notify the CQAE a minimum of one day before proof rolling. Proof rolling not done in the presence of the CQAE is not acceptable.

- f. If deflection during proof rolling is observed to be more than 2 inches, remove rutting or pumping material to a depth of at least 12 inches and replace with properly moisture conditioned and compacted acceptable fill material.

B. Embankments

1. Construct earth embankments from satisfactory materials free of organic, frozen, or other deleterious material.
2. Place the material in successive horizontal layers of loose material as follows:
 - a. Berms
 - (1) Soils suitable for berm construction shall meet the structural fill specifications in Section 2.1. If structural fill soils are not available in sufficient quantity, other soils may be used, as long as compaction is closely monitored, soils are acceptable to the CQAE, and compaction requirements are met.
 - (2) Loose lifts should be approximately 8 inches thick.
 - (3) Compacted lifts will be a maximum of 6 inches thick.
 - (4) Compact the lifts to a minimum of 95% of Standard Proctor (ASTM D698) maximum dry density at $\pm 2\%$ of optimum moisture content.
3. Spread each layer uniformly on a soil surface that has been moistened or aerated, as necessary, and scarified or otherwise broken up so that the fill will bond with the surface on which it is placed.
4. After spreading, plow, disc or otherwise break up each layer, moisten or aerate as necessary, thoroughly mix, and compact.
5. Finish compaction by sheepfoot rollers, pneumatic-tired rollers, steel-wheeled rollers, vibratory compactors, or other approved equipment.

C. Frozen Material

1. Do not place material that is frozen or contains frozen chunks.
2. Do not place material on surfaces that are muddy, frozen, or contain frost.
3. Cover all uncompleted fill or fill to receive liner components, etc., that will be exposed to freezing temperatures for more than three hours with at least 1 foot of loose material. Remove all loose material and the exposed surface of the compacted fill inspected before placing additional fill, liner components, etc. The inspection will include the CQAE and work will not proceed until surface has been approved in writing the CQAE. Remove Unsuitable areas (frozen, excess loose fill, etc.) and replace with suitable properly compacted materials.

3.4 CONSTRUCTION TOLERANCES

The top surface of the subgrade within the limits of a cell will be no greater than -0.2 to 0.0 feet above the lines and grades shown on the drawings. No plus tolerance will be

permitted within the cell. For fill areas outside the limits cell and fill placed for the construction of roads, the tolerance will be ± 0.2 feet of the lines and grades shown on the drawings. The surveyor will verify that the thickness of the foundation layer and operations layer meets the minimum thickness in the Construction Drawings.

3.5 TESTING

A. Field Testing Requirements

1. The nuclear moisture/density field testing methods and minimum frequencies to be used are presented in **Table 02300-3**.
2. Field in-place moisture density tests will be verified by laboratory testing and/or alternate field methods on a periodic basis.
 - a. At least 1 verification test shall be performed per 30 field tests.
 - b. Verification tests may include measurement of shelby tube samples or a separate nuclear density device test.
 - c. In addition, nuclear moisture/density devices will be standardized daily and the results of the standardization will be included in the daily field report.

Table 02300-3
Compaction/Moisture Specifications and Minimum Field Test Frequencies

Fill Type	Parameter/ Method	Specification	Minimum Frequency
Excavation Base (over-excavation backfill), and Embankments/berms	Soil Density ASTM D6938	$\geq 95\%$ of Standard Proctor maximum dry density	1 per 10,000 sf or at least one test per discrete area of backfill, whichever is higher; 1 per 2,000 CY for embankments/berms
	Moisture Content ASTM D2216	$\pm 2\%$ of optimum moisture content	
Anchor Trench Backfill	N/A	N/A	N/A
Structural Fill/ Foundation Layer	Soil Density ASTM D1557	Min of 93% of max dry density of Modified Proctor	1 per 500 cy
	Moisture Content ASTM D2216	$\pm 2\%$ of optimum moisture content	1 per 500 cy

Note: cy = cubic yards

B. Laboratory Testing Requirements During Construction

The qualified soils testing laboratory will conduct periodic laboratory testing on samples from the soil borrow area and from the fill areas during construction. **Table 02300-4** on the following page presents the minimum laboratory test types, methods, and frequencies for all non-granular soils used as structural fill at the site.

**Table 02300-4
Laboratory Testing**

	Test	Method	Minimum Frequency
Structural Fill	Modified Proctor	ASTM D1557	One per 8,000 cy or change in material type
	1-Point Modified Proctor	Based on ASTM D1557	As needed to assist in estimation of optimum moisture/density of material

Note: cy = cubic yards

3.6 AS-BUILT DRAWINGS

- A. Final as-built drawings of the locations and elevations of all structures shall be prepared by the QAE to the same level of detail as the construction drawings and include necessary additional details if variations were used. The as-built drawings shall be submitted to the OWNER.

END OF SECTION

SECTION 02513
HIGH-DENSITY POLYETHYLENE (HDPE) LINER

PART 1 GENERAL

1.1 SUMMARY

- A. The work to be performed under this section consists of providing the labor, equipment and materials, and ancillary construction to access and construct the geomembrane liner in Fill Area IV Phases 6 and 7 as shown on the construction documents prepared by Weaver Consultants Group.

1.2 DESCRIPTION OF THE WORK

- A. All construction will be done in accordance with these Technical Specifications and the Drawings. This will ensure all work is completed, at minimum, in accordance with manufacturer's specifications, good practice, and local, state, and federal regulations.

B. Summary of the Work

Synthetic, high-density polyethylene (HDPE) liners will be placed over the sides and bases of Phases 6 and 7.

The HDPE liner will be constructed using the materials and methods in these Technical Specifications and the drawings for Phases 6 and 7:

- 60-mil double sided textured

Alternate materials and methods may be proposed by the CONTRACTOR. Alternate materials and methods must not be used without written permission of the OWNER or its Representative(s).

The HDPE liner will be placed directly over the placed GCL. Before installing the HDPE liner, the prepared subgrade will be inspected by the OWNER or its Representative and the geosynthetics INSTALLER. Construction of the HDPE liner must not begin until the prepared subgrade is approved in writing.

The HDPE will be anchored in trenches at the top of the slopes, placed with the long dimension parallel to the slope, placed to minimize seams on slopes and near grade breaks, placed according to an approved panel placement and seaming plan, and with double fusion welds. Extrusion welding may be used only where fusion welding is impractical and must be approved prior to use. All double-weld fusion and extrusion seams will be pressure-tested and mechanically tested, as required by these Technical Specifications and the drawings. Testing will be done by the INSTALLER under the observation of the OWNER or its Representative(s).

1.3 SUBMITTALS

- A. Before delivery of any geomembrane (HDPE) rolls to the site, the Manufacturer will provide the Construction Quality Assurance Engineer (CQAE) with the following information:
 - 1. The resin supplier, supplier location, and brand name.
 - 2. Any test results conducted by the geomembrane and/or resin manufacturer to document the quality of the resin used in the membrane fabrication.
 - 3. The Manufacturing Quality Control Plan the membrane manufacturer will be using for the membrane being supplied.
 - 4. Information showing the liner materials and manufacturing meeting the requirements of **Part 2.1** (including **Table 02513-1**) of this Section of the Technical Specifications.
- B. At least 15 days before delivery of any geomembrane rolls to the site and beginning liner installation, the CONTRACTOR will provide information showing that the Manufacturer, Fabricator (if different than the Manufacturer), and INSTALLER meet the requirements of **Part 1.6.C** of this Section of the Technical Specifications, including qualifications of the INSTALLER's seamers.
- C. At least three days before beginning liner installation, the INSTALLER will provide the CQAE with seam layout drawings for each layer and each panel showing each expected seam. The CQAE will review the seam layout drawing and document that it is consistent with accepted practice and the design plans and drawings. No seaming will be performed without the CQAE's written approval.
 - 1. In general, seams should be oriented parallel to the line of maximum slope so they are oriented along, not across, the slope.
 - 2. In corners and at other odd geometric intersections, the number of seams should be minimized.
 - 3. All horizontal seams across the slope must be approved by the CQAE. Only end-of-panel seams may be approved.
 - 4. A seam numbering system that is compatible with the geomembrane roll numbering system will be agreed upon by the INSTALLER and the CQAE.
- D. Information regarding the quality of extrudate used in the welding apparatus (see **Part 1.9.E** of this Section of the Technical Specifications).
- E. Proposed alternate seaming processes (see **Part 1.9.B.4** of this Section of these Technical Specifications).

1.4 INSPECTIONS, TESTS, AND REPORTS

- A. Materials inspections upon delivery of materials (see **Part 1.7** of this Section of these Technical Specifications).
- B. Seaming quality control (QC) records (see **Part 1.9.C.2** of this Section of these Technical Specifications).
- C. Documentation of weather conditions (see **Part 1.8.D** of this Section of these Technical Specifications).
- D. Inspections and approval of the surface upon which liner will be placed (see **Part 3.1.A.4** of this Section of these Technical Specifications).
- E. Inspections of the liner deployment (see **Part 3.2.H** of this Section of these Technical Specifications).
- F. Information regarding trial seams (see **Part 3.3.A** of this Section of these Technical Specifications).
- G. Collection and testing of materials samples from each roll (see **Parts 3.4 and 3.5** of this Section of these Technical Specifications).
- H. Documentation of capping (see **Part 3.3.B.6** of this Section of these Technical Specifications).
- I. Non-destructive and destructive testing of field seams (see **Part 3.5.B and C** of this Section of these Technical Specifications).
- J. Visual inspection of the liner prior to covering (see **Part 3.7** of this Section of these Technical Specifications).

1.5 REFERENCES

The publications listed below form a part of this Technical Specification to the extent referenced. The publications are referred to within the text by the basic designation only. Consult only the most up to date versions of each publication referenced.

ASTM INTERNATIONAL (ASTM)

ASTM D792 - Method B	Density and Specific Gravity (Relative Density) of Plastics by Displacement
ASTM D1004	Initial Tear Resistance of Plastic Film and Sheeting
ASTM D1238	Flow Rates of Thermoplastics by Extrusion Plastometer
ASTM D1505	Density of Plastics by the Density-Gradient Technique
ASTM D1603	Carbon Black Content in Olefin Plastics
ASTM D3895	Oxidative Induction Time of Polyolefins by Thermal Analysis
ASTM D4218	Determination of Carbon Black Content in Polyethylene Compounds by the Muffle-Furnace Technique
ASTM D4437	Standard Practice for Nondestructive Testing (NDT) for Determining the Integrity of Seams Used in Joining Flexible Polymeric Sheet Geomembranes
ASTM D4833	Index Puncture Resistance of Geotextiles, Geomembranes, and Related Products
ASTM D5199	Measuring Nominal Thickness of Geosynthetics
ASTM D5397	Evaluation of Stress Crack Resistance of Polyolefin Geomembranes Using Notched Constant Tensile Load Test
ASTM D5596	Microscopic Evaluation of the dispersion of Carbon Black in Polyolefin Geosynthetics
ASTM D5641	Standard Practice for Geomembrane Seam Evaluation by Vacuum Chamber
ASTM D5721	Air-Oven aging of Polyolefin Geomembranes
ASTM D5820	Standard Practice for Pressurized Air Channel Evaluation of Dual-Seamed Geomembranes
ASTM D5885	Oxidative Induction time of Polyolefin Geosynthetics by High-Pressure Differential Scanning Calorimetry
ASTM D5994	Measuring Core Thickness of Textured Geomembrane
ASTM D6370	Rubber-Compositional Analysis by Thermogravimetry
ASTM D6392	Standard Test Method for Determining the Integrity of Nonreinforced Geomembrane Seams Produced Using Thermo-Fusion Methods
ASTM D6497	Standard Guide for Mechanical Attachment of Geomembrane to Penetrations or Structures
ASTM D6693	Determining Tensile Properties of Nonreinforced Polyethylene and Nonreinforced flexible Polypropylene Geomembranes
ASTM D7466	Test Method for Measuring Asperity Height of Textured Geomembranes

GEOSYNTHETIC INSTITUTE (GSI)

GSI GRI GM9	Cold Weather Seaming of Geomembranes
GSI GRI GM10	The Stress Crack Resistance of HDPE Geomembrane Sheet
GSI GRI GM19a	Seam Strength and Related Properties of Thermally Bonded Homogeneous Polyolefin Geomembranes/Barrier
GSI GRI GN4	Test Methods, Required Properties and Testing Frequency for Biplanar Geonets and Biplanar Geonet Composites

1.6 QUALIFICATIONS

- A. Manufacturer. The Manufacturer will have produced the proposed geomembrane sheets for at least five completed projects, having a total minimum area of 10,000,000 square feet.
- B. Fabricator. The Fabricator is responsible for seaming geomembrane sheets into panels. The Fabricator will have fabricated the proposed geomembrane panels for at least five completed projects, having a total minimum area of 2,000,000 square feet. CONTRACTOR will submit qualifications for the Fabricator at least 15 days prior to receiving materials.
- C. INSTALLER
 - 1. The INSTALLER is responsible for field handling, deploying, seaming, anchoring, and field QC testing of the geomembrane.
 - 2. The INSTALLER will have installed the proposed geomembrane material for at least five completed projects, having a total minimum area of 2,000,000 square feet.
 - 3. All seamers must have seaming experience of a minimum of 500,000 square feet of polyethylene (PE) geomembrane, using the same type of equipment to be used on this project.
 - 4. The most experienced onsite seamer, the "master seamer" (a seamer that has successfully seamed a minimum of 2,000,000 square feet of PE geomembrane, using the same type of equipment to be used on this project), will have direct supervisory responsibility at the site over less experienced seamers.
 - 5. The INSTALLER will provide documentation of the qualifications of the seaming crew to the CQAE at least 15 days prior to beginning installation.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Delivery
 - 1. The CQAE and the INSTALLER will be present during delivery and unloading of the geomembrane.

2. Upon arrival, the INSTALLER and CQAE will inspect all materials for defects in the manufacturing process and for damage during transportation. Materials judged by the CQAE to be severely damaged will be rejected and removed from the site. Minor damage and defects may be repaired by the INSTALLER.
 3. Each geomembrane roll/panel will be labeled with the manufacturer's name, product identification number, roll/panel number, and roll dimensions.
 4. The INSTALLER will be responsible for making certain that the manufacturer, type, and thickness of each roll in a shipment are correct.
 5. The CQAE will also maintain a log of geomembrane roll deliveries throughout the construction process. This log must include, at a minimum, the following:
 - a. Manufacture date.
 - b. Date of receipt at the site.
 - c. Roll and lot batch numbers.
- B. Storage. Temporary storage at the project site will be on a level surface, where water cannot accumulate, and free of sharp objects.
1. The geomembrane will be protected from puncture, abrasion, excessive heat or cold, material degradation, or other damaging circumstances.
 2. Storage will not result in crushing the core of roll goods or flattening of the rolls.
 3. Rolls will not be stored more than two high.
 4. Palleted materials will be stored on level surfaces and must not be stacked on top of one another.
 5. Ultraviolet sensitive materials (i.e., polyvinyl chloride (PVC)) will be covered with a sacrificial opaque and waterproof covering or placed in a temporary shelter.
 6. Damaged geomembrane will be removed from the site and replaced with geomembrane that meets the specified requirements.
- C. Handling. Rolls/panels will not be dragged, lifted by one end, or dropped.
1. A pipe of solid bar, of sufficient strength to support the full weight of a roll without significant bending, will be used for all handling activities. The diameter of the pipe of solid bar will be small enough to be easily inserted through the core of the roll.
 2. Chains will be used to link the ends of the pipe of bar to the ends of a spreader bar.
 3. The spreader bar will be wide enough to prevent the chains from rubbing against the ends of the roll.
 4. Alternatively, a stinger bar protruding from the end of a forklift or other equipment may be used. The stinger bar will be at least three-fourths the length

of the core and must be capable of supporting the full weight of the roll without significant bending.

5. If recommended by the manufacturer, a sling handling method using appropriate loading straps may be used.

1.8 WEATHER LIMITATION

- A. Moisture and Wind. Geomembrane will not be deployed or field-seamed in the presence of excess moisture (i.e., rain, snow, fog, dew), in areas of ponded water, or in the presence of excess wind.
- B. Temperature. Unless authorized by the CQAE, no placement or seaming will be attempted at ambient temperatures below 32 °F (degrees Fahrenheit) or above 104 °F.
 1. Ambient temperature will be measured at a height 12 inches above the ground or geomembrane surface.
 2. If seaming is allowed below 32 °F, follow the procedures outlined in GSI GRI GM9.
- C. In marginal conditions, cease seaming unless destructive field seam tests conducted by the QC laboratory confirm that seam properties meet the requirements listed in **Table 02513-2**. Tests will be done in accordance with paragraph "Destructive Field Seam Testing".
- D. The CQAE will document that these requirements are met by the INSTALLER and will document the actual weather conditions during the installation.

1.9 EQUIPMENT

- A. Equipment used in performance of the work will be in accordance with the following and will be maintained in a satisfactory working condition.
- B. Approved processes for field seaming are double fusion welding and extrusion welding.
 1. Double fusion welding will be used for all seams except where space and access constraints prohibit its use.
 2. Fusion welding application may be impractical where space is limited in some parts of the site.
 3. Only apparatus which have been specifically approved by the CQAE will be used.
 4. Proposed alternate processes will be documented and submitted for approval to the CQAE.
- C. Double fusion welding using a dual hot wedge-seaming device is the preferred method of seaming HDPE geomembrane.

1. The fusion welding apparatus will be equipped with gauges giving the applicable temperatures and pressures.
 2. Before installation of any geomembrane material, the INSTALLER will submit seaming QC records, including ambient temperatures, applicable apparatus temperatures and pressures, and trial seam results to the CQAE.
- D. The INSTALLER must meet the following requirements regarding use, availability, and cleaning of extrusion welding equipment to be used at the site:
1. The welding apparatus will be equipped with a continuous temperature monitoring the barrel and the nozzle.
 2. At least one spare operable double fusion and extrusion seaming device will be maintained onsite at all times.
 3. Equipment used for seaming must not damage the geomembrane.
 4. The extruder will be cleaned and purged before beginning seaming and at any time that seaming operations are stopped, until all heat-degraded extrudate has been removed from the barrel.
 5. The electric generator for the equipment will be placed on an HDPE rub sheet in such a way that no damage occurs to the geomembrane.
 6. A smooth insulating plate or fabric will be placed beneath hot equipment to protect the geomembrane.
- E. The INSTALLER and, if applicable, the Manufacturer, will provide documentation to the CQAE regarding the quality of extrudate used in the welding apparatus. At a minimum, the extrudate should be compatible with the base liner material and contain the same grade and quality of PE resin as used in the base material.

PART 2 PRODUCTS

2.1 MATERIALS

A. Raw Materials

1. The PE resin will contain no more than 2% recycled polymer by weight. Recycled polymer will be limited to material generated within the geomembrane manufacturer's plant and from the same grade and type defined in this plan.
2. No more than 10% regrind, reworked, or trim material in the form of chips or edge strips will be used to manufacture the geomembrane sheets. All regrind, reworked, or trim material will be from the same manufacturer and exactly the same formulation as the geomembrane sheet being produced.
3. The PE resin from which the geomembrane is made will have a melt index value per ASTM D1238 of less than 1.0 g/10 min.

4. The geomembrane must contain no more than 1% by weight additives, filler, or extenders, excluding carbon black.
5. The geomembrane must have no striations or roughness (inconsistent with the texture), pinholes, or bubbles on the surface.
6. The geomembrane must be free of undispersed raw materials or any other sign of contamination by foreign matter.
7. No post-consumer materials or water-soluble ingredients will be used to produce the geomembrane.
8. For geomembrane with plasticizers, only primary plasticizers that are resistant to migration will be used. The CONTRACTOR will submit a copy of the test reports and QC certificates for materials used in the manufacturing of the geomembrane shipped to the site.
9. Geomembrane materials will conform to the requirements listed in **Table 02513-1** for MQC.

B. Sheet Materials

1. Geomembrane sheets will be unreinforced and manufactured as wide as possible to minimize factory and field seams.
2. Geomembrane sheets will be uniform in color, thickness, and surface texture.
3. Sheets will be textured on both faces. The textured surface features will consist of raw materials identical to that of the parent sheet material and will be uniform over the entire face of the geomembrane.
4. The sheets will be free of and resistant to fungal or bacterial attack and free of cuts, abrasions, holes, blisters, contaminants, and other imperfections.
5. Geomembrane sheets and raw materials will conform to the requirements listed in **Table 02513-1** for MQC.

Table 02513-2
60-mil Textured HDPE Geomembrane Specifications

Test	Method	Frequency	Requirements
Sheet Thickness (min)	ASTM D5994	One per roll	54 mil (lowest individual for 8 of 10) 51 mil (lowest of any 10)
Asperity Height (min. avg.)	ASTM D7466	1 per 2 rolls	16 mil
Sheet Density	ASTM D792 Method B or ASTM D1505	One per 200,000 lb	Min. avg. of 0.940 g/cm ³
Tensile Strength Yield	ASTM D6693	One per 20,000 lb	Min. avg. 126 lb. per in. width
Break Strength	ASTM D6693	One per 20,000 lb	90 lb/in.
Elongation at Yield	ASTM D6693	One per 20,000 lb	Min. avg. 12%
Elongation at Break	ASTM D6693	One per 20,000 lb	Min. avg. 100%
Tear Resistance	ASTM D1004	One per 45,000 lb	Min. avg. 42 lbs.
Puncture Resistance	ASTM D4833	One per 45,000 lb	Min. avg. 90 lbs.
Stress Crack Resistance ¹	ASTM D5397	One per 400,000 lb	500 hr
Standard Oxidative Induction Time (OIT) ²	ASTM D3895	One per 200,000 lb	Min. avg. 100 min.
High Pressure Oxidative Induction Time (OIT) ²	ASTM D5885	One per 200,000 lb	Min. avg. 400 min.
Oven Aging @ 85 °C Standard OIT ^{2,3}	ASTM D5721 ASTM D3895	Per each formulation	Min. avg. 55% retained after 90 days
Oven Aging @ 85 °C High Pressure OIT ^{2,3}	ASTM D5721 ASTM D5885	Per each formulation	Min. avg. 80% retained after 90 days
UV Resistance High Pressure OIT ^{4,5}	GRI GM11 ASTM D5885	Per each formulation	Min. avg. 50% retained after 1600 hrs
Carbon Black Content (range) ⁶	ASTM D4218	1 per 20,000 lbs	2-3%
Carbon Black Dispersion	ASTM D5596	1 per 45,000 lbs	9 of 10 in categories 1 or 2

Notes: ¹ P-NCTL test is not appropriate for testing geomembranes with textured surfaces. Test should be conducted on smooth edges of textured rolls.

- ² The manufacturer has the option to select either the standard or high-pressure Oxidative Induction Time (OIT) methods to evaluate antioxidant content in the geomembrane.
- ³ It is recommended to evaluate the sample at 30 and 60 days to compare to the 90-day response.
- ⁴ The condition of the test should be 20 hr. UV cycle at 75 °C followed by 4 hr. condensation at 60 °C.
- ⁵ UV resistance is based on percent retained value, regardless of the original HP-OIT value.
- ⁶ Other methods such as D1603 (tube furnace) or D6370 (TGA) are acceptable if an appropriate correlation to D4218 (muffle furnace) can be established.
- mils = one thousandth of an inch min.avg = minimum average g/cm³ = grams per cubic centimeter lb = pound lb. per in. = pounds per inch hr = hours min. = minimum

PART 3 EXECUTION

3.1 PREPARATION

A. Surface Preparation

1. Surface preparation will be performed in accordance with **Section 02300** of these Technical Specifications.
2. Rocks larger than 2 inches in diameter and any other material which could damage the geomembrane will be removed from the surface to be covered with the geomembrane. No material exceeding 6 inches in diameter will be placed within 5 feet of the surface of the embankment.
3. Construction equipment tire or track deformations beneath the geomembrane will not be greater than 1.0 inch in depth.
4. Each day during placement of geomembrane, the CQAE and INSTALLER will inspect the surface on which geomembrane is to be placed and certify in writing that the surface is acceptable.
5. Repairs to the surface of the subgrade will be performed at no additional cost to the OWNER or its Representatives.

B. Anchor Trenches

1. If the anchor trench is excavated in cohesive soil susceptible to desiccation, only the amount of anchor trench required for placement of geomembrane in a single day will be excavated.
2. Ponded water will be removed from the anchor trench while the trench is open.
3. Trench corners will be slightly rounded to avoid sharp bends in the geomembrane.
4. Loose soil, rocks larger than 1/2 inch in diameter and any other material which could damage the geomembrane will be removed from the surfaces of the trench. No material exceeding 6 inches in diameter will be placed within 5 feet of the surface of the embankment.
5. The geomembrane will extend down the front wall and across the bottom of the anchor trench.

6. Backfilling and compaction of the anchor trench will be in accordance with **Section 02300** of these Technical Specifications.

3.2 GEOMEMBRANE DEPLOYMENT

- A. The procedures and equipment used will not elongate, wrinkle, scratch, or otherwise damage the geomembrane, other geosynthetic layers, or the underlying subgrade.
- B. Geomembrane damaged during installation will be replaced or repaired at the CQAE's discretion.
- C. Only geomembrane panels that can be anchored and seamed together the same day will be deployed.
- D. Adequate ballast (i.e., sand bags) will be placed on the geomembrane, without damaging the geomembrane, to prevent uplift by wind.
- E. No equipment will be operated on the top surface of the geomembrane without permission from the CQAE and INSTALLER.
- F. Seams will be oriented parallel to the line of maximum slope.
- G. The methods used to deploy and backfill over the geomembrane will minimize wrinkles and tensile stresses in the geomembrane.
 1. The geomembrane will have adequate slack to prevent the creation of tensile stress.
 2. Geomembrane wrinkles will not exceed 6 inches (150 mm) in height. All other wrinkles will be replaced or repaired at the CQAE's discretion
 3. Wrinkles that do not meet the above criteria will be cut out and repaired in accordance with the INSTALLER's approved QC manual.
- H. The CQAE will document the following:
 1. The length of the geomembrane overlap.
 2. The geomembrane overlap is adequate for the seaming process that is used.
 3. Procedures used to temporarily bond adjacent geomembrane rolls will not damage the geomembrane.

3.3 SUMMARY

A. Trial Seams

1. Trial seams will be made under field conditions on strips of excess geomembrane.

2. Trial seams will be performed at a minimum frequency of once per machine per 4 hours, before production seaming and whenever there is a change in seaming personnel, seaming equipment, or seaming equipment settings.
3. The trial seams will first be examined for squeeze out, footprint, pressure, and general appearance by the INSTALLER. If a seam fails any of these examinations, a new trial seam will be performed until satisfactory seams are obtained.
4. Trial seam samples will be collected and tested in accordance with ASTM D6392.
 - a. One sample will be obtained from each trial seam. This sample will be at least 36 inches long by 12 inches wide with the seam centered lengthwise.
 - b. Six random specimens 1 inch wide will be cut from the sample.
 - (1) Three seam specimens will be field tested for shear strength and three seam specimens will be field tested for peel adhesion using an approved quantitative tensiometer.
 - (2) To be acceptable, all test specimens will meet seam strength requirements specified in **Table 02513-2** (see **Part 3.5** of this Section of these Technical Specifications).
5. If the field tests fail to meet these requirements, repeat the entire operation. If the additional trial seam fails, the seaming apparatus or seamer will not be used until the deficiencies are corrected by the INSTALLER and two consecutive successful trial seams are achieved.

B. Field Seams

1. Panels will be seamed in accordance with the geomembrane manufacturer's recommendations and the approved layout plan.
2. In sumps, corners and odd-shaped geometric locations, minimize the number of field seams.
3. Seaming will extend to the outside edge of panels.
4. Geomembrane panels will be overlapped a minimum of 3 inches for seaming.
5. The seam area will be free of moisture, dust, dirt, and foreign material at the time of seaming. For double fusion welding, each overlap and the sheet below the overlap will be hand-wiped clean immediately before welding.
6. Fish mouths in seams will be repaired. Large "fish mouths" or wrinkles at the seam overlaps will be cut along the ridge of the wrinkle in order to achieve a flat overlap. The cut "fish mouths" or wrinkles will be seamed and any portion where the overlap is inadequate will then be patched with an oval patch of the same membrane, extending a minimum of 6 inches beyond the cut in all directions.
7. At locations where the initial seam cannot be nondestructively tested, the seam will be cap stripped with the same geomembrane material. The CQAE will observe the cap stripping to document the uniformity and completeness of the work.

8. On the side slopes, seaming will extend into the anchor trenches.

C. Polyethylene Seams

1. PE geomembranes will be seamed by thermal fusion methods.
2. Extrusion welding will only be used for patching and seaming in locations where thermal fusion methods are not feasible.
 - a. Seam overlaps that are to be attached using extrusion welds will be ground prior to welding.
 - b. Grinding marks will be oriented perpendicular to the seam direction and no marks will extend beyond the extrudate after placement.
 - c. Where extrusion welds are temporarily terminated, long enough to cool, they will be ground before applying new extrudate over the existing seam.
 - d. The total depth of the grinding marks will be no greater than 10% of the sheet thickness.

D. Non-Polyethylene Seams

1. Non-PE geomembranes will be seamed by methods as recommended by the geomembrane manufacturer.
2. Seaming adhesives, solvents, or chemical cleaning agents will be stored away from the geomembrane and only spill-resistant containers will be used while working on the geomembrane.

3.4 SAMPLES

- A. One QC sample 18 inches in length for the entire width of the roll, shall be obtained for every 100,000 square feet of material delivered to the site. Samples shall not be collected from the first 3 feet of the roll.
- B. The samples will be identified by manufacturer's name, product identification, lot, and roll/panel number. Also note the date, a unique sample number, and the machine direction.
- C. A 12-inch-by-12-inch quality assurance (QA) sample will be collected, labeled, and submitted to the OWNER or its Representative each time QC samples are collected.

3.5 TESTS

- A. The CONTRACTOR will provide all QC samples to the QC laboratory to determine density, thickness, tensile strength at break, and elongation at break in accordance with the methods specified in **Table 02513-1**.
 1. Samples not meeting the specified requirements result in the rejection of applicable rolls/panels.

2. As a minimum, rolls/panels produced immediately before and immediately after the failed roll/panel will be tested for the same failed parameter. Testing will continue until a minimum of three successive rolls/panels on both sides of the original failing roll/panel pass the failed parameter.

B. Non-Destructive Field Seam Continuity Testing

1. Field seams will be non-destructively tested for continuity over their full length.
 - a. For double fusion welds, testing will be in accordance with ASTM D5280 (pressure testing the channel between the double fusion welds).
 - b. For extrusion welds, the vacuum box or the ultrasonic shadow method may be used in accordance ASTM D5641.
2. Seam testing will be performed as the seaming work progresses, not at the completion of field seaming.
3. Any seams which fail will be documented and repaired in accordance with the INSTALLER's approved QC manual.

C. Destructive Field Seam Testing

1. A minimum of one destructive test sample per 500 feet of field seam will be obtained at locations specified by the CQAE.
 - a. Sample locations will not be identified prior to seaming.
 - b. Destructive samples will be collected and tested in accordance with ASTM D6392. Samples will be at least 45 inches long by 12 inches wide with the seam centered lengthwise.
 - (1) This sample will be cut into three equal sections, with one piece retained by the INSTALLER, one piece given to the QC laboratory, and the remaining piece given to the CQAE for QA testing and/or permanent record.
 - (2) Each sample will be numbered and cross referenced to a field log which identifies:
 - (a) panel number,
 - (b) seam number,
 - (c) date and time cut,
 - (d) ambient temperature within 6 inches (150 mm) above the geomembrane,
 - (e) seaming unit designation,
 - (f) name of seamer, and
 - (g) seaming apparatus temperature, speed, and pressures (where applicable).
2. Ten 1-inch wide replicate specimens will be cut from the INSTALLER's portion of the sample.

- a. Five specimens will be tested for shear strength and five for peel adhesion using an approved field quantitative tensiometer.
 - b. Jaw separation speed will be in accordance with the approved QC manual.
 - c. To be acceptable, four out of five replicate test specimens will meet the seam strength requirements specified in **Table 02513-2**.
3. If the field tests pass, five specimens will be tested at the QC laboratory for shear strength and five for peel adhesion in accordance with the QC laboratory's approved procedures. To be acceptable, four out of five replicate test specimens will meet the seam strength requirements specified in **Table 02513-2**.
 4. If the field or laboratory tests fail, the seam will be repaired in accordance with paragraph Destructive Seam Test Repairs. Holes for destructive seam samples will be repaired the same day they are cut.

Table 02513-2
GRI GM19a Seam Strength Specifications (pounds/inch of width) for 60-mil HDPE

Test	Number of Specimens	Method	Fusion Weld Strength	Extrusion Weld Strength
60-mil Peel	1 per 500 lineal feet per welder	ASTM D6392	98	70
60-mil Shear	1 per 500 lineal feet per welder	ASTM D6392	126	126

3.6 DEFECTS AND REPAIRS

A. Destructive Seam Test Repairs

1. Seams that fail destructive seam testing may be overlaid with a strip of new material and seamed (cap stripped).
2. Alternatively, the seaming path will be retraced to an intermediate location a minimum of 10 feet on each side of the failed seam location.
 - a. At each location, a small coupon sample will be taken for two additional shear strength and two additional peel adhesion tests using an approved quantitative field tensiometer.
 - b. If these tests pass, then full samples will be taken and tested (see **Part 3.5.C** of this Section of these Technical Specifications).
 - c. If the laboratory tests pass, then the seam will be cap stripped or repaired using other approved methods between that location and the original failed location.

3. If field or laboratory tests fail, the process will be repeated.
4. After repairs are completed, the repaired seam will be non-destructively tested in accordance with paragraph Non-Destructive Field Seam Continuity Testing.

B. Patches

1. Tears, holes, blisters, and other defects will be repaired with patches.
 2. Patches will have rounded corners, be made of the same geomembrane, and extend a minimum of 6 inches beyond the edge of defects.
 3. The geomembrane below large caps will be appropriately cut to avoid water or gas collection between the two sheets.
- C. Minor localized flaws may be repaired by spot welding or seaming as determined by the CQAE.
- D. Repairs will be non-destructively tested. The CQAE may also elect to perform destructive seam tests on suspect areas.

3.7 VISUAL INSPECTION AND EVALUATION

- A. Immediately before covering, the geomembrane seams and non-seam areas will be visually inspected by the INSTALLER and CQAE for defects, holes, or damage due to weather conditions or construction activities.
- B. At the CQAE'S discretion, the surface of the geomembrane will be brushed, blown, or washed by the INSTALLER if the amount of dust, mud, or foreign material inhibits inspection or functioning of the overlying material.
- C. Each suspect location will be non-destructively tested in accordance with paragraph Non-Destructive Field Seam Continuity Testing. Each location that fails non-destructive testing will be repaired in accordance with paragraph Patches and non-destructively retested.

3.8 PENETRATIONS

- A. Geomembrane penetration details will be in accordance with ASTM D6497 or as recommended by the geomembrane manufacturer.
- B. Factory fabricated boots will be used wherever possible.
- C. Field Seams for Penetrations
1. Will be non-destructively tested in accordance with the INSTALLER's approved QC manual.

2. Seams that fail non-destructive testing will be repaired in accordance with the INSTALLER'S approved QC manual and non-destructively tested before acceptance.

END OF SECTION

SECTION 02515
GEOSYNTHETIC CLAY LINER (GCL)

PART 1 **GENERAL**

1.1 SUMMARY

- A. The work to be performed under this project consists of providing the labor, equipment, and materials and ancillary construction to access and construct the Geosynthetic Clay Liner (GCL) in Phases 6 and 7 as shown on the Construction Documents prepared by Weaver Consultants Group.
- B. A GCL shall be used to construct the low-permeability layer.

1.2 DESCRIPTION OF THE WORK

- A. All construction will be done in accordance with these Specifications and the Drawings. This will ensure all work is completed, at minimum, in accordance with manufacturer's specifications, good practice, and local, state and federal regulations.

B. Summary of the Work

A GCL shall be placed on top of the 1-foot structural fill within the Phase boundaries throughout the bottom, on the sideslopes, and anchored in the anchor trench below the termination berms as shown on the Drawings.

The GCL shall be constructed using the materials and methods specified in these Specifications and the Drawings. The GCL recommended for this project is Bentomat®ST. The GCL shall consist of a layer of natural sodium bentonite clay encapsulated between two geotextiles and shall comply with all of the criteria listed in this section. Prior to using an alternate GCL, the Installer must furnish independent test results demonstrating that the proposed alternate material meets all requirements of this Specification. The Installer also must obtain prior approval of the alternative GCL by the OWNER or its Representatives.

The GCL will be placed directly over the foundation soil layer. (see **Part 3.3.A** of Section 02300 of these Specifications). Prior to installing the GCL, the structural fill shall be inspected by the installer and the OWNER or its Representative; construction of the GCL shall not begin until the foundation layer is approved in writing.

The GCL shall be placed with the long dimension parallel to the slope, placed to minimize seams on slopes and near grade breaks, placed according to an approved panel placement and seaming plan, and with overlap widths and sealing required by these Specifications as a minimum.

1.3 SUBMITTALS

A. Qualifications

1. Manufacturer. Documentation of the Manufacturer's experience in producing GCL (see **Part 1.6.A.** of this Section of these Specifications).
2. Installer. Documentation of the Installer's experience in constructing GCL's (see **Part 1.6.B.** of this Section of these Specifications).

B. Alternate Materials and Methods proposed by the CONTRACTOR for GCL construction must be submitted and approved prior to their use.

C. A Panel Placement Plan shall be submitted by the CONTRACTOR to the OWNER or its Representative at least seven days prior to deployment. Deployment shall not begin until the plan is approved.

D. The GCL Manufacturer's Quality Control Plan for documenting compliance with this document shall be provided to the OWNER or its Representative prior to shipping GCL to the site.

E. The Manufacturer's Quality Assurance/Quality Control (QA/QC) Certifications to verify that the materials supplied are in accordance with the Design Plans and Drawings, these Specifications and the Manufacturer's QC Plan shall be provided for each shipment. The certifications shall be signed by a responsible party employed by the GCL Manufacturer and shall include:

1. Certificates of analysis for the bentonite clay used in GCL production demonstrating compliance with the swell index and fluid loss specifications in **Table 02515-1**.
2. Manufacturer's test data for the finished GCL product of bentonite mass/area, GCL tensile and peel strength demonstrating compliance with the specifications in **Table 02515-1**.
3. GCL lot and roll numbers supplied for the project and corresponding shipping information.
4. Manufacturer's test data for finished GCL product for index flux, permeability and hydrated internal shear strength showing compliance with the specifications in **Table 02515-1**.

B. Warranties shall be provided by the Manufacturer and Installer prior to deployment of GCL.

1. The Manufacturer's Warranty shall state that the GCL materials meet all requirements of the contract documents and that for the intended use the GCL is warranted for ten years against deterioration.

2. The Installer's Warranty shall state that the GCL shall not fail due to improper installation within ten years.
- C. Samples of the GCL shall be submitted for every 100,000 square feet of GCL (see **Part 3.4** of this Section of these Specifications).

1.4 INSPECTIONS, TESTS and REPORTS

- A. Inspection of materials for defects, including Construction Quality Assurance Engineer (CQAE) documentation (see **Parts 1.7.A.3. and 1.7.A.5.** of this Section of these Specifications).
- B. Documentation of the weather conditions by the CQAE (see **Part 1.8.C.** of this Section of these Specifications).
- C. Certification the surface of the underlying layer is suitable for placing GCL (see **Part 3.1.A.** of this Section of these Specifications).
- D. Documentation by the CQAE the GCL has been properly deployed (see **Part 3.2.** of this Section of these Specifications).
- E. Documentation the GCL was inspected and approved prior to covering (see **Part 3.6** of this Section of these Specifications).
- F. As-built drawings (see **Part 3.8** of this Section of these Specifications).

1.5 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only. Consult only the most up to date versions of each publication referenced.

ASTM INTERNATIONAL (ASTM)

ASTM D4354	Sampling of Geosynthetics for Testing
ASTM D4439	Terminology for Geosynthetics
ASTM D4759	Determining the Specification Conformance of Geosynthetics
ASTM D5261	Measuring Mass Per Unit Area of Geotextiles
ASTM D5887	Measurement of Index Flux Through Saturated Geosynthetic Clay Liner Specimens Using a Flexible Wall Permeameter
ASTM D5888	Storage and Handling of Geosynthetic Clay Liners
ASTM D5889	Quality Control of Geosynthetic Clay Liners
ASTM D5890	Swell Index of Clay Mineral Component of Geosynthetic Clay Liners
ASTM D5891	Fluid Loss of Clay Component of Geosynthetic Clay Liners

ASTM D5993	Measuring Mass Per Unit of Geosynthetic Clay Liners
ASTM D6102	Guide for Installation of Geosynthetic Clay Liners
ASTM D6495	Guide for Acceptance Testing Requirements for Geosynthetic Clay Liners
ASTM D6496	Determining Average Bonding Peel Strength Between the Top and Bottom Layers of Needle-Punched Geosynthetic Clay Liners
ASTM D6766	Evaluation of Hydraulic Properties of Geosynthetic Clay Liners Permeated with Potentially Incompatible Liquids
ASTM D6768	Tensile Strength of Geosynthetic Clay Liners

1.6 QUALIFICATIONS

- A. Manufacturer. GCL shall be the product of a GCL Manufacturer who has produced the proposed GCL using the same bentonite, polyethylene geomembrane, geotextiles, sewing thread, and adhesive for at least five completed projects and shall have produced a minimum of 2,000,000 square feet of the proposed GCL. CONTRACTOR shall submit manufacturer's qualification to the CQAE for approval a minimum of 15 days before scheduled delivery of the material to the project site.
- B. Installer
 1. The Installer is responsible for field handling, deploying, seaming, anchoring, and field QC testing of the GCL.
 2. The Installer shall have installed the proposed GCL material for at least five completed projects having a total minimum area of 500,000 square feet.
- C. CQAE
 1. The CQAE shall be a Representative of the OWNER.
 2. The CQAE shall have experience in constructing geosynthetic clay liners, synthetic liners, and earthwork.
 3. The CQAE shall appoint an Inspector who will be responsible for documenting field construction and that the finished product complies with the requirements of these Specifications and Drawings, good practice and the local, state and federal laws and regulations governing their construction.
 4. The CQAE shall have a Professional Engineer with suitable experience who will be responsible for certifying that the facility has been constructed in compliance with the requirements of these Specifications and Drawings, good practice and the local, state and federal laws and regulations governing their construction.

1.7 DELIVERY, STORAGE AND HANDLING

A. Delivery

1. The Manufacturer assumes responsibility for initial loading of the GCL. Shipping will be the responsibility of the party arranging for the freight transportation. Unloading, onsite handling and storage of the GCL are the responsibility of the Installer or the Installer's designated representative.
2. The CQAE and the Installer shall be present during delivery and unloading of the GCL.
3. Upon arrival, the Installer and CQAE shall inspect all materials for defects in the manufacturing process and for damage during transportation. Materials judged by the CQAE to be severely damaged shall be rejected and removed from the site. Minor damage and defects may be repaired by the Installer.
4. A visual inspection of each roll shall be made during unloading to identify if any packaging has been damaged. Rolls with damaged packaging shall be marked and set aside for further inspection. The packaging shall be repaired, as necessary, to protect the GCL from damage during storage and handling.
5. The CQAE will also maintain a log of GCL roll deliveries throughout the construction process. This log shall include, at a minimum, the following:
 - a. Manufacture date.
 - b. Date of receipt at the site.
 - c. Roll and lot batch numbers.

B. Storage. Temporary storage at the project site shall be on a level surface, free of sharp objects where water cannot accumulate.

1. The GCL shall be protected from puncture, abrasion, excessive heat or cold, material degradation, or other damaging circumstances.
2. Rolls shall be stored in a manner that prevents sliding or rolling from the stacks.
3. Stacks shall be no higher than four rolls.
4. Palletted materials shall be stored on level surfaces and shall not be stacked on top of one another.
5. All stored GCL and accessory bentonite shall be covered with plastic sheeting or tarpaulins until their installation.
6. The integrity and legibility of the roll labels shall be preserved during storage.
7. Damaged GCL shall be removed from the site and replaced with GCL meeting the specified requirements.

C. Handling. Rolls/panels shall not be dragged, lifted by one end, or dropped.

1. A pipe or solid bar, of sufficient strength to support the full weight of a roll without significant bending, shall be used for all handling activities. The diameter of the pipe or solid bar shall be small enough to be easily inserted through the core of the roll.
2. Chains shall be used to link the ends of the pipe or bar to the ends of a spreader bar.
3. The spreader bar shall be wide enough to prevent the chains from rubbing against the ends of the roll.
4. Alternatively, a stinger bar protruding from the end of a forklift or other equipment may be used. The stinger bar shall be at least three-fourths the length of the core and must be capable of supporting the full weight of the roll without significant bending.
5. If recommended by the manufacturer, a sling handling method utilizing appropriate loading straps may be used.

1.8 WEATHER LIMITATIONS

- A. Moisture and Wind. GCL shall not be deployed or field-seamed in the presence of excess moisture (i.e., rain, snow, fog, dew), in areas of ponded water, or in the presence of excess wind.
- B. In marginal conditions, deployment or seaming shall cease unless approved by the CQAE.
- C. The CQAE will document that these requirements are met by the Installer and will document the actual weather conditions during the installation.

1.9 EQUIPMENT

The equipment to be used by the CONTRACTOR shall be appropriate to the work.

PART 2 PRODUCTS

2.1 GCL

- A. The GCL recommended for this project is Bentomat® ST or equal. Prior to using an alternate GCL, the Installer must furnish independent test results demonstrating that the proposed alternate material meets all requirements of this specification. The Installer also must obtain prior approval of the alternative GCL by the CQAE. The GCL shall substantially comply with the properties shown in **Table 02515-1**.
- B. The GCL shall consist of a layer of natural sodium bentonite clay encapsulated between two geotextiles.

1. Encapsulating geotextiles shall be mechanically bonded together using a needle punch or stitch bonding process.

ENCAPSULATING GCLs

- A. Encapsulating geotextiles shall be mechanically bonded together using a needle punch or stitch bonding process.
 1. GCL shall conform to the property requirements listed in **Table 02515-1** and shall be free of tears, holes, or other defects that may affect its serviceability.
 2. Needle punched and stitch bonded GCLs shall be continuously inspected for broken needles using an in-line metal detector and broken needles shall be removed.
- B. The minimum acceptable dimensions of full-size GCL panels shall be 98 feet long by 13½ feet wide. Short rolls (less than 98 feet but greater than 70 feet) may be supplied at a rate no greater than three rolls per truckload or three rolls per 36,000 ft² of GCL, whichever is less. The length of all short rolls shall be clearly marked on the outer packaging.
- C. A 6-inch overlap guideline shall be imprinted on both edges of the upper geotextile component of the GCL as a means of facilitating QA during seaming. Lines shall be printed in easily visible, non-toxic ink that does not negatively impact the performance of the GCL.

Table 02515-1 GCL Properties

Material Property	Material Type	Test Method	Test Frequency	Required Values
Mass/Unit Area	Geotextile	ASTM D5261	1 per 25,000 yd²	6.0 oz/yd² MARV
Swell Index	Bentonite	ASTM D5890	1 per 100,000 lb	24 mL/2g min.
Fluid Loss	Bentonite	ASTM D5891	1 per 100,000 lb	18 mL max.
Mass/Unit Area	Bentonite	ASTM D5993	1 per 5,000 sy	0.75 lbs/sf MARV
Mass/Unit Area	As Manufactured	ASTM D5993	1 per 5,000 sy	0.81 lbs/sf MARV
Tensile Strength	As Manufactured	ASTM D4632	1 per 25,000 sy	45 lbs/in
Peel Strength	As Manufactured	ASTM D6496	1 per 5,000 sy	3.5 lb/in
Moisture Content	As Manufactured	ASTM D5993	1 per 5,000 sy	35 % max.
Index Flux	As Manufactured	ASTM D5887	1 per 30,000 sy	1 x 10 ⁻⁶ cm/sec max.
Permeability	As Manufactured	ASTM D5887	1 per 30,000 sy	5 x 10 ⁻⁹ cm/sec max.
Internal Shear Strength	As Manufactured	ASTM D6243	Periodically	500 psf

* Required values can change if published by the Geosynthetic Research Institute via the test method GM 13, with the exception of asperity height.

QC = quality control lbs = pounds ml/2g = milliliters per 2 grams min = minimum max = maximum
 sf = square feet lb/sf = pounds per square feet

MARV = minimum average roll value cm/sec = centimeters per second
psf = pounds per square feet

D. Accessory Bentonite

The granular bentonite used for seaming and penetration sealing shall be made from the same natural sodium bentonite material as used in the manufacture of the GCL.

E. Manufacturing, Sampling and Testing

1. GCL and its components shall be sampled and tested in accordance with the manufacturer's approved QC manual. Sampling shall be in accordance with the specific test methods listed in **Table 02515-1**. If no sampling protocol is stipulated in the particular test method, then test specimens shall be taken evenly spaced across the entire roll width according to ASTM D4354.
 - a. The manufacturer's QC procedures shall be in accordance with ASTM D5888 and D5889.
 - b. The manufacturer's QC manual shall describe procedures used to determine rejection of applicable rolls.
2. Test results not meeting the requirements specified in **Table 02515-1** shall result in the rejection of applicable rolls.
 - a. As a minimum, rolls produced immediately prior to and immediately after the failed roll shall be tested for the same failed parameter.
 - b. Testing shall continue until a minimum of three successive rolls on both sides of the original failing roll pass the failed parameter.
 - c. Conformance of the manufactured GCL to this specification shall be performed by the manufacturer or designated by the purchaser/owner. ASTM D4759 can be used as a general guide, but individual test methods must be clearly stipulated and communicated to the parties involved.

PART 3 EXECUTION

3.1 PREPARATION

A. Surface Preparation

1. Surface preparation shall be performed in accordance with **Part 3.3.A.** of **Section 02300** of these Specifications.
2. Rocks larger than 1/2-inch in diameter and any other material which could damage the GCL shall be removed from or rolled into the surface to be covered with the GCL.

3. Construction equipment tire or track deformations beneath the GCL shall not be greater than 1.0 inch in depth.
4. Each day during placement of GCL, the CQAE and Installer shall inspect the surface on which GCL is to be placed, and certify in writing that the surface is acceptable.
5. Repairs to the surface of the low-permeability support layer shall be performed at no additional cost to the OWNER or its Representatives.

B. Anchor Trenches

1. Where an anchor trench is required, it shall be placed 18 inches back from the edge of the slope to be covered.
2. The anchor trench shall be 24 inches deep and 24 inches wide.
3. If the anchor trench is excavated in cohesive soil susceptible to desiccation, only the amount of anchor trench required for placement of GCL in a single day shall be excavated.
4. Ponded water shall be removed from the anchor trench while the trench is open.
5. Trench corners shall be slightly rounded to avoid sharp bends in the GCL.
6. Loose soil, rocks larger than 1/2-inch in diameter, and any other material which could damage the GCL shall be removed from the surfaces of the trench.
7. The GCL shall extend down the front wall and across the bottom of the anchor trench.
8. Backfilling and compaction of the anchor trench shall be in accordance with **Section 02300** of these Specifications.

3.2 ENCAPSULATING GCL DEPLOYMENT

- A. GCL shall be installed as soon as practical after completion and approval of the clay liner.
 1. The procedures and equipment used shall not elongate, wrinkle, scratch, or otherwise damage the GCL, other geosynthetic layers, or the underlying clay liner.
 2. Construction equipment may be used to deploy GCL.
- B. Rolls shall be delivered to the work area in their original packaging. Immediately prior to deployment, the packaging shall be carefully removed without damaging the GCL.
- C. GCL damaged during installation shall be replaced or repaired, at the CQAE's discretion.
- D. If premature hydration of the GCL occurs (i.e., prior to covering the GCL), the CQAE shall determine whether or not the GCL shall be replaced. Hydrated GCL is defined as having become soft as determined by squeezing the material with foot pressure,

which leaves a footprint made after stepping on the suspect area, or material which has exhibited swelling, as determined by the CQAE.

- E. On side slopes, GCL shall be anchored at the top and deployed down the slope to minimize wrinkles.
- F. Dragging of GCL panels over the ground surface shall be minimized. The CQAE has the option of requiring the use of a slip sheet.
- G. For encapsulating GCLs with differing sides, the non-woven side of the GCL shall be placed up.
- H. Only as much GCL shall be deployed as can be covered with geomembrane at the end of the working day, unless otherwise approved by the CQAE.
- I. No equipment shall be operated on the top surface of the GCL without permission from the Installer and the CQAE. Equipment that could potentially damage the GCL or subgrade shall not be allowed to travel directly on it.
- J. The GCL shall be placed so that longitudinal panel seams are parallel to the direction of the slope. Seams shall be located at least 3 feet from the toe and crest of slopes.
- K. All GCL panels shall lie flat on the underlying surface with no wrinkles or folds.
- L. The CQAE will document the following:
 - 1. Proper deployment of the GCL.
 - 2. The length of the GCL overlap, and that the GCL overlap is adequate for the seaming process that is used.
- M. The GCL shall be cut with a sharp utility knife. Cuts shall be smooth and clean.

3.3 FIELD SEAMING OF ENCAPSULATING GCLs

- A. Field Seams are constructed by overlapping their adjacent edges.
 - 1. Panels shall be seamed in accordance with the GCL manufacturer's recommendations and the approved layout plan.
 - 2. In sumps, corners and odd-shaped geometric locations, the number of field seams shall be minimized.
 - 3. Care should be taken to ensure that the overlap zone is not contaminated with loose soil or other debris.
 - 4. The minimum dimension of the longitudinal panel overlap shall be 6 inches for the finished (i.e., bentonite enhanced) seam.
 - 5. The minimum overlap at the end of roll seams shall be 24 inches.

6. The panel seams shall be shingled in the direction of the grade.

B. Granular Bentonite shall be used to enhance the seams.

1. The underlying edge of the overlap panel shall be exposed, and a continuous fillet of granular sodium bentonite shall be applied along a zone defined by the edge of the underlying panel and the 6-inch line.
2. The bentonite shall be applied at a minimum rate of 0.25 pound per linear foot of seam.

3.4 SAMPLES

- A. One QC sample, 18 inches in length, for the entire width of a roll, shall be obtained for every 100,000 square feet of material delivered to the site. Samples shall not be obtained from the first 3 feet of the roll.
- B. The samples shall be identified by manufacturer's name, product identification, lot and roll/panel number. The date, a unique sample number, and the machine direction shall also be noted.

3.5 DEFECTS AND REPAIRS

- A. If a GCL panel is torn, punctured, perforated, etc. during installation, it shall be replaced or repaired per the direction of the CQAE.
- B. Patches
 1. Patches shall be sized so that a minimum 12-inch overlap is achieved around the damaged area.
 2. Prior to placement of the patch, dry bentonite shall be placed around the damaged area.
 3. If there is potential for dislodging the patch during covering operations, the patch shall be secured to the damaged area using appropriate adhesive per CQAE approval.

3.6 VISUAL INSPECTION AND EVALUATION

- A. Immediately prior to covering, the GCL, seams, and non-seam areas shall be visually inspected by the Installer and CQAE for defects, holes, or damage due to weather conditions or construction activities.
- B. Defects and repairs shall be managed as described in **Part 3.5** of this Section of these Specifications.

3.7 PENETRATIONS

GCL penetration details shall be as shown on the drawings or as recommended by the GCL manufacturer.

3.8 AS-BUILT DRAWINGS

- A. Final as-built drawings of the GCL installation shall be prepared by the Installer and submitted to the OWNER or its Representative.
- B. These drawings shall include panel numbers, seam numbers, location of the anchor trench(es), and location of repairs and penetrations.

END OF SECTION

SECTION 02620
PIPING

PART 1 GENERAL

1.1 SUMMARY

- A. The work to be performed under this project consists of providing the labor, equipment, and materials and ancillary construction to access, assemble and install piping.

1.2 DESCRIPTION OF THE WORK

- A. All construction will be done in accordance with these Technical Specifications and the Drawings. This will ensure all work is completed, at minimum, in accordance with manufacturer's specifications, good practice, and local, state, and federal regulations.

B. Summary of the Work

The proposed work for this section will include the Phases 6 and 7 groundwater intercept piping.

Piping and trenching for this project include the following:

- Constructing leachate collection drainage pipe.
- Groundwater intercept trench piping

All excavation will be sloped or shored, as required by site conditions, to meet Occupational Safety and Health Association (OSHA) regulations.

All piping will be high-density polyethylene (HDPE) pipe.

1.3 SUBSURFACE CONDITIONS

A. Site Investigations

1. Refer to the permit documents for the Summit County Resource Allocation Park.

B. Soils

1. Soils at the site area expected to be suitable for structural fill.

C. Utilities

1. Subsurface utilities (power, water, sewer, and gas) are not known to exist at this site.

2. Before beginning work, the CONTRACTOR will confirm the clearance obtained by the OWNER. This confirmation will be provided in writing to the OWNER or its Representative.

D. Groundwater

1. Subsurface site investigations have been completed for the site and are available for review upon request.
2. Should subsurface waters be encountered during construction in sufficient quantity to affect construction, this will be considered a change of conditions.

1.4 HANDLING AND STORAGE

A. Handling

1. General
 - a. Before unloading the shipment, there must be adequate level space to unload the shipment.
 - b. The truck should be on level ground with the parking brake set and the wheels chocked.
 - c. Unloading equipment must be capable of safely lifting and moving pipe, fittings, fabrications, or other components.
 - d. Keep unnecessary persons away from the area during unloading.
2. Unloading Site Requirements
 - a. The unloading site should be relatively flat and level and large enough for the carrier's truck, the load handling equipment and its movement, and for temporary load storage.
 - b. Palletized packages should be unloaded from the site with a forklift.
 - c. Non-palletized pipe, fittings, fabrications, manholes, tanks, or other components should be unloaded from above with lifting equipment and wide web slings or from the side with a forklift.
3. Handling Equipment
 - a. Appropriate unloading and handling equipment of adequate capacity must be used to unload the truck. Safe handling and operating procedures must be observed.
 - b. Pipe must not be rolled or pushed off the truck.
 - c. Pipe, fittings, fabrications, tanks, manholes, and other components must not be pushed, dumped, or rolled off the truck.

- d. Although polyethylene-piping components are lightweight compared to similar components made of metal, concrete, clay, or other materials, larger components can be heavy. Lifting and handling equipment must have adequate rated capacity to lift and move components from the truck to temporary storage.
- e. When using a forklift or forklift attachments on equipment such as articulated loaders or bucket loaders, lifting capacity must be adequate and the load centered on the forks.
 - (1) Forklift equipment is rated for a maximum lifting capacity at a distance from the back of the forks. If the weight center of the load is farther out on the forks, lifting capacity is reduced.
 - (2) Before lifting or transporting the load, forks should be spread as wide apart as practical, forks should extend completely under the load, and the load should be as far back on the forks as possible.
- f. Lifting equipment such as cranes, extension boom cranes, and side-boom tractors should be hooked to wide-web choker slings that are secured around the load or to lifting lugs on the component.
 - (1) Only wide-web slings should be used.
 - (2) Wire rope slings and chains can damage components and should not be used.

B. Storage

1. Pre-Installation Storage

- a. The site and its layout should provide protection against physical damage to components.
- b. General requirements include sufficient area to accommodate piping components, to allow room for handling equipment to maneuver, and to have a relatively smooth, level surface free of stones, debris, or other material that could damage pipe or components or interfere with handling.
- c. Pipe may be placed on 4-inch-wide wooden dunnage, evenly spaced at intervals of 4 feet or less.

2. Pipe-Stacking Heights

- a. Coiled pipe is best stored as received in silo packs. Individual coils may be removed from the top of the silo pack without disturbing the stability of the remaining coils in the silo package.
- b. Pipe received in bulk packs or strip load packs should be stored in the same package.
- c. If the storage site is flat and level, bulk packs or strip load packs may be stacked evenly upon each other to an overall height of about 6 feet.

- d. For less flat or less level terrain, limit stacking height to about 4 feet.
- e. Before removing individual pipe lengths from bulk packs or strip load packs, the pack must be removed from the storage stack and placed on the ground.
- f. Individual pipes may be stacked in rows. Pipes should be laid straight, not crossing over or entangled with each other.
- g. The base row must be blocked to prevent sideways movement or shifting (see **Table 02620-1**).
- h. The interior of stored pipe should be kept free of debris and other foreign matter.

Table 02620-1
Loose Pipe Storage

Pipe Size, Nominal	Suggested Stacking Height - Rows	
	DR Above 17	DR 17 & Below
4	15	12
6	10	8
8	8	6
10	6	5
12	5	4
14	5	4
16	4	3
18	4	3
20	3	3
22	3	2
24	3	2

3. Exposure to Ultraviolet and Weather

- a. Polyethylene pipe products are protected against deterioration from exposure to ultraviolet light and weathering effects.
 - (1) In general, non-black products should not remain in unprotected outdoor storage for more than two years; however, some manufacturers may allow longer unprotected outside storage.
 - (2) Black products contain at least 2% carbon black to protect the material from ultraviolet (UV) deterioration. Black products with and without stripes are generally suitable for unlimited outdoor storage and for service on the surface or above grade.

b. Cold Weather Handling

- (1) Temperatures near or below freezing will affect polyethylene pipe by reducing flexibility and increasing vulnerability to impact damage.
 - (2) Care should be taken not to drop pipe or fabricated structures and to keep handling equipment and other things from hitting pipe.
 - (3) Ice, snow, and rain are not harmful to the material but may make storage areas more troublesome for handling equipment and personnel. Unsure footing and traction require greater care and caution to prevent damage or injury.
4. Keep inside of pipes and fittings free of dirt and debris.
 5. Store rubber gaskets under cover, out of direct sunlight.

1.5 SUBMITTALS

A. Qualifications

1. CONTRACTOR

- a. Documentation of the CONTRACTOR'S experience with projects of similar scope and size.
- b. Documentation of the CONTRACTOR'S ability to provide equipment appropriate to the work, in order to complete the work in a timely manner.
- c. Documentation of the experience of the CONTRACTOR'S Superintendent on projects of similar scope and size.

2. CQAE

- a. Documentation of the CQAE's experience with projects of similar size and scope.
- b. Documentation of the CQAE's ability to provide testing services required by this project. These services may be provided by a subcontractor to the CQAE or the CONTRACTOR, provided the CQAE's onsite person is experienced with projects of similar size and scope.

B. Alternate Materials and Method proposed by the CONTRACTOR for earthwork must be submitted and approved prior to their use.

C. Manufacturer's Quality Assurance/Quality Control (QA/QC) Certifications to verify that the piping supplied is in accordance with the design plans and Drawings, these Technical Specifications, ASTM D3035, ASTM F714, and the Manufacturer's Quality Control Plan will be provided for each shipment. The certification will be signed by a responsible party employed by the pipe manufacturer.

1.6 INSPECTIONS, TESTS, AND REPORTS

- A. Inspection of materials for defects, including CQAE documentation.
- B. Documentation of the weather conditions by the CQAE.

1.7 REFERENCES

The publications listed below form a part of this Technical Specification to the extent referenced. The publications are referred to within the test by the basic designation only. Consult only the most up to date versions of each publication referenced.

ASTM INTERNATIONAL (ASTM)

ASTM A139/A139M	(Electric-Fusion (Arc)-Welded Steel Pipe (NPS 4 and Over)
ASTM A252	Welded and Seamless Steel Pipe Piles
ASTM D2321	Underground Installation of Thermoplastic Pipe for Sewers and Other Gravity-Flow Applications

1.8 EQUIPMENT

The CONTRACTOR will use equipment appropriate to the work and of number and capacity to complete the work in a timely manner.

PART 2 PRODUCTS

2.1 SOILS

- A. See **Section 02300** of these Technical Specifications.

2.2 HDPE PIPE

HDPE pipe manufacture and workmanship will comply with ASTM D3035 and ASTM F714.

PART 3 EXECUTION

3.1 PREPARATION

- A. Earthwork will be performed in accordance with **Section 02300** of these Technical Specifications.
- B. Demolition
 - 1. Manmade structures, including buildings, roads, wells, pipelines, and utilities were not observed during site visits to the property. Demolition is not expected to be a part of this project.

3.2 PIPE LAYING AND JOINTING

A. Pipe Laying

1. Inspect each pipe and fitting before and after installation. Replace those found defective and remove from site. Remove fins and burrs from pipe and fittings.
2. Before placing in position, clean pipe, fittings, valves, and accessories, and maintain in a clean condition.
3. Provide proper facilities for lowering sections of pipe into trenches. Do not, under any circumstances, drop or dump pipe, fittings, valves, or any other pipeline material into trenches.
4. Cut pipe in a neat workmanlike manner, accurately to length established at the site, and work into place without springing or forcing.
5. Provide batterboards, not more than 25 feet apart, in trenches for checking and ensuring that pipe invert elevations are as indicated. Laser beam method may be used in lieu of batterboards for the same purpose.
 - a. Grade the pipeline in straight lines. Avoid the formation of dips and low points.
 - b. Support the pipe at proper elevation and grade. Secure firm, uniform support. Lay pipe so that the full length of each section of pipe and each fitting will rest solidly on the pipe bedding.
 - c. HDPE pipe often is warped. Allowable horizontal and vertical variations in alignment and grade will not exceed 0.33 feet and 0.1 feet, respectively. The exception will be when changes in alignment or grade are done by warping the pipe.
6. Keep trenches free of water until joints have been properly made.
7. Do not lay pipe when conditions of trench or weather prevent proper installation.
8. At the end of each work day, close up open ends of pipe temporarily with wood blocks or bulkheads.

B. Pipe Jointing

1. Joints and fittings will have the same or higher-pressure rating as the pipe when installed in accordance with the latest Technical Specifications.
2. Butt-fusion fittings will conform to ASTM D3261.
3. Socket-fusion fittings will conform to ASTM D2683, with tools meeting the requirements of ASTM F1056.

END OF SECTION

SECTION 02666
LEACHATE COLLECTION LAYER

PART 1 GENERAL

1.1 SUMMARY

- A. The work to be performed under this project consists of providing the labor, equipment, and materials and ancillary construction to access and construct the leachate lateral.

1.2 DESCRIPTION OF THE WORK

- A. All construction will be done in accordance with these Technical Specifications and the drawings. This will ensure all work is completed, at minimum, in accordance with manufacturer's specifications, good practice, and local, state, and federal regulations.

- B. Summary of the Work

The work will include the construction of the Geocomposite drainage net (See **Section 02930**), leachate collection drain, and gravel placement (See **Section 02620**)

1.3 SUBMITTALS

- A. Qualifications

- 1. CONTRACTOR

- a. Documentation of the CONTRACTOR's experience with projects of similar scope and size.
 - b. Documentation of the CONTRACTOR's ability to provide equipment appropriate to the work, in order to complete the work in a timely manner.
 - c. Documentation of the experience of the CONTRACTOR's Superintendent on projects of similar scope and size.

- 2. Quality Assurance Engineer

- a. Documentation of the Quality Assurance Engineer's (QAE) experience with projects of similar size and scope.
 - b. Documentation of the QAE's ability to provide testing services required by this project. These services may be provided by a subcontractor to the QAE or the CONTRACTOR, provided the QAE's onsite person is experienced with projects of similar size and scope.

- B. Alternate Materials and Method proposed by the CONTRACTOR for this project must be submitted and approved prior to their use.

- C. Results of the testing on the leachate gravel, showing compliance with 2.1 of this Section of these Technical Specifications.
- D. Manufacturer's Quality Assurance/Quality Control (QA/QC) Certifications shall be provided for each shipment to verify that the materials supplied are in accordance with the design plans and drawings, these Technical Specifications, and the Manufacturer's Quality Control Plan. The certification shall be signed by a responsible party employed by the material manufacturer.

1.4 INSPECTIONS, TESTS, AND REPORTS

- 1. Inspection of materials for defects, including QAE documentation.
- 2. As-built drawings (see **Part 3.6 of Section 02300** of these Technical Specifications).

1.5 REFERENCES

The publications listed below form a part of this Technical Specification to the extent referenced. The publications are referred to within the test by the basic designation only. Consult only the most up to date versions of each publication referenced.

ASTM INTERNATIONAL (ASTM)

ASTM C136	Sieve Analysis of Fine and Coarse Aggregates
ASTM D2434	Permeability of Granular Soils (Constant Head)
ASTM 4373	Determination of Carbonate Content of Soils

1.6 QUALIFICATIONS

A. CONTRACTOR

- a. The CONTRACTOR is responsible for removing, processing, and replacing soils, as required by these Technical Specifications and the drawings.
- b. The CONTRACTOR and its Superintendent shall have experience in excavating and replacing soils on projects of similar requirements and size.
- c. The CONTRACTOR shall have, or be able to provide, equipment appropriate to the work and in capacity and number to complete the work in a timely fashion

B. QAE

- 1. The QAE shall be a Representative of the OWNER.

2. The QAE shall have experience in constructing clay liners, synthetic liners, geocomposite, earthwork, and piping.
3. The QAE shall appoint an Inspector who will be responsible for documenting field construction that the finished product complies with the requirements of these Technical Specifications and Drawings, good practice, and the local, state, and federal laws and regulations governing their construction.
4. The QAE shall have a Professional Engineer, licensed in the State of Colorado, and with suitable experience that will be responsible for certifying that the facility has been constructed in compliance with the requirements of these Technical Specifications and drawings, good practice, and the local, state, and federal laws and regulations governing their construction.

1.7 EQUIPMENT

The equipment to be used by the CONTRACTOR shall be appropriate to the work and of number and capacity to complete the work in a timely manner.

PART 2 PRODUCTS

a. MATERIALS

A. Leachate Collection Drain Gravel

1. Provide gravel materials with a permeability $\geq 12\text{cm/sec}$
2. A grain size test (ASTM C136) will be conducted per 2,000 cubic yards of gravel placed.

B. Geotextile

1. The Geotextile 16 oz non-woven geotextile will be used to wrap the gravel in the leachate collection trench. The 8 oz non-woven geotextile will be used to wrap the gravel in the groundwater intercept trench. The contractor shall submit the manufacture's specifications for these materials to the CQAE prior to shipment of the material for approval.

PART 3 EXECUTION

3.1 LECHATE COLLECTION DRAINS

The leachate collection lateral will be constructed above the geocomposite liner, and will demonstrate compliance at the borrow source and at delivery to the site with **Table 02666-1**. See details on the Drawings.

3.2 DRAINAGE MEDIA

A geocomposite drainage layer will be placed above the geomembrane liner to facility drainage in the base of the disposal cell. Refer to **Section 02930** for further requirements and details for the geocomposite layer.

3.3 FILTER GEOTEXTILE

The 16-ounce filter geotextile (needle-punched non-woven) will be placed below the drainage media and above the geocomposite to protect the liner. The 8 oz geotextile will be used in the groundwater interceptor trench.

Table 02666-1
Gravel Drainage Properties

Phase	Material	Test and ASTM Number	Frequency	Required Value
Pre-Construction	Borrow Source	Grain Size Distribution (C136)	1 per 2,000 cubic yards (cy)	D ₅₀ > collection pipe perforations
		Permeability (D2434)	1 per 2,000 cy	≥ 1 x 10 ⁻² cm/sec
Construction	Gravel, when delivered	Visual Observations	Continuous	--
		Grain Size Distribution (C136)	1 per 2,000 cy	D ₅₀ > collection pipe
		Permeability (D2434)	1 per 2,000 cy	≥ 1 x 10 ⁻² cm/sec

END OF SECTION

SECTION 02700
PROTECTIVE LAYER

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:

1. Hauling and placement of protective layer soil above the geosynthetic liner system to achieve design grades.

1.2 DEFINITIONS

A. Unsuitable Material:

1. Topsoil, peat, organic soils, and materials containing slag, cinders, foundry sand, debris, and rubble, or soil with less than required bearing capacity as determined by CQAE. Particles of protective soil cover shall not be of a size or shape which may damage any underlying geosynthetic component.

PART 2 PRODUCTS

2.1 MATERIALS

A. Protective Layer Soil:

1. Stockpiled materials excavated from the expansion area footprint and approved by CQAE. CQAE will designate which stockpiles will be used for the protective layer soil.
2. Unsuitable materials shall not be used.

PART 3 EXECUTION

3.1 PREPARATION

A. The protective layer shall be placed where designated on the Plans or as directed by the CQAE.

3.2 MATERIAL PLACEMENT

- A. The method of placement of the protective layer shall not cause damage to the geosynthetic liner system or underlying subgrade. The CQAE prior to commencing the work shall approve all placement procedures.
- B. A low ground pressure (LGP) dozer shall be used for all placement of protective cover soils, equipment shall have a ground pressure of 5 psi or lighter. The leading edge of the fill shall be advanced in a manner that does not place tensile strain on the liner system and shall be done in a way that the soils tumble in front of the dozer blade.

- C. If trucks will be used within lined areas to transport protective cover material a temporary road shall be constructed a minimum of 3-feet thick in all areas where truck traffic is anticipated.
- D. The protective layer shall be formed of satisfactory materials with a lifts thickness of not less than twelve (12) inches in loose depth.
- E. The grading operations shall be conducted, and the soil strata placed to produce a soil structure as shown on the typical cross section or as otherwise specified. All material shall be free of organic matter such as leaves, grass, roots and other objectionable material.
- F. Operations on earthwork shall be suspended at any time when satisfactory results cannot be obtained because of rain, freezing weather, or other unsatisfactory conditions of the field.
- G. Schedule Work in coordinated effort with OWNER. Do not block or obstruct roads, streets, or pavements with excavated materials, except as authorized by OWNER.

3.3 FIELD QUALITY CONTROL

A. Tolerances for protective layer soil:

- 1. Grade: -0.0 to +0.2 foot.
- 2. Line: +/- 0.2 foot.

B. Completed grades shall be surveyed by CONTRACTOR and inspected by OWNER'S representatives prior to acceptance. Any grades exceeding the tolerances will be reworked and resurveyed at CONTRACTOR'S expense.

END OF SECTION

SECTION 02930
GEOCOMPOSITE

PART 1 **GENERAL**

3. 1.1 SUMMARY

- A. The work to be performed under this project consists of providing the labor, equipment, and materials and ancillary construction to access and construct the geocomposite drainage layer in Phases 6 and 7 as described in the Construction Drawings, CQA Plan, and these Technical Specifications.

4. 1.3 SUBMITTALS

- A. The Geosynthetic Contractor shall submit the following product information to the Owner's CQA Consultant for approval prior to procurement of the product:
1. Material Prequalification: The Geosynthetic Contractor shall submit the manufacturer's product data sheets for the geocomposite demonstrating compliance with the material properties listed in **Table 02930-1** (Geotextile Properties), and **Table 02930-2** (Geocomposite Properties).
 2. Manufacturer's qualifications for geotextile, and geocomposite, as specified in Part 2.1.
 3. Manufacturer's Brochure: Complete manufacturer's specifications, descriptive drawings, and literature for the geocomposite, including the product identification and suppliers of the polymer resin and recommended methods for handling and storage of all materials prior to installation. Describe the manufacturer's methodology to comply with the requirements specified for manufacturing quality control.
 4. Manufacturer Quality Assurance/Manufacturer Quality Control (MQA/MQC) Program: Complete description of the MQA/MQC program for manufacturing, fabricating, handling, installing, and testing. The description shall include, but not be limited to, polymer resin supplier and product identification, acceptance testing, production testing, installation inspection, installation techniques, repairs, and acceptance. The document shall include a complete description of methods for both roll end and roll side joining.
 5. Installer's Qualifications: The name or names of the Geosynthetic Contractor's field superintendent who will be proposed for the project and a list of completed facilities

for which the field superintendent has installed geocomposite layer totaling a minimum of 2,000,000 square feet.

B. Geosynthetic Contractor shall submit the following information for the geocomposite to the Owner's CQA Consultant for approval prior to shipment of the geocomposite to the site:

1. Manufacturer's Quality Control Testing (See Part 2.5 for tests and test frequencies): The manufacture shall test all supplied materials for the specified properties using the specified test methods described in Part 2.5.B – D. At a minimum, each material property shall be verified at least once per quantity supplied or at the specified frequencies listed in Part 2.5, whichever is greater.
2. The manufacturer must provide a certificate of compliance which states production dates for the geocomposite and that all material to be installed meets or exceeds the material properties specified in **Table 02930-1** and **02930-2** and was manufactured using the same techniques, resin type, and formulation as that for which test results were submitted.
3. Suppliers and/or manufacturers shall also certify that HDPE drainage net and non-woven geotextile are compatible with one another when bonded to form the geocomposite.
4. Protection from Wind and Weather: Submit plans to protect the geocomposite from wind, dirt, and extended direct sunlight exposure.
5. Installation Instructions: Samples of the geocomposite with a complete set of specifications, and manufacturer's complete written instructions for storage, handling, installation, and joining.

5. 1.4 REFERENCES

- A. The publications listed below form a part of this Specification to the extent referenced. The publications are referred to in the text by basic designation only. Where the test method references are not the most recently published methods, the recently published methods shall supersede the methods listed below.

ASTM D4632 Grab Breaking Load and Elongation of Geotextiles

ASTM D4716 Constant Head Hydraulic Transmissivity (In-Plane Flow) of Geotextiles and Geotextile Related Products

ASTM D4751 Determining the Apparent Opening Size of a Geotextile

ASTM D4833	Index Puncture Resistance of Geotextiles, Geomembranes, and Related Products
ASTM D5261	Measuring Mass per Unit Area of Geotextiles
ASTM D5321	Determining the Coefficient of Soil and Geosynthetic or Geosynthetic and Geosynthetic Friction by the Direct Shear Method

PART 2 PRODUCTS

2.1 MANUFACTURER'S QUALIFICATIONS

- A. Manufacturer shall have manufactured a minimum of 5,000,000 square feet of geocomposite.
- B. Single Source
 - 1. All drainage net used for construction of the geocomposite must be obtained from a single material supplier or manufacturer.
 - 2. All geotextile fused to the drainage net and used for the construction must be obtained from a single material supplier.
 - 3. All fusion of HDPE drainage net to non-woven geotextile must be accomplished by a single material supplier or manufacturer.
 - 4. Suppliers and/or manufacturers shall certify that the HDPE drainage net and non- woven geotextile will be compatible with one another.

2.2 HDPE DRAINAGE NET

- A. The HDPE drainage net component of the geocomposite shall be manufactured by extruding strands of material into a counter-rotating die to form a three-dimensional structure to provide planar water flow.
- B. The HDPE drainage net shall consist of new, first-quality products designed and manufactured specifically for the intended purpose designated in the Technical Specifications and shown on the Construction Plans, as satisfactorily demonstrated by prior use. The HDPE drainage net shall contain stabilizers to prevent ultraviolet light degradation. The HDPE drainage net shall be unmodified HDPE containing no plasticizer, fillers, chemical additives, reclaimed polymers, or extenders. Carbon black shall be added to the resin for ultraviolet resistance. The only other

allowable compound elements shall be anti-oxidants and heat stabilizers, of which up to 1 percent total, as required for manufacturing, may be added.

2.3 NON-WOVEN GEOTEXTILE

- A. Geotextile shall meet the physical property requirements set forth in **Table 02930-1.**

2.4 GEOCOMPOSITE

- A. Geocomposite supplied for this project shall be double-sided geocomposite, which shall be comprised of three layers, including a lower non-woven geotextile, a middle HDPE drainage net, and an upper non-woven geotextile. The lower and upper geotextiles shall be heat-bonded to the middle HDPE drainage net. Double-sided geocomposite shall be installed at the locations indicated on the Construction Plans.
- B. The geocomposite shall be fabricated by heat bonding the non-woven geotextile to one or both sides of the HDPE drainage net. No burn through of non-woven geotextiles will be permitted. No glue or adhesive shall be permitted. The bond between the geotextile and the HDPE drainage net shall meet the requirements of Table 02930-2, Geocomposite Properties.
- C. Geocomposite shall be supplied in rolls, marked or tagged with the following information:
 - 1. Manufacturer's name;
 - 2. Product identification;
 - 3. Lot number; and
 - 4. Roll number and roll Dimensions.
- D. The geocomposite shall be supplied as a continuous sheet with no factory seams.
- D. During installation, the roll length shall be maximized to provide the largest manageable roll for the fewest field seams. Rolls shall be wound on a core which shall be stable enough to support the rolls during handling and shipping.

2.5 MANUFACTURING QUALITY CONTROL TESTING

- A. It is the Geosynthetic Contractor's responsibility to verify that all property tests were performed by the Manufacturer's laboratory consistent with test methods described below.
- B. At a minimum, the properties listed in **Tables 02930-1, 02930-2, and 02930-3** for geotextile and geocomposite, respectively, shall be tested using the specified test methods.
1. HDPE resin shall be tested at a frequency of one test per resin batch for compliance with Table 02930-1, HDPE Drainage Net Properties. One batch is defined as 1 rail car load of resin. The finished rolls of the HDPE drainage net shall be identified by a roll number corresponding to the resin batch used.
 2. HDPE drainage net shall be tested for compliance with Table 02930-1, HDPE Drainage Net Properties.
- C. Geotextile shall be tested during manufacturing for the compliance with Table 02930-2. Manufacturer's Documentation, Certification, and Quality Control Test Results for the geotextile and thread shall be obtained every 1000,000 square feet per lot.
- D. Geocomposite shall be tested during manufacturing for compliance with Table 02930-3, Geocomposite Properties, at a minimum frequency of 1 per 100,000 square feet. The transmissivity may be performed specifically for the project or may be certified as meeting or exceeding the requirements based on historical test data provided by the manufacturer.
- E. The Geosynthetic Contractor shall inspect every roll for bonding integrity between the HDPE drainage net and the non-woven geotextile. All poorly bonded and/or delaminated material shall be rejected.

**Table 02930-1
Geonet Properties**

Material Property	Test Method	MQC Frequency	Required Values
Polymer Density, Resin	ASTM D1505	1 per 50,000 lb.	0.932 g/cm ³
Polymer Density Resin plus Carbon Black	ASTM D 1505	1 per 50,000 lb.	0.940 g/cm ³
Carbon Black	ASTM D1603/4218	1 per 100,000 lb.	2-3 %
Nominal Thickness	ASTM D5199	1 per 50,000 lb.	200 Mils

Tensile Strength	ASTM D5035	1 per 50,000 lb.	50 +/-10 lbs/in
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Table 02930-2
Geotextile Properties

Material Property	Test Method	Test Frequency	Required Values
Mass per Area	ASTM D5261	1 per 100,000 sf per lot	6-oz per square yard
CBR Puncture Strength	ASTM D6241	1 per 100,000 sf per lot	310 lbs
Grab Tensile Strength	ASTM D4632	1 per 100,000 sf per lot	157 lbs
Apparent Opening Size	ASTM D4751	1 per 100,000 sf per lot	0.25 millimeters
Water Flow Rate	ASTM D4491	1 per 100,000 sf per lot	110 gpm/ft ²
UV Resistance	ASTM D4355	1 per 100,000 sf per lot	50 % after 500 hrs.

Table 02930-3
Geocomposite Properties

Material Property	Test Method	Test Frequency	Required Values
Ply Adhesion	ASTM D7005	1 per 100,000 lb.	1.0 lb/in
Transmissivity	ASTM D4716	1 per 200,000 lb.	2x10 ⁻⁴ m ² /sec

PART 3 EXECUTION

3.1 ROLL JOINING METHODS

A. Table 02930-4, Geocomposite Joining Methods, summarizes acceptable roll joining methods.

1. Lap Seams: The bottom layer of non-woven geotextile shall be lap seamed. Lap seaming is accomplished by overlapping adjacent non-woven geotextile a minimum of 6 inches.
2. Nylon Ties: Geocomposite layers shall be overlapped and fastened with nylon ties. Nylon ties shall be yellow or white in color to facilitate inspection.
3. Machine Sewn Seams: Sewing shall be accomplished with a chain-stitching sewing machine. The thread shall be polymeric thread which complies with non-woven geotextile manufacturer's recommendations and is a color which contrasts with the color of the non-woven geotextile. The seam shall be placed

a minimum of 4 inches from the non-woven geotextile edges. The finished seam shall be folded to one side ("J" seam) and be secured with a double row of stitches.

6. 3.2 ROLL JOINING REQUIREMENTS

A. The minimum requirements for joining rolls are specified in **Table 02930-3**, Geocomposite Joining Methods.

1. Roll Ends: At roll ends the material shall be overlapped a minimum of 12 inches. Roll ends shall be shingled; the uphill roll end shall be overlapped 12 inches over the downhill roll end. At roll ends, the HDPE drainage net shall be tied every 12 inches on centers at a minimum. The bottom layer of non-woven geotextile shall be overlapped a minimum of 6 inches. The upper layer of non-woven geotextile shall be machine sewn.
3. Adjacent Roll Sides: At roll sides the material shall be overlapped a minimum of 4 inches. The bottom non-woven geotextile shall be lap seamed. The HDPE drainage net shall be overlapped and tied a minimum of 5 feet on center. The upper layer of non-woven geotextile shall be machine sewn.

**TABLE 02930-3
GEOCOMPOSITE JOINING METHODS**

Location	Layer	Joining Method	Min. Overlap (in)	Tying Frequency (ft)
Roll End	Upper geotextile	machine sewing	4	N/A
	Geonet	nylon ties	12	1' on center
	Lower geotextile	overlap	6	N/A
Roll Side	Upper geotextile	machine sewing	4	N/A
	Geonet	nylon ties	4	5' on center
	Lower geotextile	overlap	6	N/A
Repair of Minor damage	Upper geotextile	machine sewing	4	N/A
	Geonet	N/A	N/A	N/A

7. 3.3 INSTALLATION

- A. The Geocomposite shall be installed in accordance with the manufacturer's recommendations and as specified herein. In case of a conflict between requirements, the more stringent shall apply.
- B. The Owner's CQA Consultant shall be onsite at all times during installation of the geocomposite.
- C. Both geocomposite and the underlying geomembrane shall be clean, dry, and free of dirt and dust during installation.
- D. Geocomposite shall be rolled down the slope in such a manner as to continually keep the material in tension. If necessary, the material shall be positioned by hand after unrolling to minimize wrinkles. The material shall not be unrolled horizontally (i.e., across the slope).
- E. The Geosynthetic Contractor shall provide sufficient ballast and temporary anchorage to protect the material from wind damage or displacement. The Geosynthetic Contractor is responsible for protecting the material from damage due to weather at all times.
- F. Personnel walking on the material shall not engage in activities or wear footwear that could damage the material. Smoking shall not be permitted on or near the geosynthetics.
- G. Vehicular traffic shall not be permitted on the geosynthetics. Equipment shall not damage the material by handling, trafficking, or leakage of hydrocarbons. The surface shall not be used as a work area for preparing patches, storing tools and supplies, or other uses.
- H. The material shall be installed to avoid bridging.
- I. In corners, where overlaps between rolls are staggered, an extra roll shall be installed from the top to the bottom of the slope to provide a smooth, protected surface.
- J. Geocomposite shall be protected from direct sunlight or precipitation prior to installation. After installation this material shall have minimal exposure to direct sunlight and shall be completely protected from direct sunlight within 30 days of installation. Material which is exposed to direct sunlight for 30 days or more shall be replaced at the Geosynthetic Contractor's expense.
- K. It is the Geosynthetic Contractor's responsibility to provide all labor and materials for protection of the geocomposite during the period of time prior to installation of

overlying materials. The Geosynthetic Contractor's protection method is subject to the approval of the Owner's CQA Consultant.

8. 3.4 REPAIRS

- A. Damaged, soiled, or delaminated geocomposite shall be removed and discarded.
- B. Minor Damage: Minor damage is defined as a defect or hole in the material that is smaller than 2 inches in its lesser dimension. Minor damage may be repaired by snipping out any protruding drainage net and machine sewing a non-woven geotextile patch over the hole. The patch shall be a minimum of 12 inches larger than the damaged area in all directions.
- C. Major Damage: Major damage is defined as a defect or hole in the material that is 2 inches or larger in its lesser dimension. Major damage shall be repaired by replacing the entire geocomposite panel width.

END OF SECTION



CONSTRUCTION QUALITY ASSURANCE PLAN



CONSTRUCTION QUALITY ASSURANCE PLAN

Summit County Resource Allocation Park (SCRAP)

Prepared for:

Summit County, Colorado



Summit County Resource Allocation Park
639 Landfill Road
Dillon, Colorado 80435
(970) 468-9263

Prepared by:

SCS ENGINEERS

6161 S. Syracuse Way
Greenwood Village, Colorado
(303) 221-1719

June 2018

SCS Engineers Project No. 27215011.02

Offices Nationwide
www.scsengineers.com

Construction Quality Assurance Plan

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1 INTRODUCTION

This Construction Quality Assurance Plan (CQAP) for the Summit County Resource Allocation Park (SCRAP) construction in Summit County, Colorado, has been prepared to guide construction of liner, leachate collection systems, environmental control systems, and final cap for disposal of municipal solid waste at the landfill. The landfill is owned and operated by Summit County.

1.1 PURPOSE

During facility construction, Quality Assurance (QA) activities will be required to ensure that:

- (1) components are constructed in accordance with the plans and specifications, and
- (2) requirements of agencies related to documentation are satisfied.

This CQAP has been prepared to describe the activities that will be performed during construction to satisfy these objectives. Procedures invoked by the CQAP are intended to identify problems that may occur during construction and to document that these problems are corrected before construction is complete.

This CQAP is intended to satisfy the regulatory requirements and guidance established by the Colorado Department of Health and Environment (CDPHE) and EPA/600/R-93-182 *Quality Assurance and Quality Control for Waste Containment Facilities, 2nd Edition, Waste Containment Facilities, ASCE Press, 2007.*

1.2 SCOPE

This CQAP establishes general administrative and documentation procedures. With respect to specific inspection and testing activities, this plan addresses only those activities associated with the following systems:

- Groundwater interception and removal system
- Leachate collection and removal system
- Landfill floor and side slope foundation and geosynthetic liner system (includes operations layer)
- Surface Water Drainage
- Final Cap

The scope of this CQAP includes quality assurance applicable to these four landfill systems for the following construction activities:

- Excavation
- Construction of groundwater interception trenches and installation of piping
- Compacted Soil Layer Testing
- Construction of anchor trenches and side slope riser trenches
- Testing, and installation of geosynthetics
- Placement of leachate collection layers
- Site grading (civil survey, layout, etc.)

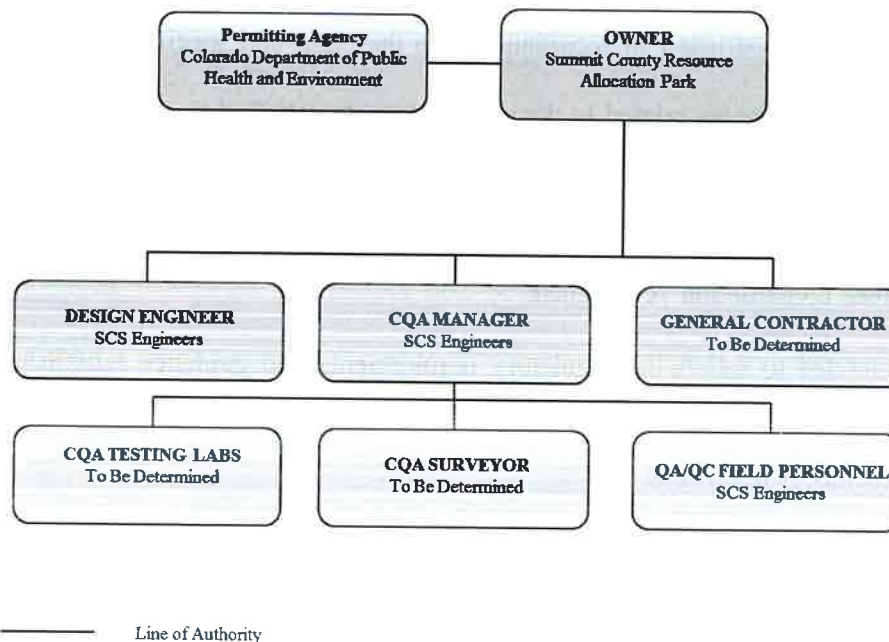


Figure 1: SCRAP Construction/Quality Assurance Organization

1.3 RESPONSIBILITY AND AUTHORITY

The quality assurance organization chart for SCRAP construction is shown on Figure 1. Each major organization is described in the following sections.

Owner

Summit County Resource Allocation Park

Permitting Agency

The facility is being constructed to meet regulations established by CDPHE. This CQAP is designed to meet the CDPHE regulations.

General Contractor

The Construction CONTRACTOR(s) will perform the work activities associated with actual construction at SCRAP. The Construction CONTRACTOR will be responsible for implementing their own internal quality control (QC) activities, as defined in the construction documents, approved submittals, and other supporting documentation. The Construction CONTRACTOR will report directly to and receive direction from the OWNER.

CQA Manager

A CQA Manager shall perform the work specified in the CQAP. The CQA Manager has the overall responsibility of implementing the CQAP and directly supervises the onsite CQA personnel, CQA Surveyor and CQA soils and geosynthetics labs. The CQA Manager shall be a registered Professional Engineer in the State of Colorado and has the authority to provide certification that the SCRAP Facility was constructed in accordance with the permitting agency-approved documents.

The CQA Manager shall review the Construction CONTRACTOR's plans and other submittals, as required by the construction documents. The CQA Manager shall also be responsible for training and qualifying CQA inspection personnel on requirements, procedures, scheduling, and inspection activities and ensuring that the CQA testing laboratories and surveyors conform to CQA requirements. The CQA Manager shall ensure that sample custody procedures are followed and test data are accurately reported and maintained for preparation of periodic reports. The most important duty of the CQA Manager is confirming that the facility was constructed in accordance with plans and specifications approved by the permitted agency. The CQA Manager shall report directly to and receive direction from the OWNER.

The CQA Manager manages the onsite QA personnel and CQA work, location and frequency of tests, schedule and monitor results of tests, identifies deficiencies and verifies that deficiencies have been corrected, completes reports and provides peer review of completed data, testing, and oversight of activities. CQA field personnel work under the direction of the CQA Manager and perform testing and observations in accordance with the CQAP.

CQA Testing Lab

CQA testing labs conduct the CQA tests specified in the CQAP that are not completed onsite, including the soils testing and geomembrane testing per the documents. CQA testing labs shall be provided by the CQA Manager.

CQA Surveyor

The CQA Surveyor shall provide surveys necessary for conducting the work specified in the CQAP. The CQA Surveyor shall be managed by the CQA Manager and paid directly by the OWNER. CQA surveying work shall be performed under the direction of a registered professional land surveyor in the State of Colorado.

QA/QC Field Personnel

Qualified field personnel will provide QA/QC oversight of General Contractor activities during construction.

1.4 PROJECT MEETINGS

This section includes a discussion of various progress and status meetings to be held throughout construction activities. The intent of the meetings is to ensure communication between organizations involved in the construction at the SCRAP Facility and to ensure that construction proceeds in a timely and adequate fashion.

1.4.1 CQA/Construction Coordination Meeting

A meeting will be held to resolve any uncertainties following the award of the construction and CQA contracts. The meeting will include the organizations involved in the construction and CQA activities, including representatives of SCRAP, the Design Engineer, CQA Manager, Construction CONTRACTOR, and regulatory agencies, as agreed upon. The topics of this meeting will include, but are not limited to, reviewing the responsibilities of each organization, as follows:

- Integrated work control;
- Interface protocol (e.g. points of contact, notification process, etc.);
- Reviewing lines of authority and communication for each organization;
- Providing each organization with CQA documents and supporting information;
- Familiarizing each organization with the CQAP and its role relative to the design criteria, plans and specifications;
- Determining any changes to the CQAP that may be needed to document that the facility will be constructed to meet or exceed the specified design requirements;
- Discussing the established procedures or protocol for observations and tests, including sampling strategies;
- Discussing the established procedures or protocol for handling construction deficiencies, repairs and retesting, including “stop work” conditions;
- Reviewing methods for documenting and reporting inspection data;
- Reviewing methods for distributing and storing documents and reports;
- Reviewing work area security and safety protocol;
- Reviewing the proposed project schedule;
- Discussing procedures for the location and protection of construction materials and for the prevention of damage of the materials from inclement weather or other adverse events; and
- Conducting a site walk-around to review construction material and inspect equipment storage locations.

The meeting will be documented in the CQA Manager’s meeting notes.

1.4.2 Daily Progress Meetings

An informal progress meeting will be held daily. The purpose of the meeting is to:

- Discuss any health and safety issues;
- Review the previous day's activities and accomplishments;
- Review the work location and activities for the day;
- Discuss the Construction CONTRACTOR's personnel and equipment assignments for the day;
- Review any new test data; and
- Discuss any potential construction problems.

This meeting will be documented in the CQA Manager's daily field monitoring reports.

1.4.3 Weekly Progress Meetings

Weekly progress meetings (or as agreed to) will be held. The purpose of the meeting is to:

- Review the previous week's activities and accomplishments;
- Review claims, change orders, delays, and similar items;
- Review planned activities for the upcoming week;
- Review the project schedule;
- Finalize resolution of problems from the previous week; and
- Discuss any potential problems with the work planned for the upcoming week.

This meeting will be documented in the CQA Manager's daily field monitoring reports.

1.4.4 Problem or Work Deficiency Meetings

Meetings will be convened, as necessary, to address deficiencies, scheduling, and nonconformance. Deficiencies observed during construction will be brought to the attention of the Construction CONTRACTOR and the OWNER. Material, construction, testing, discrepancies, etc., shall be documented in accordance with this CQAP.

2 PERSONNEL QUALIFICATIONS AND TRAINING

This section describes the qualifications and training required for CQA personnel.

The CQA Manager is responsible for qualification, certification, and maintenance of the personnel fulfilling the CQA position(s). The CQA Manager shall submit documentation to the OWNER regarding the qualifications of CQA personnel.

2.1 CQA MANAGER

The CQA Manager shall be a Professional Engineer registered in the State of Colorado, which will enable the construction certification report to be signed and sealed for submission to CDPHE. The CQA Manager shall have soil and liner construction certification experience. The CQA Manager shall have at least 10 years practical, technical, and managerial experience to successfully direct the onsite CQA activities discussed in this plan and in the Technical Specifications. The CQA Manager's qualification shall be documented by training records, copies of licenses, and professional resume. The CQA Manager shall have complete knowledge of the requirements of the CQAP, including but not limited to, documentation, receiving inspection, equipment calibration, design control, and personnel training.

2.2 CQA FIELD PERSONNEL

CQA field personnel will have a high school diploma and at least one year of experience conducting CQA monitoring for earthworks and geosynthetics installation, or a Bachelor of Science degree from a four year college or university.

Prior to undertaking project activities, CQA personnel shall understand the requirements of the CQAP and applicable technical requirements. In addition, CQA personnel shall be trained in the use of visual-manual soil classification techniques. Project plans and specifications shall be reviewed. The purpose of the training is to provide CQA staff with a clear understanding of expected conditions, methods of construction and the scope of plans and specifications. Prior to beginning project activities, CQA personnel must also receive health and safety training to perform work safely on the site.

3 INSPECTION ACTIVITIES

This section describes the inspection activities (observations and tests) that will be conducted by the CQA Personnel during construction at SCRAP. The following subsections address each facility component separately and, if appropriate, are further subdivided into sections on pre-construction, construction, and post-construction testing and observation activities unique to each component. Soil testing requirements are summarized in Table 4-1. Geosynthetic testing requirements are summarized in Table 4-2.

Sampling of soil, geosynthetic materials, and other materials will be required for testing purposes. Every sample shall be assigned a unique identification number which describes the sample location and type. Sample numbers shall be recorded by CQA Personnel.

3.1 EARTHWORKS

3.1.1 Excavation

During excavation, CQA Personnel shall generally observe the excavated material and subgrade conditions and shall perform the following activities:

- Periodically observe stripping and excavation to document that there are no moisture seeps and that soft, organic, and otherwise undesirable materials are removed.
- Coordinate with the CQA Surveyor to confirm that the depth and slope of the excavations, sumps, surface water drainage ditches, and other construction components meet design requirements.
- Record progress, observations, excavation quantities, problems deficiencies, and safety issues on daily field report forms.

3.1.2 Fill

During fill placement, CQA Personnel shall perform the following activities:

- Prior to placement of any structural backfill, or compacted soil liner, verify that the subgrade has been prepared (scarified, moisture-conditioned, and compacted) in accordance with the requirements of the Specifications. CQA Personnel shall test the subgrade with in-place density methods at the frequency specified in Table 4-1.1. This shall be done prior to filling. Nuclear density methods may be used (e.g., American Society for Testing and Materials (ASTM) D2922), or as approved by the Design Engineer.
- During structural fill or compacted soil liner placement, conduct tests and observations to document that the quality of compacted fill meets project specifications. This will include visual observation, measurement of lift thickness, verifying grain size analysis, determining moisture-compaction characteristics, and measuring in-place density and moisture content, and other tests. Loose lift thickness shall not exceed 8 inches. Field in-

place density tests shall be conducted at a listed in Table 4-1.1. Additional tests may be conducted at the discretion of the CQA Manager.

- Subgrade preparation shall be observed for compliance with the specifications and outlined in Table 4-1.1. On the floor of the trench, the subgrade shall be compacted to at least 95% of standard Proctor dry density (ASTM D698), and in place density shall be measured at the frequency listed in Table 4-1.1. Compaction and testing will be required if fill is required to bring the subgrade elevations up to design grades at the frequency listed in Table 4-1.1.
- Review the soil testing and field density data to verify that the materials satisfied the testing requirements specified in Table 4-1.1 and that specified compaction was achieved.
- Record observations on daily field report forms, drawings, and test data forms.
- Coordinate with the CQA Surveyor to verify that final lines and grades conform to design requirements. The survey tolerance for this layer shall be -0.2 ft. to 0.0 ft. in relation to the design elevations.

Observations shall be recorded on daily field monitoring report forms, drawings, and test data forms.

3.2 COMPACTED SOIL LAYER

3.2.1 Pre-Construction

The compacted soil layer is present in both the bottom liner and final cover and this section pertains to both.

Materials shall be inspected to document that they satisfy the requirements of the design specifications. Material inspection shall continue throughout the liner construction period. Unsuitable material shall be rejected. Changes in color or texture may be indicative of a change in soil type or soil moisture content. The soil shall be inspected for roots, stumps, large rocks, and other deleterious materials. No rocks greater than 4 inches will be allowed in the soil layer.

A sufficient number of samples of the constituent materials and finished compacted soil liner, as determined by CQA Personnel, shall be tested to document that material properties are within the ranges stated in the specifications. These tests shall include at least the following:

- Remolded Permeability – as indicated in Table 4-1.
- Soil density/moisture content relationships - as indicated in Table 4-1.
- Maximum clod size - Periodic visual monitoring.
- Particle size distribution (hydrometer and - #200 sieve) - as indicated in Table 4-1.
- Atterberg limits - as indicated in Table 4-1.
- Natural water content – as indicated in Table 4-1.

- USCS Classification – as indicated in Table 4-1.

Samples will be collected and tested by CQA Personnel or assigned laboratory. Tests shall be conducted in accordance with the methods and procedures specified in Table 4-1. Testing shall be completed and compliance with the specifications from the Design and Construction Plans prior to any placement of compacted soil liner material.

3.2.2 Construction

Low-permeability soil liner shall be constructed by using the materials equipment and procedures used in the design and project specifications and as documented by CQA Personnel. Criteria to be used for determining the acceptability of the liner including field and laboratory testing are identified in Table 4-1.2.

To document that proper construction practices are followed, CQA Personnel shall continuously observe the liner material placement and compaction process. During material spreading, the following shall be observed, as required:

- Area to be covered is lightly scarified and moisture conditioned to facilitate bonding;
- Liner material is spread adequately to obtain complete coverage and the specified loose lift thickness;
- Equipment used to transport material does not affect lower material that was previously scarified;
- Oversize clods in the liner material are discarded or reduced in size;
- Soil moisture content is adjusted appropriately in the event of a significant prolonged rain or drought during construction;
- When required, water is adequately spread and incorporated to obtain full penetration through clods and uniform distribution;
- Significant water loss and desiccation cracking before and after compaction are prevented through the use of water application, covering, or other appropriate methods; and
- At tie-in locations, any dry, cracked, or otherwise unsuitable areas of the existing soil are removed.

During the soil liner compaction process, the following shall be observed, as required:

- Compaction equipment as to type, configuration, and weight;
- Coverage by compaction equipment is uniform, especially at compacted fill edges, in equipment turnaround areas, and at the tops and bottoms of slopes;
- The specified soil density, water content, and permeability throughout each completed lift is achieved. This will be determined by laboratory and field testing;
- Repaired sections are tied-in with undisturbed sections of the liner, if necessary;

- Compacted lifts are tied together by scarifying the top of each lift, if necessary, with appropriate equipment prior to applying the following lift;
- Newly placed material is thoroughly kneaded into existing material at tie-in locations;
- In place field density tests and moisture content tests shall be conducted at a frequency as listed in Table 4-1.2. Additional tests may be conducted as directed by the CQA Manager. Moisture content measured with the nuclear gauge shall be validated by collecting a minimum of one sample per week for laboratory moisture determination;
- Protective covers to prevent desiccation of liner material after completion of the liner are placed in a timely manner where necessary, overbuilding the liner can be considered protective cover;
- At locations where the field testing indicates that moisture contents or densities are outside the acceptable limits of the specifications, the failing area shall be reworked or removed and replaced. These areas shall be retested and the repair process repeated as necessary until passing results are achieved; and
- Shelby tube samples of the in place soil liner shall be obtained at a minimum frequency as listed in Table 4-1.2 for material placed. At any time, additional samples may be obtained at the discretion of the CQA Manager.

3.2.3 Post Construction

Immediately before placement of any geomembrane, the soil liner shall be inspected for cracks, holes, defects, or any other features that may increase its permeability. Defective areas shall be repaired. If the underlying foundation is defective (e.g., soft or wet), then this material shall be removed and the resultant volume replaced. Excavated areas of the soil liner shall be repaired by the method demonstrated during test fill construction; inspection shall document that there is continuity between the repaired and undisturbed areas.

Special attention shall be paid to the final inspections of the sump area, sidewall and bottom slopes, liner coverage, and liner thickness. The survey tolerance for this layer shall be ± 0.1 ft. in relation to the design elevations. The CQA Manager shall coordinate with the CQA Surveyor to confirm that minimum design thicknesses and grades are achieved prior to placement of any additional material over the soil liner.

3.3 GRAVEL DRAINAGE LAYERS

3.3.1 Pre-Construction

Samples of the drainage layer gravel and the sump gravel shall be obtained at the borrow source pit or stockpile. Samples shall be obtained and tested to document compliance with the specifications at a frequency as listed in Table 4-1.3. Tests shall consist of the following:

- Grain size

- Permeability
- Carbonate Content

Tests shall be conducted in accordance with the methods and procedures specified in Table 4-1.3.

3.3.2 Construction

As the drainage material is delivered to the site and placed in the facility, the CQA Personnel shall perform the following activities:

- Visually observe the material for contamination by debris or deleterious material;
- Visually observe the material for uniformity;
- Sample the material for grain size, permeability, and carbonate content tests at a frequency as listed in Table 4-1.3 for material delivered to the site;
- Observe the placement of the material to confirm minimum thickness under spreading and hauling equipment to prevent damage to the underlying liner materials and components of the leachate collection system; and
- Observe placement and compaction of the material around piping and risers in the sumps.

Tests shall be conducted in accordance with the methods and procedures specified in Table 4-1.3.

3.3.3 Post-Construction

The CQA Manager shall coordinate with the CQA Surveyor to document that minimum thickness and design grades in the gravel layer have been achieved prior to the placement of any additional materials over the top of the gravel.

3.4 ANCHOR TRENCH

3.4.1 Pre-Construction

There are no pre-construction requirements for the proposed anchor trench backfill materials.

3.4.2 Construction

During placement of backfill in the anchor trenches, CQA Personnel shall observe the placement operations on a periodic basis and perform the following:

- Visually observe the material for contamination with debris or deleterious material;
- Visually observe the material for particle size;

- Visually observe that the material is moisture conditioned and compacted in maximum 8 inch lifts by rubber wheel rolling;
- Observe the placement of the material to document minimum thickness under equipment to prevent damage to the underlying materials; and
- Visually observe to detect any damage to the underlying liner materials.

Tests shall be conducted in accordance with the methods and procedures specified in Table 4-1.

3.4.3 Post-Construction

There are no specific post-construction requirements for the anchor trench backfill.

3.5 HDPE GEOMEMBRANE LINER

3.5.1 Preconstruction

CQA Personnel shall perform conformance and "fingerprinting" tests on samples of the HDPE liner material submitted by the geomembrane installer. These activities are discussed in the following subsections. "Fingerprinting" tests include specific gravity, melt index, and crystallinity.

HDPE Manufacture

Quality assurance requirements for the geomembrane manufacturer initially consist of evaluating the raw polymer materials. The resin supplier shall provide documentation with each shipment or production lot confirming that the raw materials comply with the manufacturers' product properties and performance requirements. The Manufacturer shall test each batch (lot) of resin to verify that the raw material meets or exceeds the specifications.

CQA Personnel shall review testing results and other documentation submitted by the geomembrane Manufacturer for conformance to the specification requirements provided in Table 4-2.1. Submittals from the Manufacturer include the following:

- the origin (Resin Supplier's name, resin production plant), identification (brand name, number), and production date of the resin;
- a list of quantities and descriptions of materials other than the base polymer which comprise the geomembrane;
- a copy of the quality control certificates issued by the Resin Supplier;
- reports on the tests conducted by the Manufacturer and the CQA Manager to confirm that the quality of the resin used to manufacture the geomembrane satisfies the specifications;
- a statement that no recycled polymer is added to the resin or that recycled polymer is clean and does not exceed 2% by weight, and does not include material that has seen previous service life;

- a properties sheet including properties listed in the specifications, measured using test methods indicated in the specifications, or equivalent;
- reports on the tests, including sampling procedures, conducted by the Manufacturer and/or the CQA Manager to confirm that the geomembrane meets the project specifications; and
- a certification that property values given in the properties sheet are guaranteed by the Geomembrane Manufacturer.

Receiving Inspection and Conformance Testing

The CQA Personnel shall perform an inspection upon receiving geomembrane material. CQA Personnel shall also confirm that transportation, handling, and storage of geomembrane are performed in accordance with the specifications and manufacturer's instructions, and shall determine the condition of rolls of geomembrane upon delivery to the site.

CQA Personnel shall remove samples to be tested to determine conformance to the design specifications and the manufacturer's specifications. Samples may also be taken at the manufacturing facility. The properties which shall be tested include:

- Specific Gravity;
- Asperity height
- Tear
- Melt index;
- Carbon black content and dispersion;
- Thickness;
- Strength/elongation properties;
- Puncture resistance;
- Friction angle of the textured geomembrane vs. compacted soil liner;
- Seam strength (if applicable).

Samples of geomembrane shall be taken across the entire width of the roll and shall not include the first three feet. Unless otherwise specified, samples shall be three feet long by the roll width. Samples shall be taken at a rate of one per lot or one per 50,000 square feet, whichever results in the greater number of tests, except that only one (1) friction angle test will be performed per soil/geomembrane interface. Tests shall be completed in accordance with the methods and procedures specified in Table 4-2.1.

Bedding Surface

CQA Personnel shall confirm that the surface upon which the geomembrane will be installed is suitably prepared and will not damage the geomembrane. Details of required observations are presented in the specifications and are summarized in the following paragraphs.

The geomembrane bedding layer shall be free of clods, rocks, sticks, sharp changes in grade, ruts greater than 1 inch, desiccation cracks, and standing water. Where the bedding surface is the low permeability liner, methods shall be taken to prevent the soil liner surface from drying and cracking prior to installing the geomembrane. These methods may include the use of a temporary cover. Desiccation cracks larger than the limits listed in the Specifications shall be repaired using approved methods as described in the Design and Construction Specifications for the project.

The Geomembrane Installer shall inspect and provide written certification to the Owner or CQA Manager that the prepared surface under consideration is suitable for installation of the geomembrane.

3.5.2 Construction

Sheets of geomembrane will be welded together after they are placed in the landfill to form a continuous moisture barrier. CQA Personnel shall document that the placement and seaming activities are performed in accordance with the specifications; particularly that required materials, methods, and testing procedures are employed. Seams or repaired areas which do not pass the tests shall be repaired and retested as described in the specifications until a passing result is achieved. Requirements for geomembrane installation and testing will be described in detail in the specifications and are summarized in the following subsections.

Each field panel and field seam shall be given an identification code which is consistent with the proposed sequence of installation. A field panel is defined as the area of geomembrane which is to be cut and seamed in the field by the Installer.

On slopes or grades steeper than ten percent, seams shall be oriented down and not across the slope. No horizontal seam shall be less than five feet from the top of the slope or other area of potential stress concentration. Seams shall not line up with leachate piping runs. The number of field seams shall be minimized in areas such as corners and odd-shaped geometric locations. In anchor trenches, the geomembrane shall be continuous through the trench, over the crest, and down the slope.

Geomembrane shall not be placed when ambient temperatures are less than 32°F or more than 104°F measured 12 inches above the geomembrane. Placement shall not be attempted in rain or snow or under conditions of excessive fog or dew. Placement will not be permitted in areas of ponded water or in the presence of excessive winds.

Equipment used for placement shall not damage the geomembrane or the subgrade by handling, trafficking, leakage of hydrocarbons, or in other ways. Personnel working on the geomembrane shall not engage in any activities or wear footwear which could damage the geomembrane.

Direct contact of any heavy mechanical equipment with the geomembrane shall not be allowed.

Panels shall be carefully unrolled according to the Manufacturer's and Fabricator's instructions, and in a manner that does not scratch or crimp the geomembrane. Panels shall be aligned to minimize wrinkles or "fishmouths", especially along the field seams. Adequate precautions (such as placement of sand bags) shall be taken to minimize the likelihood of wind uplift.

Any field panel or part of a field panel which becomes seriously damaged shall be replaced at the direction of the CQA Personnel. Minor damage, such as small wrinkles, crimps, etc., shall be repaired using approved procedures as described in the specifications. Damaged field panels which have been rejected for use shall be removed from the site.

Field Seaming Methods and Equipment

General: Approved seaming methods are extrusion welding and single or dual track fusion welding. Fusion welding shall be utilized for tie-in seams between existing and new geomembrane. Seaming shall be a continuous process with a minimum of interruptions along any given seam. The Installer shall maintain at least two operable spare seaming units on site.

Where conditions warrant, the Installer may be allowed to use a temporary support surface between the geomembrane and the subgrade to achieve proper support conditions during seaming operations. The use of such support methods shall be subject to the approval of the CQA Manager. The support shall not be left in place and shall be removed on completion of seaming.

Wherever possible, wrinkles or "fishmouths" shall be pulled out of the overlap area prior to seaming. Where this cannot be done, they shall be cut along the ridge of the wrinkle in order to achieve a flat surface. Such cuts shall be seamed. Where the overlap is inadequate, an oval or round patch of the same geomembrane, extending a minimum of six inches beyond the cut in directions, shall be seamed onto the geomembrane.

Extrusion Welding Process: Extrusion welding apparatus shall be equipped with gauges to measure the temperature at the nozzle or the preheat temperature of the apparatus. The CQA Personnel shall monitor the extrudate and ambient temperature at appropriate intervals. The extruder shall be purged of heat-degraded extrudate at the beginning of each seaming sequence.

Artificially induced cooling of extrudate welds (using water or any other means) shall not be allowed. Sufficient time between welding and non-destructive testing shall be taken so that nondestructive testing procedures do not cause artificial cooling of the extrudate.

Fusion Welding Process: Fusion welding apparatus shall be automated, self-propelled devices which produce either a single seam or a double seam with an enclosed central air space. The apparatus shall be equipped with gauges which indicate the equipment temperatures during welding. For the seaming of cross-seams, the top and bottom edges of the cross-seam shall be ground to a smooth incline prior to seaming.

The CQA Personnel shall log ambient and seaming apparatus temperatures, as well as seaming apparatus speed for each seam.

Seam Overlap and Preparation: Prior to seaming, geomembrane rolls or panels shall be overlapped by a minimum of three inches for extrusion welding and five inches for fusion welding or as recommended by manufacturer. Procedures used to temporarily bond adjacent rolls together shall not result in damage to the geomembrane. If mechanical devices such as hot air leisters are used for temporary bonding, the air temperature at the nozzle of such equipment shall be controlled so as not to damage the geomembrane. Solvents or adhesives shall not be used.

Seams shall be aligned to create as smooth a surface as practicable with a minimum of wrinkles and "fishmouths". The area in the immediate vicinity of the seam shall be free of moisture, dust, dirt, debris, or any other foreign material and, if necessary, sheltered from wind and dust immediately prior to and during the seaming operation. If grinding is required along the seam, this shall be done according to the Manufacturer's recommendations, within one hour of the seaming operation and in a way which does not damage the geomembrane. This process also shall include cleaning the seam area with a brush or forced air immediately prior to seaming.

Particular care shall be paid to the condition of existing geomembrane prior to tie-in with new geomembrane.

The CQA Personnel shall document geomembrane seam overlaps and preparation procedures.

Weather Conditions

In general, seaming shall not be attempted when ambient temperatures are below 32°F or above 104°F as measured 12 inches above the liner. Below 32°F, seaming may be allowed provided that suitable precautions are taken and the Installer is able to certify in writing that seaming under these conditions will not cause any chemical or physical alteration to the geomembrane which may deleteriously affect its short- or long-term performance. Approval by the CQA Manager will be required to seam with ambient temperatures are below 32°F or above 104°F.

Extrusion welding will require the geomembrane to be preheated by either the sun or the use of a hot air device, and the Installer shall take precautions that excessive cooling resulting from wind does not affect the seaming operation. CQA Personnel shall determine when preheating is required and whether wind affects may be deleterious to seaming operations.

Seaming shall not be performed during wet weather where the geomembrane is exposed to the elements.

Trial Seams

Trial seams shall be made to verify that adequate conditions exist for field seaming to proceed. Each seamer shall produce a trial seam at the beginning of each shift. Additional trial seams shall be made every four hours or, if a breakdown of the seaming equipment

occurs, prior to resumption of seaming operations. The CQA Personnel shall monitor and log the trial seam results.

Trial seams shall be made on pieces of geomembrane identical to the installed product measuring at least two feet long by one foot wide (after seaming) with the seam centered lengthwise and overlapped as required for the particular seaming process. Seaming shall be conducted in the trench near the area where production seaming will occur.

Six samples, each one inch wide, shall be cut from the test seam and tested, 2 in shear and 4 in peel, using a tensiometer calibrated within the past 6-months. The peel samples must have strength of at least 98 lb/in for a fusion weld and 70 lb/in for an extrusion weld. The sheer samples must have strength of at least 126 lb/in for both a fusion weld and an extrusion weld. The samples shall not fail in the seam. If seam failure occurs, then a second seam shall be produced and tested. If second failure results, the apparatus or seamer shall be rejected and shall not be used for field seaming until any deficiencies have been corrected. This shall be verified by the production and successful testing of two consecutive trial seams.

3.5.2.1 Nondestructive Testing of Field Seams

General

Seams shall be nondestructively tested by the Installer over their full length to verify their continuity. It should be noted that this testing does not provide any information regarding seam strength. Nondestructive testing shall be performed concurrently with field seaming using the equipment and procedures described below. Any seam which fails the nondestructive test shall be repaired in accordance with approved procedures as described in the Specifications. Repairs shall be retested to determine the success of the repair.

Where CQA Personnel determine that seams cannot be nondestructively tested due to physical constraints, the seams shall be capped with the same geomembrane or double seamed. CQA Personnel shall observe the seaming and capping of such seams to assess their adequacy and determine whether additional action is required. Where such a seam is accessible for testing prior to final geomembrane deployment, testing shall be performed prior to deployment.

The non-destructive testing shall be conducted by the Installer and continuously monitored by CQA Personnel.

Vacuum Testing

For extrusion and single wedge fusion welded seams, seams shall be evaluated using vacuum box testing. The vacuum box shall consist of a rigid housing with a transparent viewing window on top and a soft, flexible gasket attached to the bottom of the housing. A port hole and valve assembly along with a calibrated vacuum gauge shall be provided at one end of the housing. The vacuum gauge shall be calibrated prior to initial use on the project and recalibrated on at least an annual basis, at the end of the project, or at the discretion of the CQA Manager. The Installer shall supply vacuum gauge calibrations to the CQA Manager for review prior to the start of testing. A steel vacuum tank and pump assembly complete

with the necessary pressure controls, pipe connections, pressure hoses, and fittings shall be provided. A soapy solution and a method of dispensing the solution are also required.

The tests shall be performed according to ASTM D5641. To perform the test, the pressure in the vacuum tank shall be reduced to approximately five inches of mercury. The soapy solution shall be applied to the test section and the vacuum box placed over the wetted area. The bleed valve shall then be closed and the vacuum valve opened. Once a tight seal has been established, the test section shall be visually examined for a period of not less than 10 seconds to determine whether bubbling of the soapy solution is occurring. The vacuum valve shall then be closed and the bleed valve opened. The vacuum box shall be removed and the process repeated on the next adjacent test section. A minimum three-inch overlap shall be provided on test sections.

Locations where bubbling of the soapy solution is observed shall be clearly marked for repairs to be performed in accordance with approved procedures as described in the Specifications.

Repairs shall be retested.

The non-destructive testing shall be conducted by the Installer and continuously monitored by CQA Personnel.

Air Pressure Testing

This test method (ASTM D5820) shall apply only when the double hot wedge fusion seaming method is used to form the seam. The testing equipment shall consist of an air pump capable of generating and sustaining pressure of at least 40psi complete with a pressure gauge and the necessary pressure hose, fittings, and connections. An approved pressure feed device such as a sharp hollow needle shall be provided to penetrate into the central air channel at one end of the seam. A second calibrated pressure gauge with 1 psi increments capable of reading pressures up to 40psi shall be provided to detect any pressure loss at the opposite end of the seam from the pressure feed device.

To perform the test, a section of the seam shall be sealed off at both ends. The pressure feed device shall be inserted into the air channel at one end of the sealed section, and the second pressure gauge shall be inserted into the opposite end of the air channel. If the seam is 1/2-inch wide, it shall be pressurized to a minimum pressure of 30 psi. The pressure valve shall be closed and the pressure monitored for a period of not less than 5 minutes. If a pressure loss greater than 2 psi is observed at either end or if the required pressure cannot be reached, then the seam shall be rejected. If in the judgment of the CQA Personnel, significant changes in temperature occur during the test (e.g., due to cloud cover), the test shall be repeated after the geomembrane has stabilized. Faulty areas along the seam shall be identified, repaired in accordance with approved procedures, and retested. Holes created during nondestructive testing shall be repaired in accordance with approved procedures as described in the Specifications upon completion of the test.

The nondestructive testing shall be conducted by the Installer and continuously monitored by CQA Personnel.

3.5.2.2 Destructive Testing of Field Seams

Destructive Testing of Field Seams

Destructive testing of field seams shall be performed at selected locations in order to verify that seams satisfy the strength requirements listed in the specifications. Sampling and testing shall be done concurrently with field seaming operations so that corrective action, if required, may be implemented as the work progresses. Samples shall be taken for testing so as to achieve a minimum average daily frequency as listed in Table 4-2.1. Sample locations shall be determined by CQA Personnel based on the required sampling frequency and seaming observations. The Installer shall not be informed in advance of the locations where the seam samples will be taken. Additional test locations may be required during seaming operations such as along tie-in seams with existing geomembranes. The necessity for such additional sampling and testing shall be determined by CQA Personnel, and extra testing shall be performed when there is cause to suspect the presence of excess crystallinity, contamination, offset welds, or any other potential defect. The CQA Manager may increase the minimum frequency of destructive testing as the work progresses based on the results of previous testing.

Samples shall be cut by the Installer under the observation of CQA Personnel. Samples may be cut prior to nondestructive seam testing. Each sample shall be numbered and identified. The sample number and location shall be recorded by CQA Personnel on the layout drawings.

The test sample shall measure approximately 12 inches wide by 42 inches long with the seam centered lengthwise. Two one-inch wide strips shall then be cut, one from either end of the sample. Both of these strips shall be tested by the Installer in the field using a tensiometer to determine the mode of failure in both peel and shear. The remaining portion of the sample shall be cut into three equal parts having a minimum length of 12 inches. One sample shall be taken by CQA Personnel for destructive testing under laboratory conditions. One sample shall be given to the Installer to perform CQC testing. The third sample shall be kept in storage by the Owner, if desired.

The area from which the test sample was cut shall be immediately repaired in accordance with approved procedures described in the Specifications. Seams created for these repairs shall be nondestructively tested in accordance with Section 3.5.2.1.

Neither of the field tests shall fail in the seams. The results of the laboratory testing by CQA Personnel shall in any case determine the acceptability of the field seam. The tests shall be performed in accordance with the methods listed in Table 4-2.1.

Passing values for field and laboratory testing are defined as:

- Fusion weld: peel sample strength of at least 98 lb/in
- Extrusion weld: peel sample strength of at least 70 lb/in
- Fusion weld: sheer sample strength of at least 126 lb/in
- Extrusion weld: sheer sample strength of at least 126 lb/in

. Field testing shall meet these values for each test otherwise the seam will be considered failing.

A field seam shall only be considered acceptable when it is bounded by two destructive test locations which meet the seam strength requirements listed in the specifications, as well as passing the nondestructive tests described in Section 3.5.2.1. Whenever a sample fails a destructive test, whether that test is conducted by field tensiometer, CQA Laboratory or the Installer's laboratory, the following procedures shall be employed. The Installer shall have three options at his disposal as follows:

- The Installer may cap the failing seam between any two passed test locations; or
- The Installer may elect to trace the seam to two intermediate locations a minimum of 10 feet in either direction from the point of the failed test and take a small sample for an additional field test at each location. If these additional samples pass the test, then full samples shall be taken for CQA laboratory testing. If these laboratory samples pass the tests, then the seam shall be capped between these locations. If either sample fails, then the sampling and testing process shall be repeated to establish the zone over which the seam shall be capped; or
- Cap all seams welded by the machine that had the failing test.

The continuity of capped seams shall be verified by nondestructive testing in accordance with Section 3.5.2.1. In addition, if the total capped seam length exceeds 150 feet, a destructive sample shall be taken for laboratory testing as described above.

The CQA Personnel shall document actions taken in conjunction with destructive test failures.

Repairs

The entire geomembrane surface shall be examined by CQA Personnel in order to confirm that the geomembrane is free of any defects, holes, blisters, undispersed raw materials, or contamination by foreign matter. Particular attention shall be paid to existing geomembrane in tie-in areas. Whenever possible, the examination of the geomembrane surface shall be done prior to any seaming in that area. If necessary, the geomembrane surface shall be cleaned by the Installer so that it is free of dust, mud, or any other materials which may inhibit a thorough examination of the surface. Any suspect areas shall be clearly marked by CQA Personnel and nondestructively tested by the Installer in accordance the CQAP. Any location which fails to pass the nondestructive testing or from where a destructive test sample has been removed shall be repaired using one of the procedures described below.

Small tears, wrinkles, scratches, or pinholes shall be repaired by the Installer using spot welding, seaming, or patching, as appropriate. Large holes and tears, undispersed raw materials, and any areas which have been contaminated by foreign matter shall be repaired by the Installer using patches or by capping the area. All damage that fully penetrates the layers shall be repaired with a patch. Patches shall be round or oval in shape, shall consist of the same geomembrane material, and shall extend a minimum of 6 inches beyond the edge of the defect in all directions.

Temporary bonding methods used to hold patches in place prior to seaming shall be approved methods only. Geomembrane surfaces to be patched shall be abraded in accordance with the Specifications. Surfaces shall be clean and dry at the time the repair work is performed. Repair seaming shall be performed using approved extrusion welding methods and equipment.

Repairs shall be nondestructively tested using the appropriate methods described in Section 3.5.2.1. Unless additional destructive testing is required as described, repairs which pass the nondestructive test shall be accepted as being adequate. Any repairs which fail the nondestructive test shall not be accepted, and the Installer shall perform the necessary remedial work and retest the repaired area until it passes the nondestructive testing criteria.

Upon completion of field seaming and testing, and prior to any placement of materials on top of the geomembrane, CQA Personnel shall identify any large wrinkles or "fishmouths" which may have been built into the geomembrane. Any such features shall be cut out, repaired, and tested by the Installer.

In any given area, no work shall proceed with any materials which may cover the geomembrane until repairs in that area have been successfully made. As the work progresses, CQA Personnel shall document locations requiring repair work and shall confirm that repairs have been successfully made.

Materials in Contact with Geomembrane

The requirements of this section are intended only to minimize the risk of geomembrane damage during installation on existing surfaces or during placement of overlying materials. The construction and material specifications shall govern the adequacy of construction using these overlying materials. Installer shall not perform any cutting, testing or work on top of the geomembrane. All generators shall be kept off geomembrane.

The installation of geomembrane on rough surfaces shall be carefully performed so as to prevent any damage to the geomembrane. The Installer, with prior approval from the Owner, may elect to use a remnant piece of geosynthetic material as a temporary "rub-sheet" beneath the geomembrane to act as a cushion. Foreign objects and particles in excess of the maximum size allowed in the material specifications shall be removed from the bedding surface prior to geomembrane placement.

Placement of materials on top of the geomembrane shall not be allowed when the ambient temperature is below 32°F or above 104°F.

Equipment used for placing and compacting overlying soil materials shall not be driven directly on to any geosynthetic material. A minimum thickness of one foot of material shall be maintained between the geomembrane and the low contact pressure bulldozer or light motor grader used to place granular materials. No sharp turning of the spreading equipment will be allowed on the initial 12 inches cover. No heavy rubber-tired vehicles shall be allowed in areas underlain by geomembrane until a minimum of 3 feet of soil cover material has been

placed, with the exception that a light grader may be used on the one-foot cover for fine grading and trimming operations. However, the weight of the equipment may not exceed 5 pounds per square inch (psi) as measured on the geomembrane surface. Equipment shall be observed by the CQA Personnel during placement to document that no leakage of hydrocarbons occurs, particularly on top of the geomembrane.

Placement of soil materials on top of the geomembrane shall not be allowed within 50 feet of any unseamed edge of geomembrane until field seaming of that edge is complete. This is required to allow sufficient room to work out any large wrinkles or "fishmouths" prior to seaming. The placement of cover materials shall be done with caution and in a manner which is least likely to cause wrinkles in, or damage to, the geomembrane. The CQA Personnel shall monitor the placement of cover materials over the geomembrane on a regular basis.

3.5.3 Post-Construction

Site Cleanup

Upon completion of work in any given area, CQA Personnel shall examine that area to determine whether waste and extraneous materials have been removed and that the area has been left in a satisfactorily clean condition to allow placement of materials on top of the geomembrane.

3.6 GEOSYNTHETIC CLAY LINER (GCL)

GCL material required shall be installed by a qualified third-party geosynthetics contractor. GCL material is required to be tested and installed in accordance with Table 4-2.4. Care shall be used during construction to ensure that GCL materials are not damaged.

The CQA Monitor shall log-in the rolls of GCL material that arrive on site and review the manufacturer's QC certification documentation in accordance with Table 4-2.4. Each roll shall be documented on a Material Inventory Log.

3.6.1 Product Delivery, Storage, and Handling

The GCL shall be manufactured from geotextiles and high swelling, contaminant resistant sodium bentonite. The GCL shall be manufactured by the mechanical bonding of the needle-punch process to enhance the internal friction characteristics of the GCL and to maintain the integrity of the GCL under hydration. No glues or adhesives shall be used in lieu of the needle-punch process so as to retain these characteristics.

GCL rolls shall be labeled and bagged in packaging that is resistant to photo-degradation by ultraviolet (UV) light. The CQA Personnel shall obtain and review the manufacturer's quality control reports for conformance with project specifications.

GCL shall be properly protected until ready for use, and not stored directly on the ground. Tarps should be used over material stored onsite to avoid unnecessary stress on the packaging. Storage

of GCL material shall be done in a manner that reasonably protects the material from puncture, denting, deformation of rolls, and other damaging situations prior to its deployment.

Rolls shall be handled in accordance with the manufacturer's recommendation, which generally involve utilizing a solid bar inserted through the core bar and slings or chains attached to the ends of the bar. The core bar shall be suspended from a spreader bar so that the edges of the liner are not damaged by the suspending straps or chains.

3.6.2 GCL Installation

The following shall be observed by the CQA Personnel during installation:

- Contacting surfaces shall be clean and clear of dirt or native soil with the edges pulled tight to maximize contact and to smooth out wrinkles or creases. Overlaps shall be the minimum recommended by the Manufacturer and verified by CQA Personnel.
- If required by the Manufacturer, seams shall be augmented with granular bentonite to provide seam integrity. If granular bentonite is required for seaming, it shall be applied in accordance with manufacturer's specifications. Accessory bentonite shall be of the same type as the material within the GCL materials. Adhesives may be used on seams to keep panels in contact during backfill operations if necessary.
- The Contractor shall only work on an area that can be completed in one working day. Completion shall be defined as the full installation of the GCL liner and placement and seaming of the overlying geomembrane.
- Large rips or tears in the GCL shall be repaired by completely exposing the affected area, removing all foreign objects or soil, and placing a patch over the defect. A minimum overlap of 12 inches shall be maintained on the edges of the overlap. Accessory bentonite shall be placed between the patch and the repaired material at a rate of 1/4 pound per lineal foot of edge. The above procedures shall also be implemented in the event that a rip or tear occurs on a sloped surface. In this instance, the edges of the patch shall be fastened to the main panel of the liner with construction adhesive in addition to the bentonite-enhanced seam.
- GCL materials that become hydrated prior to covering with geomembrane liner material shall be replaced.
- Photo documentation of GCL installation and repair procedures will be included in the final CQA Report.

3.7 GEOTEXTILES

Geotextile material required shall be installed by a qualified third-party geosynthetics contractor. Geotextile material is required is to be tested in accordance with Table 4-2.2. Care shall be used during construction to ensure that geotextile materials are not damaged.

3.6.1 Product Delivery, Storage, and Handling

The geotextile shall be manufactured from polypropylene resin. The geotextile will be supplied to the site in factory rolls. Upon receipt of material shipments at the site, the Contractor shall

inspect the geotextile for defects in the manufacturing process and for damage during transportation. Materials judged to be severely damaged shall be rejected and removed from the site. Minor damage and defects shall be repaired by the Contractor.

GCL shall be properly protected until ready for use. Storage of geotextile material shall be done in a manner that reasonably protects the material from ultraviolet exposure, puncture, denting, deformation of rolls, and other damaging situations prior to its deployment.

3.6.2 Geotextile Installation

The following shall be observed by the CQA Personnel during installation:

- On side slopes, the geotextile shall be rolled down the slope in such a manner to continually keep the geotextile in tension.
- Geotextiles will be cut using only approved geotextile cutters. If the geotextile is already in place at the time of cutting, special care shall be taken to prevent damage to the underlying geomembrane.
- During placement of the geotextile over the geomembrane, care will be taken not to entrap foreign matter or excessive moisture between the geotextile and geomembrane.
- A visual inspection of the geotextile will be carried out over the entire surface after installation by the Contractor, to insure that no potentially harmful foreign objects are present. All such foreign objects or material shall be removed.
- Photo documentation of geotextile installation and repair procedures will be included in the final CQA Report.

3.6.3 Seams and Overlaps

The following requirements shall be followed with regard to seaming and overlapping of geotextile:

- Geotextile seams will be continuously sewn and will overlap a minimum of 3 inches prior to seaming. Spot seaming will not be allowed.
- Horizontal seams on the landfill side slopes (except as part of a patch) will be allowed only at the approval of the CQA Manager.
- The Contractor will pay particular attention to seams to insure that no earthen materials are inadvertently trapped beneath the geotextile.
- Sewing will be performed using polypropylene thread manufactured of the same base material as the geotextile. The thread shall be resistant to degradation by ultraviolet radiation.

The CQA Personnel shall observe and document that the Contractor follows the seam and overlap protocol. Following completion of the geotextile installation, CQA Personnel will complete a final inspection to detect the presence of holes or tears and to examine the seams for tension due to excessive stretching of fabric during installation. Repairs will be made to any non conforming areas

3.6.4 Repairs

All seamed and non-seamed areas of the geotextile will be examined and documented by the CQA Personnel to identify detects, tears, holes, large wrinkles, and any sign of contamination by foreign matter. Each location which fails examination will be marked by CQA Personnel and repaired by the Contractor. Placement of material onto the geotextile will not occur before repairs are made.

Any holes or tears will be repaired as follows:

- A patch made from the same geotextile will be sewn, or heat-bonded in place, with a 3 inch minimum overlap in all directions.
- Care will be taken to remove any foreign material which may have penetrated a torn geotextile

3.6.5 Placement of Soil Materials

Placement of soil materials on top of geotextile will be performed by the Contractor in such a manner as to confirm the following:

- Damage of the underlying geotextile or geomembrane does not occur;
- Slippage and wrinkling of the underlying geotextile is minimal;
- No excess tensile stresses are imposed on the geotextile or geomembrane.

If there will be an extended time delay between placement of materials on top of geotextile, the Owner/Operator shall make provisions, approved in advance, to protect the geotextile against excessive exposure to ultraviolet radiation.

3.8 LEACHATE COLLECTION SYSTEM (LCS)

The CQA Personnel shall perform the following activities:

3.7.1 Pre-Construction

CQA Personnel shall inspect leachate collection system materials, equipment, and components when they are delivered to the site to confirm that they conform to the design criteria and specifications. Receiving inspection shall be performed in compliance with the procedures specified in the CQAP. In general, activities performed by CQA Personnel shall include the following:

- Inspect materials upon arrival at the site to confirm conformance to the specifications;
- Inspect piping components to confirm (from appearance and shipping documents) that they are constructed of materials as listed in the plans, specifications, and procurement documents and that they are not damaged. Take measurements to confirm that pipe is of specified size and wall thickness and that perforations are sized and spaced as specified;

- Observe and test to confirm that sand and gravel materials conform to the specifications are of the proper size and gradation, and do not contain unacceptable types of materials. Testing requirements for the leachate collection layer are outlined in Section 3.3; and
- Inspect to confirm that prefabricated structures are as specified in the design. Such items include, but are not limited to, non-HDPE piping systems, prefabricated HDPE components, electrical equipment, and monitoring equipment. Inspection shall include visual observation of any corrosion-resistant coatings to document that they are present and without flaw.

3.7.2 Construction

Pipe Network Installation

The HDPE pipe network shall be placed according to the design. CQA monitoring activities shall include:

- Review of construction subcontractor's submittals concerning joining methods and type of perforations;
- Review of manufacturer's certification to document that the HDPE pipe meets the specifications;
- Observe and measure to confirm that the pipes are placed at specified locations and in specified configurations, and that pipe grades are as specified;
- Verify that the internal cleanliness of HDPE pipe is maintained;
- Visually observe that pipes are joined together and perforated in accordance with the approved procedures;
- Observe that the placement of any filter or backfill materials around the pipe proceeds as shown on the plans;
- Witness, review, and document testing of HDPE piping prior to being buried or covered with liner; and
- Observe that backfilling and compaction are completed as specified and that, in the process, the pipe network is not damaged.

Leachate Collection Granular Drainage Layer

The leachate collection system will consist of a drainage layer consisting of either a granular material (i.e., sand) or a geocomposite (see Section 3.6.2) over the entire geomembrane liner surface. The granular materials will be subjected to hydraulic conductivity (ASTM D 2434 or any other method approved by the CDPHE) and grain size analysis (ASTM C 117/C 136) at the minimum frequency listed in Table 4-1.3. The granular material will have a hydraulic conductivity as determined from laboratory testing of 1×10^{-2} cm/sec or greater. The granular material should have no particles larger than 2 inch and should have less than 7 percent

passing the U.S. No. 200 sieve. These limits may be adjusted by the CQA Manager during construction based on the results of the hydraulic conductivity testing.

The granular material will be placed in a single 12 inch (minimum) lift on the cell floor (over the geomembrane) using a dozer with a ground pressure of less than 5 psi. No rubber tired vehicle traffic will be allowed on the granular drainage layer until the first lift of waste has been placed in a given area. Prior to granular drainage layer installation, the CQA Personnel shall verify that the installation of underlying geomembrane, including all required documentation, has been completed.

Leachate Collection Geocomposite Drainage Layer

As an alternative to a granular drainage layer a geocomposite drainage layer may be used over the entire geomembrane liner surface. Geocomposite drainage material is required is to be tested and installed in accordance with Table 4-2.3. Care shall be used during construction to ensure that GCL materials are not damaged. The CQA Monitor shall log-in the rolls of GCL material that arrive on site and review the manufacturer's QC certification documentation in accordance with Table 4-2.3. Each roll shall be documented on a Material Inventory Log. All work involving the geocomposite shall be performed in accordance with the lines, grades, and dimensions on the Engineering Design and Operations Plan (EDOP) drawings, or as directed by the CQA Personnel. The leachate collection geocomposite on the sideslopes may be installed either at the time of liner construction, or by the Owner during operations (i.e., just prior to waste placement), in order to avoid damage due to UV degradation, wind-blown silt, or snow accumulation.

Geocomposites are to be thermally bonded (i.e., the geotextiles to the geonet). Slopes that are not covered with a geocomposite should be covered with a sacrificial geotextile to prevent damage to the underlying geomembrane.

Product Delivery, Storage and Handling

The CQA Personnel shall verify the following:

- Equipment used to unload the rolls will not damage the geocomposite;
- Care is used in unloading;
- The following manufacturer-supplied information has been received and approved:
 - Manufacturer's name;
 - Product information, including a written statement and test results indicating that product has been tested and meets or exceeds transmissivity requirements;
 - Roll number;
 - Batch or lot number;
 - Roll dimensions.
- The geocomposite is covered to minimize contact with dirt and other contaminants.

Any damaged rolls shall be rejected and removed from the site or stored at a location, separate from accepted rolls, designated by the Owner. All rolls that do not have proper manufacturer's documentation shall also be stored at a separate location until all documentation has been received and approved.

Surface Preparation

Prior to geocomposite installation, the CQA Personnel shall verify that:

- Installation of underlying geomembrane, including all required documentation, has been completed.
- The underlying surface is free of deleterious material or debris.

Installation

During roll placement, the CQA Personnel shall:

- Observe the geocomposite as it is deployed and record all defects and disposition of the defects (panel rejected, patch installed, etc.);
- Verify that equipment used does not damage the geocomposite or underlying materials by handling, trafficking, leakage of hydrocarbons, or by other means;
- Verify that installation workers do not smoke, wear damaging shoes, or engage in activities that could damage the geocomposite, or underlying geomembrane;
- Verify that the geocomposite is anchored to prevent movement by the wind (the Contractor is responsible for any damage resulting from wind);
- Verify that the geocomposite remains free of contaminants such as soil, grease, fuel, etc.

The CQA Personnel shall inform both the General Contractor and the Owner if the above conditions are not met.

Field Seaming

During geocomposite placement, the CQA Personnel shall verify:

- Seams shall be overlapped a minimum of 6 inches between adjacent panels and shall be fastened in accordance with manufacturer's recommendations or as approved by the CQA Manager.
- Butt-seams will only be allowed on grades less than 15%. Butt-seams shall be overlapped a minimum of two feet and be secured in accordance with manufacturer's recommendations or as approved by the CQA Manager.

Repairs

Repair procedures include:

- Patching-used to repair holes, tears, and defects;

Removal-used to replace areas with large defects where patching is not appropriate.

Surveying

The permanent piping installed shall be surveyed along the top of the pipe on a spacing of 25 feet. In addition the beginning, ending, turning points and intersection points (vertical and horizontal) in each pipe shall be surveyed. The installed locations of any liner penetration boxes shall be measured at locations indicated on future design drawings. Elevations shall be measured to the nearest 0.01 foot and horizontal locations shall be measured to the nearest 0.1 foot.

Electrical System and Pump Controls

The electrical system which controls the leachate pumps shall be checked for proper installation and operation. CQA Personnel shall perform the following activities:

- Receipt inspections of electrical components (verify UL, listings, etc.);
- Review construction subcontractor's submittals and proposed equipment to document compliance with the specifications;
- Verify and document final tagging, labeling, and marking of the electrical systems (i.e. breaker, outlets, disconnects, switches, etc.);
- Perform or review component checks of resistance, grounding, and load prior to complete system check.

Pumps, Piping, Meters, and Valves

The pumps, piping, instruments (such as the flow meters), and valves that are included in the leachate collection (removal and transfer) system shall be examined and tested at the system level for conformance to the specifications and proper performance. CQA Personnel shall perform the following activities in conjunction with these items:

- Review construction subcontractor's submittals and equipment deliveries to the site to verify conformance with the specifications;
- Review the results of subcontractor's acceptance testing of the piping system;
- Review system performance checks to confirm operation in accordance with the specifications;
- Review the complete leachate removal system performance using the installed pumps as described in the specifications.

3.9 GROUNDWATER INTERCEPTION SYSTEM (GIS)

The CQA Personnel shall perform the following activities:

3.8.1 Pre-Construction

CQA Personnel shall inspect groundwater interception system materials and equipment when they are delivered to the site to confirm that they conform to the design criteria and specifications. Receiving inspection shall be performed in compliance with the procedures

specified in the CQAP. In general, activities performed by CQA Personnel shall include the following:

- Inspect materials upon arrival at the site to confirm conformance to the specifications;
- Inspect piping components to confirm (from appearance and shipping documents) that they are constructed of materials as listed in the plans, specifications, and procurement documents and that they are not damaged. Take measurements to confirm that pipe is of specified size and wall thickness and that perforations are sized and spaced as specified;
- Observe and test to confirm that sand and gravel materials conform to the specifications in Table 4-1.3, are of the proper size and gradation, and do not contain unacceptable types of materials. Testing requirements for the groundwater interception layer are outlined in Section 3.3; and
- Inspect to confirm that prefabricated structures are as specified in the design.

3.8.2 Construction

The groundwater interception system is comprised of two sub-systems including the groundwater collection lateral system and the groundwater header system.

Pipe Network Installation

The HDPE pipe network shall be placed according to the design. CQA monitoring activities shall include:

- Review of construction subcontractor's submittals concerning joining methods and type of perforations;
- Review of manufacturer's certification to document that the HDPE pipe meets the specifications;
- Observe and measure to confirm that the pipes are placed at specified locations and in specified configurations, and that pipe grades are as specified;
- Verify that the internal cleanliness of HDPE pipe is maintained;
- Visually observe that pipes are joined together and perforated in accordance with the approved procedures;
- Observe that the placement of any filter or backfill materials around the pipe proceeds as shown on the plans;
- Witness, review, and document testing of HDPE piping prior to being buried or covered with liner; and
- Observe that backfilling and compaction are completed as specified and that, in the process, the pipe network is not damaged.

Groundwater Collection Lateral Pipe System

The groundwater collection lateral pipe system will consist of a trench in weathered bedrock with compacted backfill over a drainage layer consisting of a granular material (i.e., pea gravel). The groundwater collection lateral pipe will be 8"-10" diameter SDR-17 HDPE piping with 0.5 inch perforations along the underside of the pipes. The granular materials will be subjected to hydraulic conductivity (ASTM D 2434 or any other method approved by the CDPHE) and grain size analysis (ASTM C 117/C 136) at the minimum frequency listed in Table 4-1. The granular material in the drainage layer will have a hydraulic conductivity as determined from laboratory testing of 1×10^{-2} cm/sec or greater. The granular material should have no particles smaller than 0.5 inch and should have less than 7 percent passing the U.S. No. 200 sieve. These limits may be adjusted by the CQA Manager during construction based on the results of the hydraulic conductivity testing.

The perforated groundwater lateral pipe will be installed on at least 6 inches of granular material. The granular material layer will extend from the bottom of the trench around the piping up to 3 feet above the top of the piping. Compacted backfill will be placed in 1 foot thick lifts to a total thickness of 3 feet above the drainage layer (refer to Engineering Design & Operations Plan Figure 16). The compacted backfill will be compacted to meet moisture and density specifications provided in Section 3.2.2 and tested at the frequency listed in Table 4.1.5.

Groundwater Header Pipe System

The groundwater header pipe system will be exposed on the landfill surface and alternate to consist of a trench with compacted backfill over the header pipe. The groundwater collection lateral pipe will be 8"-10" diameter SDR-17 HDPE solid piping. The backfill will be sourced from an on-site burrow area and compacted in 1 foot lifts to meet moisture and density specifications provided in Section 3.2.2 and tested at the frequency listed in Table 4-1.5. Compacted backfill will be placed in 1 foot thick lifts to match the surface grade (refer to Engineering Design & Operations Plan Figure 16).

The groundwater header pipe system will have clean-out risers for the sections of buried pipe. Each clean-out riser will intersect the header pipe at a 45-degree "y" connection. Each clean-out riser will be 8"-10" diameter SDR-17 HDPE solid pipes capped with a blind flange at the surface. The clean-out risers will be protected at the surface by a 12"-14" diameter SCH. 40 steel pipe set in a concrete pad with a locking steel cap. Compacted backfill will be placed around the clean-out pipe under the same specifications as backfill for the header pipe.

Surveying

The permanent piping installed shall be surveyed along the top of the pipe on a spacing of 25 feet. In addition the beginning, ending, turning points and intersection points (vertical and horizontal) in each pipe shall be surveyed. The installed locations of any liner penetration boxes shall be measured at locations indicated on future design drawings. Elevations shall be measured to the nearest 0.01 foot and horizontal locations shall be measured to the nearest 0.1 foot.

3.10 PIPING

This section specifies usage and testing of High Density Polyethylene (HDPE) pipes installed at the site. Generally, specifications (thickness, size, etc.) for pipe and culvert used at the site are provided in design drawings. The CQA Manager will be responsible for insuring all piping or culverts meet the requirements of the Design Plans and Drawings and this CQAP.

3.10.1 HDPE Pipe

The HDPE pipe manufacturer and welder shall comply with ASTM D3035 and F714. Pipe shall be joined by butt fusion welding or by electro-fusion coupling. The HDPE pipe coupled system shall be approved by the CQA Manager prior to installation. The piping shall be leak tested to a minimum of 45 psi for at least ten minutes. The maximum pressure loss for piping to pass is 3 psi over 10 minutes. The testing procedures shall be previously approved by the CQA Manager.

Pipe shall be installed in on the surface or in trenches in accordance with the specifications for the given system. Any initial bedding installation and backfill shall be accomplished prior to leak testing. Utility burial tape shall be placed along the top of the bedding layer. Compactable soil (Table 4-1), free of rocks (material greater than 4 inches) and organic material, shall be installed in the trench to within two feet of the ground surface and mechanically compacted using method(s) proposed by the CONTRACTOR and approved by the CQA Manager. The density of this material shall be adequate to prevent slumping in the trench and to allow the top two feet of backfill in the trench to pass density specifications. The top two feet of the backfill in the trench shall be non-granular soil (SC or CL). This soil shall be placed, moisture conditioned, compacted, and tested in accordance with the specifications and the procedures from Section 3.0 and relevant subsections. The general compaction specification for the top layers of backfill in the trench is 92% of the maximum modified Proctor density.

3.10.2 Liner Penetration

Penetration of liner shall follow design drawings for a HDPE liner penetration box. The piping manufacturer shall provide the liner penetration box with a section of HDPE pipe welded to the box as shown on the Design Plans and Drawings. The liner penetration box shall be manufactured with lifting hooks or rings which allow the box to be handled without compromising the structural integrity or the water tight seals of the box. The manufacturer shall test the integrity of the box by pressure testing to 45 psi for 10 minutes with a maximum pressure drop of 3 psi and provide testing documentation for inclusion with the final construction documentation report. The liner penetration box shall be constructed with HDPE material and the manufacturing and workmanship of the box shall comply with ASTM D3035 and F714.

Shop drawings of the liner penetration box shall be approved by the CQA Manager prior to delivery and installation in the field. These drawing shall be provided in the final construction documentation report.

Installation of the liner penetration box shall be in accordance with the Construction Plans. Any alterations in materials or construction techniques shall be approved by the CQA Manager prior to construction.

Following installation, the liner penetration box shall be pressured tested in the field to the specifications previously required for the manufacturer. All gauge access ports shall be extrusion welded closed following successful pressure testing.

3.10.3 Smooth Interior Corrugated Polyethylene Pipe

3.10.3.1 Culvert Manufacturing

Culvert style pipe used at the site shall be HDPE corrugated pipe with and integrally formed smooth interior and hydraulic characteristics as specified by the project Design and Construction Drawings.

Requirements for testing methods, pipe dimensions, and markings are provided by AASHTO Designations M252 and M294. Pipe and joints shall be manufactured with polyethylene compounds, which meet or exceed requirements of Type 111, Category 4 or 5, Grade P33 or P34, Class C per ASTM D1248 with the applicable requirements from ASTM D1248. Clean reworked materials may be used.

Minimum parallel plate pipe stiffness values, per ASTM D2412, shall be as provided in Table 4-2.5. The nominal size for pipes and fittings is based on the nominal inner diameter of the pipe. Corrugated fittings shall either be molded or fabricated by the manufacturer. Fittings fabricated by any other manufacturers than the piping shall not be permitted without approval from the CQA Manager.

Joints shall be made with split couplings, which are corrugated to engage the pipe corrugations and shall engage a minimum of four corrugations, with two for each joined pipe. A neoprene gasket shall be utilized with each coupling to provide a soil-tight joint.

A manufacturer's certification for the manufacturing, testing, and transporting of the product in accordance with this specification shall be provided to the CQA Manager.

3.10.3.2 Culvert Placement

Installation shall take place in accordance with ASTM D2321 or as specified by the CQA Manager. Culverts shall be installed based on elevations specified in the Construction Drawings.

Pipe bedding material and testing requirements shall be in accordance with specifications provided in Sections 3.2 and 3.3 and Table 4-1. Soil used as backfill material above the bedding shall be approved by the CQA Manager and shall be compacted to a minimum of 92% of maximum modified Proctor density at ± 4 of optimum moisture content. The backfill soil shall not be compacted in loose lifts greater than 8 inches. The soil shall be placed above the pipe to elevations of recommended minimum height of cover. At least one moisture density test shall be taken for each lift of soil per culvert installation.

Bedding Placement

Bedding shall consist of granular material conforming to the specifications of Table 4-1.

3.10.3.3 Acceptance Criteria

The pipe and fittings shall be free of foreign inclusions and visible defects. Holes in the corrugated crests or sidewalls of the piping will be considered unacceptable. The ends of the pipes shall be cut cleanly and squarely to best accommodate fittings at joints. All joints shall be observed and accepted by CQA Personnel prior to soil placement around the culvert.

A survey of the culverts shall be performed on the inlet and outlet points as well as 25 foot spaced points with an accuracy to the nearest 0.01 foot vertical and 0.1 foot horizontal. Surveys of the cover thickness (as provided in the Design and Construction Drawings) shall conform to the same accuracy as the top of pipe survey.

3.11 GROUNDWATER DETENTION CELL

The groundwater detention cell shall be constructed in accordance with the Design Plans and Drawings. The groundwater detention cell embankments shall be constructed using non-granular soils placed in maximum 8-inch loose lifts and compacted to a minimum of 90% of maximum modified Proctor density at $\pm 4\%$ of optimum moisture. Prior to constructing the berm, the subgrade beneath the embankment shall be scarified and proof-rolled to the satisfaction of the CQA Personnel. Field moisture-density tests shall be conducted at a minimum rate of one test per compacted soil lift per embankment. As-built construction of the embankments shall be verified by surveying.

3.12 SURFACE WATER DRAINAGE

Surface water drainage features on-site shall be constructed in accordance with the Design Drawings. The as-built configuration of the surface water drainage features shall be measured by surveying. These features include, but are not limited to the following:

- Perimeter run on and run off channels
- Drainage culverts
- Drainage spreader structures
- Sedimentation pond embankments, inlet risers, conveyance piping, valve locations, spillways, etc.

The flow line of each drainage channel shall be surveyed for horizontal and vertical location on a minimum spacing of 50 feet. All turning points of channels shall be surveyed in addition. Cross sections of the channels shall be made on 200 foot spaced points along the flow line to verify construction in accordance with the Design Plans and Drawings. Elevations shall be measured to the nearest 0.01 vertical foot and horizontal locations shall be measured to the nearest 0.1 foot.

Rip Rap

Rip rap may be utilized in drainage channels and shall comply with the specifications detailed in Table 4-1.7. No testing of this material is required, though the CQA Manager will require testing of the material as appropriate in the event there is any indication that the material does not meet specifications. The performance of these materials is assured by post-closure financial assurance and their performance is observable by surface inspection.

Type II Rip Rap Bedding

Type II granular bedding shall be installed for all rip rap at a thickness of 12-inches. Granular bedding for rip rap shall meet specifications in Table 4-1.7. These specifications shall be verified at a minimum rate of one test per source of granular bedding used per phase of construction in which the material is used.

4 DOCUMENTATION

4.1 DAILY REPORTS

Daily reports shall be completed by each of the CQA Personnel when they are on site. Entries may include but not be limited to the following information:

- Weather conditions;
- Reports on any meetings held and their results;
- Equipment and personnel being used in each location, including subcontractors;
- Descriptions of areas being observed, inspected, and documented;
- Description of materials delivered to the site, including any quality verification (vendor certification) documentation;
- Decisions made regarding use of material and/or corrective actions to be taken in instances of substandard quality;
- Unique identifying sheet numbers of inspection data sheets and/or problem reporting and corrective measures reports used to substantiate the decisions described in the preceding item.

The CQA Manager shall review each daily report.

4.2 DESIGN CHANGES AND CLARIFICATIONS

Requests for modifications to the CQAP or design changes shall be made by memorandum to the Owner and Design Engineer with copies to the CQA Manager and will require approval of CDPHE.

4.3 FINAL DOCUMENTATION

At the completion of the project, a final summary report that incorporates the field testing, along with as-built drawings, shall be prepared by the CQA Manager and submitted to the Owner and CDPHE. The as-built drawings, which will be generated by a licensed land surveyor licensed in the State of Colorado and retained by the Owner, shall include scale drawings depicting depths, plan dimensions, elevations, and fill thicknesses. The report shall include documentation of each construction component monitored by CQA Personnel and shall certify that the facility was constructed in accordance with the CQAP, Technical Specifications, and Drawings. The report shall be sealed by a professional engineer registered in the State of Colorado. Use of any newly constructed portion of the landfill shall commence after CDPHE approves the documentation report.

4.4 STORAGE OF RECORDS

During the construction of Southside Landfill, the CQA Manager shall be responsible for CQA documents. This includes the CQA Manager's copy of the design criteria, plans, procedures, and specifications, the CQAP, and the originals of the data sheets and reports.

5 REFERENCES

ASTM, 2010, *2010 Annual Book of ASTM Standards*, American Society for Testing and Materials, Philadelphia, Pennsylvania

D422 Method for Particle-Size Analysis of Soils

D792 Test Method for Specific Gravity of Soil

D698 Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft³) (600 kN-m/m³)

D1004 Standard Test Method for Initial Tear Resistance (Graves Tear) of Plastic Film and Sheeting

D1140 Test Method for Amount of Material in Soils Finer than the No. 200 (0.075mm) Sieve

D1238 Standard Test Method for Melt Flow Rates of Thermoplastics by Extrusion Plastometer

D1505 Standard Test Method for Density of Plastics by the Density-Gradient Technique

D1557 Test Method for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft³) (2,700 kN-m/m³)

D1603 Standard Test Method for Carbon Black Content in Olefin Plastics

D1790 Standard Test Method for Brittleness Temperature of Plastic Sheeting by Impact

D1777 Standard Test Method for Measuring Thickness of Textile Materials

D2216 Test Method for Laboratory Determination of Water (Moisture) Content of Soil and Rock by Mass

D2434 Test Method for Permeability of Granular Soils (Constant Head)

D3895 Oxidative Induction Time of Polyolefins by Differential Scanning Calorimetry

D4218 Determination of Carbon Black Content in Polyethylene Compounds by the Muffle-Furnace Technique

D4318 Test Method for Liquid Limit, Plastic Limit, and Plasticity Index of Soils

D4354 Sampling of Geosynthetics and Rolled Erosion Control Products (RECPs) for Testing

D4437 Standard Practice for Non-Destructive Testing (NDT) for Determining the Integrity of Seams Used in Joining Flexible Polymeric Sheet Geomembranes

D4439 Terminology for Geosynthetics

D4716 Standard Test Method for determining the (In-plane) Flow Rate per Unit Width and Hydraulic Transmissivity of a Geosynthetic Using a Constant Head

D4759 Determining the Specification Conformance of Geosynthetics

- D4833 Standard Test Method for Index Puncture Resistance of Geomembranes, and Related Products
- D5035 Standard Test Method for Breaking Force and Elongation of Textile Fabrics (Strip Method)
- D5084 Test Method for Hydraulic Conductivity of Saturated Porous Materials Using a Flexible Wall Permeameter
- D5199 Standard Test Method for Measuring Nominal Thickness of Geosynthetics
- D5261 Standard Test Method for Measuring Mass per Unit Area of Geotextiles
- D5321 Standard Test Method for Determining the Shear Strength of Soil-Geosynthetic and Geosynthetic-Geosynthetic Interfaces by Direct Shear
- D5397 Evaluation of Stress Crack Resistance of Polyolefin Geomembrane Using Notched Constant Tension Load Test (Appendix A, Single Point)
- D5596 Microscopic Evaluation of the Dispersion of Carbon Black in Polyolefin Geosynthetics
- D5641 Standard Practice for Geomembrane Seam Evaluation by Vacuum Chamber
- D5721 Air-Oven aging of Polyolefin Geomembranes
- D5820 Standard Practice for Pressurized Air Channel Evaluation of Dual Seamed Geomembranes
- D5885 Oxidative Induction Time of Polyolefin Geosynthetics by High-Pressure Differential Scanning Calorimetry.
- D5887 Measurement of Index Flux through Saturated Geosynthetic Clay Liner Specimens Using a Flexible Wall Permeameter
- D5888 Storage and Handling of Geosynthetic Clay Liners
- D5889 Quality Control of Geosynthetic Clay Liners
- D5890 Swell Index of Clay Mineral Component of Geosynthetic Clay Liners
- D5891 Fluid Loss of Clay Component of Geosynthetic Clay Liners
- D5993 Measuring Mass per Unit of Geosynthetic Clay Liners
- D5994 Test Method for Measuring Core Thickness of Textured Geomembrane
- D6072 Obtaining Samples of Geosynthetic Clay Liners
- D6102 Guide for Installation of Geosynthetic Clay Liners
- D6243 Determining the Internal and Interface Shear Resistance of Geosynthetic Clay Liner by the Direct Shear Method
- D6370 Rubber-Compositional Analysis by Thermogravimetry
- D6392 Standard Method for Determining the Integrity of Non-Reinforced Geomembrane Seams Produced Using Thermo-Fusion Methods
- D6495 Guide for Acceptance Testing Requirements for Geosynthetic Clay Liners.
- D6496 Determining Average Bonding Peel Strength between the Top and Bottom Layers of Needle-Punched Geosynthetic Clay Liners
- D6693 Standard Test Method for Determining Tensile Properties of Non-Reinforced Polyethylene and Non-Reinforced Flexible Polypropylene Geomembranes
- D6766 Evaluation of Hydraulic Properties of Geosynthetic Clay Liners Permeated with Potentially Incompatible Aqueous Solutions.

D6768 Tensile Strength of Geosynthetic Clay Liners

D6938 Standard Test Method for In-Place Density and Water Content of Soil and Soil-Aggregate by Nuclear Methods (Shallow Depth)

D7005 Determining the Bonds Strength (Ply Adhesion) of Geocomposites

D7179 Standard Test Method for Determining Geonet Breaking Force

D7466 Test Method for Measuring Asperity Height of Textured Geomembranes

EPA/600/R-93/182, EPA, Technical Guidance Document, Quality Assurance and Quality Control for Waste Containment Facilities, 2nd Edition, Waste Containment Facilities, ASCE Press, 2007.

TABLES

TABLE 4-1. SOIL MINIMUM TESTING REQUIREMENTS

4-1.1 SUBGRADE/STRUCTURAL FILL

Phase	Material	Test and ASTM Number	Frequency	Required Value
Pre-construction	Soil	Grain Size Distribution (C136/D422)	1 per 5,000 cy	--
		Atterberg Limits (D4318)	1 per 5,000 cy	--
		Standard Proctor Compaction (D698)	1 per 5,000 cy	--
Construction	Soil	In-Place Density (D6938)	1 per 750 cy	95% Standard Proctor max dry density moisture to provide compaction

4-1.2 COMPACTED SOIL LINER

Phase	Material	Test and ASTM Number	Frequency	Required Value
Pre-construction	Soil	Recompact Hydraulic Conductivity (D5084)*	1 per 10,000 cy	$\leq 1 \times 10^{-7}$ cm/sec
		Soil Density/Moisture Content Relationship (D698)	1 per 10,000 cy	--
		Atterberg Limits (D4318)	1 per 10,000 cy	--
		Natural Moisture Content (D2216)	1 per 10,000 cy	--
		Maximum Clod Size	Periodic Visual Monitoring	--
		Particle Size Distribution/Hydrometer (D422)	1 per 10,000 cy	--
		USCS Classification (D2487)	1 per 10,000 cy	--
		In-Place Moisture-Density (Nuclear, D6938)	1 per 500 cy	95% of Standard Proctor minimum moisture determined based upon passing remolded permeability
		Shelby Tube for Hydraulic Conductivity (D5084)	1 per 5,000 cy	$\leq 1 \times 10^{-7}$ cm/sec
		Soil Density/Moisture Content Relationship (D698)	1 per 5,000 cy	--
Construction	Soil	Atterberg Limits (D4318)	1 per 5,000 cy	--
		Natural Moisture Content (D2216)	1 per 1,000 cy	--
		Maximum Clod Size	Periodic Visual Monitoring	--
		Particle Size Distribution/Hydrometer (D422)	1 per 5,000 cy	--

* Moisture content of a passing remolded permeability test shall determine the minimum acceptable moisture content for a given soil type during field testing (e.g., if remolded permeability is tested at 95% Standard Proctor and at 1.0% above optimum, the minimum acceptable moisture content shall be 1.0% above optimum for field testing purposes).

4-1.3 GRAVEL DRAINAGE

Phase	Material	Test and ASTM Number	Frequency	Required Value
Pre-construction	Borrow Source	Grain Size Distribution (C136)	1 per 2,000 cy	$D_{50} > \text{leachate collection pipe perforations}$
		Permeability (D2434)	1 per 2,000 cy	$\geq 1 \times 10^{-2} \text{ cm/sec}$
Construction	Gravel, when delivered	Visual Observations	Continuous	95% of Standard Proctor minimum moisture determined based upon passing remolded permeability
		Grain Size Distribution (C136)	1 per 2,000 cy	$D_{50} > \text{leachate collection pipe perforations}$
		Permeability (D2434)	1 per 2,000 cy	$\geq 1 \times 10^{-2} \text{ cm/sec}$

Gravel used around leachate collection pipe or within the sumps shall have a value of 1 cm/sec or greater.

4-1.4 ANCHOR TRENCH

Phase	Material	Test and ASTM Number	Frequency	Required Value
Construction	Soil	Visual Observations	Periodic	--

4-1.5 GROUNDWATER INTERCEPTION SYSTEM TRENCH

Phase	Material	Test and ASTM Number	Frequency	Required Value
Construction	Soil	Visual Observations	Periodic	--

4-1.6 PIPE BEDDING MATERIAL

Sieve Size	Mass Percent Passing SQUARE Mesh Sieves
19 mm (3/4")	10
9.5 mm (3/8")	>90
4.75 mm (#4)	>45
0.147 mm (#100)	<10
0.074 mm (#200)	<5

4-1.7 RIP RAP

Rip Rap Designation	% Smaller by Weight	Intermediate Rock Dimension (Inches)	D50 (Inches)
Type VL	70-100	12	6
	50-70	9	
	35-50	6	
	2-10	2	
Type L	70-100	15	9
	50-70	12	
	35-50	9	
	2-10	3	
Type M	70-100	21	12
	50-70	18	
	35-50	12	
	2-10	4	
Type H	100	30	18
	50-70	24	
	35-50	18	
	2-10	6	
Type VH	100	42	24
	50-70	33	
	35-50	24	
	2-10	9	

4-1.7 TYPE II RIP RAP BEDDING

Sieve Size	Mass Percent Passing SQUARE Mesh Sieves
3"	10
3/4"	>90
#4	>45
#200	<10

TABLE 4-2. GEOSYNTHETIC MATERIALS MINIMUM TESTING REQUIREMENTS**4-2.1 HDPE GEOMEMBRANE**

Phase	Material	Test and ASTM Number	Frequency
Pre-Shipment (Before Shipping)	Resin	Manufacturer's Documentation Certification and QC Test Results	Every Lot
	Geomembrane	Manufacturer's Documentation, Certification and QC Test Results	Every Roll
Pre-Construction (Before Installing)	Geomembrane	Receiving Inspection	Every Roll
		Specific Gravity (D1505) Carbon Black Content (D1603 or D4218) Asperity Height (D7466) Tear (ASTM D1004) Melt Index (ASTM D1238) Carbon Black Dispersion (D5596) Thickness (D5199 or D5994) Yield Strength (D6693) Elongation at Yield (D6693) Break Strength (D6693) Elongation at Break (D6693) Puncture Resistance (D4833)	Every 80,000 sf per Lot
		Friction Angle (Direct Shear - D5321) soil liner vs geomembrane	1 Test Total ¹
	Extrudate	Documentation and Certification	Every Resin Lot
	Installation Surface	Installer's Certification of a Suitable Installation Surface	Each Installation Surface
Construction	Geomembrane	Seam Overlap	Every Panel
		Trial Seams	Every 4 Hours per Welder per Machine
		Vacuum Test (D5641)	All Extrusion or Single Wedge Fusion Welds
		Air Pressure Test (D5820)	All Double Wedge Fusion Welds
		Seam Destructive Test (D6392) (5 peel/5 shear)	Min. Avg. of 1 per 750 ft. per Welder

1. Interface friction testing may be left up to the discretion of the CQA Engineer if geomembrane and compacted soil liner interfaces have previously been tested in subsequent cell constructions. If the CQA Engineer decides to forego interface friction testing, they shall verify that soil liner proctor and Atterberg Limits are consistent with historical interface friction testing results. The CQA Engineer shall also verify that the geosynthetic manufacturer and product line are consistent with historical interface friction testing results.

2. Required testing values shall be in accordance with the most recent version of GRI GM13 and GM19.

3. QC Conformance testing will not be required if the manufacturer of the HDPE liner material has at least five (5) years of continuous experience in manufacturing of polyethylene geomembrane and/or experience totaling 10,000,000 square feet of manufactured polyethylene geomembrane.

4-2.2 GEOTEXTILE

Phase	Material	Test and ASTM Number	Frequency	Required Test Values
Pre-Shipment (Before Shipping)	Geotextile and Thread	Manufacturer's Documentation, Certifications, and QC Test Results	Every 50,000 sf per Lot	--

4-2.3 GEOCOMPOSITE

Phase	Material	Test and ASTM Number	Frequency	Required Test Values
Pre-Shipment (Before Shipping)	Geocomposite	Manufacturer's Documentation, Certifications, and QC Test Results	Every Roll	--
Pre-Construction (Before Installing)	Geocomposite	Receiving Inspection	1 per Lot	--
		Geocomposite: Transmissivity (ASTM D5944) Ply Adhesion (ASTM D4833)		1 x 10 ⁻⁴ m ² /sec 0.5 lbs./in
		Geonet: Density (ASTM D4766) Thickness (ASTM D1505 or D792)		Minimum 0.94 g/cc Minimum 200 mil
		Geotextile: Mass per Unit Area (ASTM D6693) Permeability (ASTM D1004)		6-8 oz./yd ² Minimum 4.7 x 10 ⁻⁵ cm/sec
Construction	Installation Surface	Installer's Certification of Suitable Installation Surface	Each Installation Surface	--
	Geocomposite	Seam Overlap	Every Panel	In accordance with Manufacturer's installation requirements
		Seam Fastening	Every Panel	In accordance with Manufacturer's installation requirements
		Butt Seam Locations	Every Panel	In accordance with Manufacturer's installation requirements

1. QC Conformance testing will not be required if the manufacturer of the geocomposite and geotextile material has produced at least 300 million square feet of each product within the past three years. The manufacturing facility must have produced at least 200 million square feet of each product within the past 5 years in order to ensure consistency in material and workmanship.

4-2.4 GEOSYNTHETIC CLAY LINER (GCL)

Phase	Material	Test and ASTM Number	Frequency	Required Test Values
Pre-Shipment (Before Shipping)	GCL	Manufacturer's Documentation, Certifications, and QC Test Results	Every Roll	--
Pre-Construction (Before Installing)	GCL - Geotextile	Nonwoven, Mass/Unit Area (ASTM D5261)	1/25,000 yd ²	6.0 oz/yd ² MARV
	GCL - Bentonite	Swell Index (ASTM D5890)	1/100,000 lb	24 mL/2g min.
		Fluid Loss (ASTM D5891)	1/100,000 lb	18 mL max.
		Mass/Area (ASTM D5993)	1/5,000 yd ²	0.75 lb/ft ² min.
	GCL - As Manufactured	Mass/Area (ASTM D5993)	1/5,000 yd ²	0.81 lb/ft ²
		Tensile Strength - Side Slopes (ASTM D6768)	1/25,000 yd ²	45 lbs/in
		Tensile Strength - Floor (ASTM D6768)	1/25,000 yd ²	30 lbs/in
		Peel Strength (ASTM D6496)	1/5,000 yd ²	3.5 lb/in
		Moisture Content (ASTM D5993)	1/5,000 yd ²	35% max.
		Index Flux (ASTM D5887)	1/30,000 yd ²	1 x 10 ⁻⁶ cm/sec max.
		Permeability (ASTM D5887)	1/30,000 yd ²	5 x 10 ⁻⁹ cm/sec max.
		Internal Shear Strength (ASTM D6243)	Periodically	500 psf
	Installation Surface	Installer's Certification of Suitable Installation Surface	Each Installation Surface	--
Construction	GCL	Seam Overlap	Every Panel	In accordance with Manufacturer's installation requirements
		Seam Fastening	Every Panel	In accordance with Manufacturer's installation requirements
		Butt Seam Locations	Every Panel, on grades <15%	In accordance with Manufacturer's installation requirements

1. QC Conformance testing will not be required if the manufacturer of the GCL has produced at least 300 million square feet of each product within the past three years. The manufacturing facility must have produced at least 200 million square feet of GCL within the past 5 years in order to ensure consistency in material and workmanship

4-2.5 PIPING

Diameter (inches)	Pipe Stiffness (psi)
18	40
24	34
30	28
36	22

