

SHENANDOAH COUNTY LANDFILL – PHASE 4 CONSTRUCTION PROJECT

ADDENDUM NO. 1

JUNE 9TH, 2020

SCS ENGINEERS

June 11, 2020
File No. 02201010.02

MEMORANDUM

TO: All Pre-Bid Meeting Attendees
FROM: Ken Armentrout, P.E.
SUBJECT: Shenandoah County Landfill Phase 4 Expansion – Addendum No. 1
Notes from Pre-Bid Meeting on June 8, 2020

This memorandum provides the notes from the Pre-Bid meeting held on June 8, 2020 at the County Landfill. The meeting started at 2:00 PM with opening remarks by Patrick Felling (Shenandoah County Director of Public Services), followed by a brief overview of the project from Ken Armentrout (SCS Engineers). Meeting participants included the following:

- Patrick Felling Shenandoah County
- Brad Dellinger Shenandoah County
- Ken Armentrout SCS Engineers
- Bidders/Contractors See attached Attendees List

Pre-Bid Meeting Notes

Below is a summary of general items discussed during the Pre-Bid Meeting. Please note, however, that technical provisions in the project documents, including drawing and specifications, control the work and the following summary is for your convenience:

- Patrick Felling gave brief introductions of County and SCS personnel and provided a brief overview of the project. The meeting was conducted at the work site and an aerial photograph of the site was used for discussion purposes. Bidders were invited to drive around the site location to familiarize themselves with the site and observe the borrow area.
- A Sign-In Sheet was passed around and signed by all attendees. A copy of this sheet will be included with this Addendum.
- Bids are due on June 29, 2020 at 2:00 pm.
- Substantial Completion date is 150 days from NTP. Please note this excludes leachate sump controls improvements work.
- The full geotechnical report was requested and has been sent to all attendees of the pre-bid meeting by SCS.
- Final Completion date is 180 days from NTP.
- Smoking is prohibited on site.



- It was iterated that soils and materials testing is the responsibility of the CONTRACTOR.
- Questions and requests for CAD files should be sent to the County and SCS via email.
- Existing monitoring wells and probes within the project site shall be removed prior to construction and are not part of this contract work.
- The County stated the CONTRACTOR will not have to obtain any permits. The site currently has its own VPDES permit and the County will coordinate with their Erosion and Sediment Control Department about any issues. It was expressed that E&S controls need to be provided and maintained in a proper manner and in accordance with the drawings and specifications.
- An estimated cost was inquired about and the County noted the previous cell construction cost was approximately \$2.7 million dollars.
- It was made known to the bidders that CONTRACTORS may dig their own test pits in preparation of their bids and should coordinate their site access with the County.
- The County stressed that the existing landfill perimeter road to the South of the work site must stay open at all times.

List of Attachments

1. Attendees List
2. Questions and Responses
3. Revised Specification Sections 02225.



ATTACHMENT 1
ATTENDEES LIST



Shenandoah County Landfill
Phase 4 Expansion Pre-Bid Meeting
6/8/20 - 2:00 PM
Sign-In Sheet

<u>Name</u>	<u>Company</u>	<u>Email</u>
<u>Will Perry</u>	<u>Perry Engineering</u>	<u>wperry@perryeng.com</u>
<u>Mike Perry</u>	<u>Perry Engineering</u>	<u>mperry@perryeng.com</u>
<u>Billy Rudolph</u>	<u>brudolph Perry Engineering</u>	<u>brudolph@perryeng.com</u>
<u>Brianna Heckert</u>	<u>Independence Excavating</u>	<u>amabon@indexc.com</u>
<u>Mark Rowles</u>	<u>General Excavation</u>	<u>mrowles@gei-va.com</u>
<u>BRAD ZIMMERMAN</u>	<u>GL SERVICES</u>	<u>bzimmerman@glSpecialty.com</u>
<u>Jason Sheetz</u>	<u>Ryan Inc. Central</u>	<u>jason.sheetz@ryancentral.com</u>
<u>Brad Dellinger</u>	<u>Shenandoah</u>	<u>bdellinger@shenandoahva.us</u>
<u>FRANK ECKARD</u>	<u>C. William Hetzer, Inc</u>	<u>geckard@williamhetzer.com</u>
<u>Robert B. Adams</u>	<u>M.D. x 3</u>	
<u>Rick Norville</u>	<u>Wright Brothers Contracting</u>	<u>rnorville@wbcc.com</u>
<u>Hans HARMAN</u>	<u>Momentum Earthworks</u>	<u>hans@momentumearthworks.com</u>
<u>ERIC HINKLE</u>	<u>ERIC @ TEAM A AND J .COM</u>	<u>A+J EXCAVATING</u>
<u>Daniel Soderquist</u>	<u>Atlantic Contracting & Material</u>	<u>DSoderquist@acmpave.com</u>
<u>AARON TODD</u>	<u>SARGENT CORP.</u>	<u>ATODD@SARGENT-CORP.COM</u>
<u>Thomas Missal</u>	<u>Thalle Construction</u>	<u>tmissal@thalle.com</u>
<u>Patrick Felling</u>	<u>Shenandoah County</u>	<u>pfelling@shenandoahcountyva.us</u>

ATTACHMENT 2
QUESTIONS AND RESPONSES

Questions and Responses:

Question 1: General conditions item 6.04 Builder's Risk insurance. Is this required? The supplementary conditions do not have it deleted.

Response 1: *Yes. Builders Risk Insurance is required. No specific guidelines for this coverage are outlined in the Supplemental Conditions.*

Question 2: Earthwork – Part 1.1D – is the rock removal below the base grade elevation paid under the cell excavation or is this at the contractor's risk?

Same thing on subgrade pumping 3.2A.4 – is this contractor's risk?

Response 2: *Rock removal and removal of pumping or unsuitable subgrade will be quantified and paid for per Specification 01025 Measurement and Payment, 3.1.B.B1 – Cell Excavation.*

Question 3: Earthwork – part 3.2A.6 - unsatisfactory materials – when you say off-site do you mean off the landfill property? Drawing sheet 3 shows the location of excess and unsuitable materials within the landfill but not in phase 4 location.

Response 3: *Unsuitable materials will be disposed of at an on-site location as directed by the County. The Earthwork specification section 3.2A.6 has been revised accordingly and a revised copy of the specification is attached.*

Question 4: On sheet 3 – Note #8, you say a soils report is available upon request. Can we get this electronically?

Response 4: *Soils report has been provided to all bidders in attendance at the pre-bid meeting.*

Question 5: Mass deficiency area – where on the bid form should this be included?

Response 5: *The mass deficiency area shall be included in bit item A6 – Compacted Clay Liner.*

Question 6: When do you think this project will be awarded? IE – do you see this being completed this year?

Response 6: *The project is anticipated to be awarded early July with construction beginning in August and completion by the end of the year.*

Question 7: Do we need to temporary seed the waste areas or the clay borrow area once we are done?

Response 7: *Areas within the waste cell limit do not require seeding. Areas disturbed during removal of the existing Phase 3-4 intermediate berm should be temporarily and permanently seeded outside of the Phase 4 cell limit. It is not anticipated that the borrow area will need to be seeded.*

Question 8: Drawing 5 – on the new leachate lines – there are 3 tie in's and 3 cleanouts. What happens on the other ends of the lines – IE top left corner of cell for 1 ea 8" and 3" 6" lines – are they capped?

Response 8: *There are one 8 inch, and two 6 inch leachate collection lines located in the Northwest corner of the cell. These lines shall be capped.*

Question 9: Drawing 7 – force main improvements – can we shut down this during the tie in or do we need to bypass pump when we are removing the old line and tying in the new line?

Response 9: *Contractor should coordinate these new forcemain connections in such a manner as to minimize the impact to leachate collection operations. If leachate levels indicate the need to pump leachate from existing cell 3, measures must be taken so that this can be accomplished without delay. Additionally, the existing forcemain is not required to be removed, but should be abandoned in place. A three-inch HDPE line was previously used to pump-around, and is still available.*

Question 10: Soils report - This only has some of the test pits. Does this mean the other test pits will not work for the clay? Also, what is the depth of these test pits? I thought we would have info on where they were terminated and rock encountered.

Response 10: *The full Soils report prepared for Phase 4 has been provided to all bidders in attendance at the pre-bid meeting. Test pit depths ranged from approximately 5 to 8 feet. Additionally, prior studies including boring logs and maps were prepared for the site in its entirety. While this information contains information that may not be applicable to the work area, it does contain some useful information. These documents will be provided to bidders in attendance at the pre-bid meeting for their use.*

Question 11: Where should cell dewatering discharge to?

Response 11: *Dewatering operations should discharge to the existing stormwater channel located along the Southeast of Cell 3.*

Question 12: Is water available on site?

Response 12: *Water is available. Trucks can be filled via pump along Narrow Passage Creek, which can be accessed from within the landfill.*

Question 13: Is topsoil available on site?

Response 13: *Topsoil is available on-site and the contractor shall coordinate the location for obtaining the on-site topsoil with the County.*

End of Questions.

ATTACHMENT 3
REVISED SPECIFICATION 02225-EARTHWORK

SECTION 02225

EARTHWORK

PART 1 - GENERAL

1.1 DESCRIPTION

- A. The work in this section includes all labor, materials, equipment, construction quality control (CQC) testing, and incidentals required to perform earthwork for site grading. Earthwork includes, but is not limited to the following:
1. Excavation, filling, backfilling and compacting earthen materials to achieve final grades for all related earthen features. This includes backfilling of trenches and anchor trenches; sheeting and shoring; construction of subbase, subgrade, base grade, compacted clay liner, dewatering; general backfilling and compacting, and grading around structures; segregating, stockpiling, screening, and other material processing of excavated materials for on-site use; disposing of earth materials, as required to complete construction, and associated features shown on the PLANS.
 2. Erosion and sediment control, construction of temporary and permanent access roads, diversion berms, storm drainage structures and related structures as shown on the PLANS and as specified herein.
 3. CONTRACTOR'S Construction Quality Control (CQC) observations, field testing, sampling, laboratory testing of earthwork, as specified herein, to establish compliance with material and performance requirements.
 4. Blasting to facilitate excavation of rock, as described in Section 02316, Rock Removal.
- B. No classification of type of excavated material will be made. Excavation includes all soil, boulders, waste materials (if encountered), rock, organic material and other material from areas to be graded, regardless of type, character, composition, moisture, or condition thereof.
- C. CONTRACTOR is responsible for all construction layouts and staking.
- D. Where rock is encountered within the footprint of the landfill, it shall be removed to a minimum depth of 2 feet below the Base Grade elevation and backfilled with Controlled Fill to the Base Grade elevation as shown on the Drawings in preparation for the Compacted Clay Liner.

1.2 DEFINITIONS

- A. Excavation means the removal of soil, waste, rock, debris and other materials to the proposed grading limits indicated on the PLANS, and as required to excavate within designated borrow areas to supply the required volume and quality of soil for the construction.
- B. Unauthorized excavation consists of removal of materials beyond indicated areas without specific direction of the OWNER or ENGINEER. Unauthorized excavation shall be at CONTRACTOR'S expense. Unauthorized excavations shall be backfilled and compacted as specified for authorized excavations at no additional cost to the OWNER.
- C. Additional Excavation: When excavation has reached required elevations, notify the ENGINEER, who will make an inspection of conditions. If the ENGINEER determines that bearing materials at required elevations are unsatisfactory, continue excavation until satisfactory bearing materials are encountered. Replace excavated material with suitable fill material as directed by the ENGINEER.
- D. Maximum Dry Density: Maximum dry weight in pounds per cubic foot (pcf) of a specific soil material as determined by Standard Proctor ASTM D698.
- E. Optimum Moisture Content: The moisture content at which the maximum dry density of a soil material is determined by Standard Proctor ASTM D698.
- F. Fill material is soil used for filling or backfilling of areas including trenches, structural areas, or slopes to meet a grade, depth, or layer thickness.
- G. Filled areas are areas that have received trench backfill, structural fill or embankment materials, placed and compacted as specified herein.
- H. Open areas are all areas other than the following: paved areas, areas within the public right-of-way, and areas upon which structures are to be constructed.
- I. Reference Standards: Test methods widely used by the industry including those methods published by ASTM International.

1.3 SUBMITTALS

- A. Sheeting, shoring and bracing shall be designed and signed by a registered professional ENGINEER and submitted for approval.

1.4 SAFETY

- A. All excavation guidelines shall comply with CONTRACTOR'S Site Health and Safety Plan and the applicable requirements as stated in the:
 - 1. OSHA excavation safety standards.

2. State and County construction safety regulations.
3. Trench safety guidelines as specified by the Landfill Gas Division of the Solid Waste Association of North America (SWANA).
4. Contact "Miss Utility" to obtain clearance prior to any excavation work.

1.5 PROJECT CONDITIONS

- A. Site Information: The CONTRACTOR shall be responsible for having determined to his/her satisfaction, prior to the submission of the bid, the conformation of the ground, the characteristics and quality of the substrata, the types and quantities of materials to be encountered, the nature of the rock and groundwater conditions, the prosecution of the work, the general and local conditions and all other matters which can in any way affect the work under this Contract.
 1. Additional test borings, soil testing, and other exploratory operations may be performed by the CONTRACTOR, at the CONTRACTOR'S option; however, the OWNER will not pay for such additional exploration.
- B. Existing Structures: Shown on the PLANS are certain surface features and underground structures adjacent to and within the work area. This information has been obtained from existing records. It is not guaranteed to be correct or complete and is shown for the convenience of the CONTRACTOR. The CONTRACTOR shall explore ahead of the required excavation to determine the exact location of all structures. They shall be supported and protected from damage by the CONTRACTOR. If they are broken or damaged, they shall be restored immediately by the CONTRACTOR at his expense.
- C. Protection of Persons and Property
 1. Barricade open excavations or trenches occurring as part of this work and post warning signs or lights, as appropriate.
 2. CONTRACTOR shall plan and conduct operations to prevent damage or disturbance to existing structures and utilities, buried utilities, existing monitoring wells, paved roads, signs, trees and bench marks.
 3. Protect existing slopes, embankments, and other facilities from damage caused by settlement, lateral movement, undermining, washout, and other hazards created by earthwork operations.
 4. Failure of ENGINEER to order the use of bracing or sheeting or shoring shall not in any way or to any extent relieve the CONTRACTOR of any responsibility concerning the conditions and safety of excavations or of their obligations under this Contract.

5. Work is restricted to the area provided for CONTRACTOR'S use.
6. Side slopes shall be maintained in stable condition under all normal anticipated weather conditions for the period that the excavation will be open. The CONTRACTOR shall regrade side slopes to be a more stable configuration if so directed by ENGINEER.

1.6 QUALITY CONTROL

- A. All materials and labor furnished under this section shall comply with OSHA, ASTM, VDOT, NEC, ANSI and other applicable Federal, State and County codes and regulations including revisions to the date of the Contract.
- B. The CONTRACTOR shall provide CQC.
- C. Use adequate number of skilled workmen who are thoroughly trained and experienced in the specified requirements and the methods needed for proper performance of the work in this Section.

PART 2 – PRODUCTS

2.1 MATERIALS

- A. General Fill:
 1. General Fill shall be inorganic soil that is not excessively wet or saturated, free of stone, rock or gravel larger than three (3) inches in any dimension, and free of debris, waste, frozen materials, vegetation, organic materials, roots, and other deleterious matter. The satisfactory excavated soil materials shall be capable of maintaining its stability on all slopes. Excess or unsatisfactory material shall be removed and disposed as directed by the ENGINEER to the designated on-site stockpiles.
 2. General Fill shall be used for backfilling and filling as shown on the PLANS, and for areas as otherwise directed by the ENGINEER.
- B. Controlled Fill:
 1. Controlled Fill refers to select inorganic soil materials that are classified as CL, CL-ML, SM, SP, SC or SW as defined by Unified Soil Classification System, or otherwise approved by the ENGINEER. The ENGINEER or OWNER shall designate areas on-site to separately stockpile potential Controlled Fill materials.
 2. Controlled Fill shall be used in the last five (5) feet of filling for access roads and building structures (if any) outside of the limits of waste.

3. Controlled Fill is also referred to as select excavated material, select material, and electrical bedding material on the electrical portions of the Drawings if provided.
- C. Compacted Clay Liner: refer to Section 02443, Compacted Clay Liner.
- D. Topsoil
1. Soil material per Specification 02900, Landscaping.
- E. Trench Backfill
1. Provide general fill unless otherwise noted on the drawings or in pipe related specifications.
- F. Bedding and Haunching for Pipe and Pipe Structures Outside the landfill Footprint
1. Bedding and haunching for pipe shall be ½-inch to ¾-inch size stone granular material, unless otherwise shown.
 2. Bedding for manholes and vaults shall be ½-inch to ¾-inch size stone granular material, unless otherwise shown.
- G. Other Materials: All other materials, not specifically described or noted on the drawings, but required for proper completion of the work shall be selected by the CONTRACTOR and approved by the ENGINEER.

PART 3 – EXECUTION

3.1 PREPARATION

- A. Site Clearing, Grubbing, and Stripping:
1. Prior to construction, all areas to receive fill or to be excavated shall be cleared and grubbed of vegetation, roots, organic soil, peat, trash, debris, or other deleterious materials as specified in Section 02110, Clearing, Grubbing, and Stripping.
- B. Dewatering
1. The CONTRACTOR shall at all times during construction provide and maintain proper equipment and facilities to remove all water entering excavations, and shall keep such excavations dry so as to obtain a satisfactory foundation condition until the fill, structures or pipes to be built thereon have been completed to such extent that they will not be floated or otherwise damaged by allowing water levels to return to natural levels.

2. Do not allow water to accumulate in excavations. Remove water to prevent softening of foundation bottom, and soil changes detrimental to stability of subgrades and foundations. Subgrade soils, which become soft, loose, "quick", or otherwise unsatisfactory for support of structure as a result of inadequate dewatering or other construction methods shall be removed and replaced by crushed stone as required by the ENGINEER at the CONTRACTOR's expense. The bottom of excavations shall be rendered firm and without standing water before placing structures or pipes. Provide and maintain pumps, well points, sumps, suction and discharge lines, and other dewatering system components necessary to convey water away from excavations.
3. Establish and maintain temporary drainage ditches and other diversions outside excavation limits to convey rain water and water removed from excavations to collecting or runoff areas. Do not use trench excavations as temporary drainage ditches.
4. Disposal of Water Removed by Dewatering System:
 - a. Dispose of water in such a manner as to cause no inconvenience to the OWNER, the ENGINEER, or others involved in work about the site.

C. Construction Quality Control (CQC)

1. CQC testing and observations shall be provided by a qualified testing firm that is approved by the OWNER.

3.2 EXCAVATION

A. General:

1. Excavation equipment operators and other concerned parties shall be familiar with subsurface obstructions as shown on the PLANS.
2. Excavation work shall be performed in a safe and proper manner with appropriate precautions being taken against hazards and in accordance with the Health and Safety Plan. Excavations shall provide adequate working space and clearances for the work to be performed therein. If walls of the excavation cannot be kept stable, the excavation shall be properly shored and braced.
3. CONTRACTOR may need to screen, crush, or segregate excavated material during excavation to remove oversize particles and rock, and to set aside material that will be suitable for use in construction.

4. If subgrade "pumping" is encountered during excavation, perform the following:
 - a. Excavate and remove the underlying unsuitable material to a minimum depth of 12 inches.
 - b. Proof-roll and compact by appropriate heavy equipment for at least 6 passes and approved by the ENGINEER.
 - c. Backfill with General Fill or Controlled Fill material as directed by the ENGINEER and compact to a stable condition approved by the ENGINEER.
5. Excavation shall conform to the limits indicated on the PLANS and as specified herein. This work shall include shaping, sloping, grading and other work necessary in bringing the site to the required grade, alignment, and cross-section.
6. Unsatisfactory materials shall be removed to the required depth and replaced to the satisfaction of the ENGINEER with General Fill or Controlled Fill. Unsatisfactory materials shall be removed and disposed of on-site at a location designated by the COUNTY.
7. Satisfactory excavated materials shall be stockpiled in such a manner as to prevent nuisance conditions. Surface drainage shall not be hindered.

3.3 TRENCH EXCAVATION FOR DRAINAGE STRUCTURES

- A. Trench width shall be minimized to the greatest extent practical but shall conform to the following:
 1. Sufficient to provide room for installing, jointing, and inspecting piping, but in no case wider at top of pipe than pipe barrel outside diameter plus 18 inches unless otherwise shown on drawings or as approved by the ENGINEER.
 2. Trench enlargements at pipe joints.
 3. Sufficient for sheeting, bracing, sloping, and dewatering.
 4. Sufficient to allow thorough compacting of backfill adjacent to bottom half of pipe.
- B. Excavate trenches to depth indicated or required to establish indicated slope and invert elevations and to support bottom of pipe or conduit on undisturbed soil.

1. For pipes less than 6 inches in nominal size, do not excavate beyond indicated depths. Excavate bottom cut to accurate elevations and support pipe on undisturbed soil.
 2. For pipes 6 inches or larger in nominal size, shape bottom of trench to fit bottom of pipe. At each pipe joint, dig bell holes to relieve pipe bell of loads and ensure continuous bearing of pipe barrel on bearing surface.
- C. No more than 300 feet of trench within landfill area may be opened in advance of pipe laying operations at one time unless approved by the ENGINEER.
- D. All trenches shall be constructed in a uniform grade, and free of standing water. The CONTRACTOR shall be responsible for maintaining these conditions. Subgrade soils that become soft, loose, or unsatisfactory as a result of inadequate dewatering and cannot be stabilized or recompacted shall be removed and replaced by VDOT No. 57 stone or an approved equal at the CONTRACTOR's expense.
- E. Excavation for appurtenances shall maintain a minimum clearance of 12 inches between their outer surfaces and the face of the excavation, or sheeting, if used.
- F. Document the location, elevation, size, material, type and function of all new subsurface installations, and utilities encountered during the course of construction and include this information as part of the Record PLANS.

3.4 STABILITY OF EXCAVATIONS

- A. General: Comply with local codes, ordinances, and requirements of agencies having jurisdiction including OSHA.
- B. Slope sides of excavations to comply with local codes, ordinances, and requirements of agencies having jurisdiction. Shore and brace where sloping is not possible because of space restrictions or stability of excavated material. Maintain sides and slopes of excavations in safe condition until completion of backfilling.
- C. Shoring and Bracing: Provide materials for shoring and bracing, such as sheet piling, uprights, stringers, and cross braces, in good serviceable condition. Maintain shoring and bracing in excavations during period excavations will be open. Extend shoring and bracing as excavation progresses.

3.5 STORAGE OF EXCAVATED AND BORROW MATERIALS

- A. Stockpile materials where directed by the OWNER. Place, grade, and shape stockpiles for proper drainage.
1. Locate and retain excavated soil and backfill materials away from edge of excavations. No excavated materials or other construction materials shall

be placed within thirty (30) feet of the edge of pavement of any public road.

2. Comply with all erosion and sediment control requirements of State and local authorities.

3.6 BACKFILL AND FILL

- A. General: Place soil material in layers to required elevations, for each area classification listed below, using materials specified in Part 2 of this Section.
 1. For general site grading, use General Fill or Controlled Fill unless otherwise indicated.
 2. Do not backfill trenches until tests and inspections have been made. Use care in backfilling to avoid damage or displacement of pipe systems. Work which is covered or concealed without the knowledge and consent of the ENGINEER shall be uncovered or exposed for inspection at no cost to the OWNER. Partial backfill may be made to restrain the pipe during pressure testing if pressure test is required. No more than 50 feet of trench with pipe in place shall be partially backfilled at any time.
- B. Backfill excavations as promptly as work permits.

3.7 PLACEMENT AND COMPACTION

- A. General:
 1. Ground Surface Preparation: Remove vegetation, debris, unsatisfactory soil materials, obstructions, and deleterious materials from ground surface prior to placement of fills. Plow, strip, or scarify surfaces so that fill materials will bond with existing surfaces.
 2. Waste or unsuitable materials shall not be used as backfill materials.
 3. Place backfill and fill materials in horizontal layers not more than 8 inches in loose depth for material compacted by heavy compaction equipment, and not more than 4 inches in loose depth for material compacted by hand-operated equipment. Thickness of layers may be increased or decreased provided the equipment and methods used are proven by field density and moisture content testing, or test pads, to be capable of compacting thicker or thinner layers to specified densities and moisture range, and only as approved by the ENGINEER.
 4. Before compaction, moisten or aerate and process (e.g. disking and mixing) each layer as necessary to provide suitable moisture contents. Compact each layer to required percentage of maximum dry density or relative dry density and moisture range for each area classification. Do

not place backfill or fill material on surfaces that are submerged, soft, muddy, frozen, or unstable.

5. Recompress areas or lifts if soil density and moisture tests indicate inadequate compaction and/or moisture. No additional compensation shall be given to the CONTRACTOR due to re-working of failed areas. The extent of area for repair shall be determined by the ENGINEER.
 6. Place backfill and fill materials evenly adjacent to structures or piping to required elevations. Prevent wedging action of backfill against structures or displacement of piping by carrying material uniformly around structure or piping to approximately same elevation in each lift.
- B. Moisture Control: Where subgrade or fill material must be moisture conditioned before compaction:
1. Uniformly apply water to surface of subgrade or fill material. Apply water as necessary to prevent free water from appearing on surface during or subsequent to compaction operations. The CONTRACTOR shall process soil materials so that moisture is uniformly mixed into soils.
 2. Remove and replace, or scarify and air dry, soil material that is too wet to permit compaction to specified density and moisture range. Stockpile or spread soil material that has been removed because it is too wet to permit compaction. Assist drying by disking, harrowing, or pulverizing until moisture content is reduced uniformly to a satisfactory value.
- C. Compaction Requirements: Compact fill materials and aggregates not less than the following percentages of maximum dry density, unless otherwise approved by the ENGINEER, as follows:
1. Before placement of soil or other materials on existing grade, the existing grade subgrade compaction shall be achieved by appropriate heavy compaction equipment with a minimum of 6 passes and approved by the ENGINEER, unless otherwise specified.
 2. General Fill: Minimum 90 percent.
 3. Controlled Fill: Minimum 95 percent compaction within 4 percent of optimum of moisture content.
 4. Compacted Clay Liner: Refer to Section 02443, Compacted Clay Liner.
 5. Topsoil shall receive limited compaction to minimize erosion, yet should not inhibit plant growth and root penetration.

6. Pipe: Bedding and Haunching Aggregates: Tamp with appropriate equipment to maximum obtainable density as field-determined by the CONTRACTOR.
 7. Trench backfill shall have a minimum 92 percent compaction within 4 percent of optimum moisture content.
- D. Construction Quality Control: Testing in accordance with Table 1-02225 and Table 2-02225.

3.8 GRADING

- A. Perform grading operations so that the excavation will be well drained at all times. Maintain drainage ditches and keep them open and free from soil, debris, and leaves until final acceptance of the work. Finish all grading on neat, regular lines conforming to the sections, lines, grades and contours shown on the PLANS or if not shown in accordance with the criteria set forth hereinafter. Perform grading work in proper sequence with all other associated operations.
- B. Structures and pavement: bring finished subgrade to the elevation as shown on the drawings. Bring entire areas to the finished subgrade elevation before excavating for footings.
- C. Uniformly grade all areas disturbed by the project, at trench locations, excavated and fill areas and adjacent transition areas so that finished surfaces are at the proposed grade or are approximately at preexisting grades, adjusted as required to provide positive drainage.

3.9 MAINTENANCE

- A. Protection of Graded Areas: Protect newly graded areas from traffic and erosion. Keep free of trash and debris.
- B. Repair and reestablish grades in settled, eroded, and rutted areas to specified tolerances.
- C. Reconditioning Compacted Areas: Where completed compacted areas are disturbed by subsequent construction operations or adverse weather, scarify surface, reshape, and compact to required density and moisture range prior to further construction.
- D. Settling: Where settling is measurable or observable at excavated areas during general project warranty period, remove surface (pavement, lawn, or other finish), add backfill material, compact, and replace surface treatment. Restore appearance, quality, and condition of surface or finish to match adjacent work, and eliminate evidence of restoration to greatest extent possible.

3.10 DISPOSAL OF EXCESS SOIL AND WASTE MATERIALS

- A. Dispose of excess soil and waste materials to designated areas on-site as directed by the OWNER.

3.11 FINISHING WORK

- A. The CONTRACTOR shall maintain all final surfaces to be free of ruts, depressions, and damage resulting from the hauling and handling of any material, equipment, tools, etc.
- B. All drainage structures shall be constructed and maintained as necessary along the completed section.
- C. Unless otherwise specified by the ENGINEER, the elevation of all constructed grades, structures, and pipes shall be in accordance with Specification Section 01050, Surveying, Part 1.2.A.

However, the thicknesses of all liner/leachate system components (e.g., compacted clay layer and protective layer) are minimum values.

- D. After berms, ditches, swales, shoulders, and embankments are completed, the disturbed areas shall be finish graded. Any lumber, undesirable materials, and rocks larger than the 3 inches in size shall be removed from the surface immediately and the surface shall be prepared for final landscaping.
- E. Paved and grass areas disturbed by the operations under this section shall be restored as indicated on the PLANS and/or specified in the Specifications.

**TABLE 1-02225
PRECONSTRUCTION EARTH MATERIALS TESTING**

Granular Materials (Bedding for Pipe, Gravel Roads)			
Test	Method	Minimum Frequency	Comment
Sulfate Soundness	ASTM C88	1 per source	Provided by supplier
Percent Finer than No. 200 Sieve	ASTM C117	1 per source	Provided by supplier
LA Abrasion	ASTM C131/C535	1 per source	Provided by supplier
Sieve Analysis	ASTM C136	1 per source	Provided by supplier
Fine-Grained Soils (General Fill, Controlled Fill, Trench Backfill)			
Test	Method	Minimum Frequency	Comment
Water Content	ASTM D2216	1/5000 yd ³ /soil type	ENGINEER may reduce frequency if results are consistent and a single source used
Particle Size Analysis	ASTM D422	1/5000 yd ³ /soil type	ENGINEER may reduce frequency if results are consistent and a single source used
Standard Proctor Compaction	ASTM D698	1/5000 yd ³ /soil type	ENGINEER may request additional tests if inconsistencies in field testing (noted in Table 2 below) are observed
Percent Finer than No. 200 Sieve	ASTM D1140	1/5000 yd ³ /soil type	May be eliminated if same information provided by ASTM D422
Atterberg Limits	ASTM D4318	1/5000 yd ³ /soil type	ENGINEER may reduce frequency if results are consistent and a single source used

Note: If similar soils are used for various material/layer types, then preconstruction soil test results may be combined for multiple material/layer types.

**TABLE 2-02225
EARTH MATERIALS CQC TESTING**

Granular Materials (Bedding for Pipe, Gravel Roads)			
Test	Method	Minimum Frequency	Comment
Percent Finer Than No. 200 Sieve	ASTM C117	1/1000 yd ³ or 1 per 1000 linear feet of trench/road	Temporary access roads are excluded
Sieve Analysis	ASTM C136	1/1000 yd ³ or 1 per 1000 linear feet of trench/road	Temporary access roads are excluded
Fine-Grained Soils (General Fill, Controlled Fill, Trench Backfill)			
Nuclear Density Test	ASTM D2922	5 tests/acre/lift or 1 per 500 linear feet of trench	Requirements are reduced to 1 test per acre for General Fill
Water Content (Nuclear Method)	ASTM D3017	5 tests/acre/lift or 1 per 500 linear feet of trench	

END OF SECTION