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Purchasing Division
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Email
September 29, 2017

TO: All Interested Bidders

SUBJECT: Invitation for Bid (IFB) #17-1641DC
Phase III Gas Collection Expansion Lena Road Landfill
ADDENDUM 3

Bidders are hereby notified that this Addendum shall be acknowledged and made a part of the above-named bidding and contract documents.

The following items are issued to add to, modify, and/or clarify the bid and contract documents. These items shall have the same force and effect as the original bidding and contract documents, and cost involved shall be included in the bid prices. Bids to be submitted on the specified bid date, shall conform to the additions and revisions listed herein.

1. Attachments: Supplemental Specification Section 99999 revised sections: Section 01010 Summary of Work, Part 1. 07; Section 02221 Trenching; Section 03511, and Section 33217 LFG , Part 2.08. Drawings revised: Drawing No.4; Drawing No.5; and Drawing No.7.

**The following questions have been presented by potential bidders:**

2. QUESTION: Detail 2 on Drawing No. 8 calls for the 6" SDR11 well casing to be perforated with round holes. However, the Well Schedule on Drawing No. 7 calls out "slotted" pipe. Please clarify. If it is to be slotted, please provide a slot detail.

   **RESPONSE: Detail 2 on Drawing 8 is correct and the perforations shall be round holes. Revised Drawing No. 7 is attached.**

3. QUESTION: Specification Section 02485 Seeding and Sodding states that all disturbed or trenched slope areas will be sodded and the flat areas are to be seeded. This specification does not specify any seed or sod type, fertilizers, watering, etc. Are there any particular seed and sod specifications, or are we to provide anything that will grow? Are we only to water once following installation?

   **RESPONSE: Reference Specification Section 02485 Seeding and Sodding (page 87 of the Infrastructure Engineering Standard Specification. The sod and seed type is Bahia. All disturbed or trenched slope areas will be sodded and the flat areas are to be seeded.**

PRISCILLA TRACE * CHARLES B. SMITH * STEPHEN JONSSON * ROBIN DiSABATINO * VANESSA BAUGH * CAROL WHITMORE * BETSY BENAC
District 1 District 2 District 3 District 4 District 5 District 6 District 7

4. QUESTION: Specification Section 33511 Pipes, Valves, and Pipe Fittings, Part 2.03A specifies "ductile iron backup rings" with a finish of blue primer, hot dipped galvanized, and epoxy coated. However, we are unable to get backup rings with all three finishes. Please clarify which of the three finishes are to be applied to the ductile iron backup rings.

   **RESPONSE: The attached Specification 33511 is revised to read "or" (in lieu of "and"). Any one of the three finishes is acceptable.**

5. QUESTION: Will it be acceptable to utilize granite for the extraction well gravel screen, or must the material be rounded river gravel?

   **RESPONSE: The material shall be Non-Calcareous Stone as described in Supplemental Specification Section 99999 Section 02221 Trenching, Bedding and Backfill for Pipe, Part 2.02. Granite of the appropriate size and grade is acceptable.**

6. QUESTION: During the site inspection, it was mentioned that working hours are Monday through Friday with special permission needed on Saturday. The contract documents state that the hours are Monday through Saturday with special permission needed for Sunday. Please clarify.

   **RESPONSE: Work hours are Monday through Friday, 7:00 AM to 5:00 PM, with special permission for work on Saturdays – 8:00 AM to 5:00 PM – and some Holidays. Revised Supplemental Specification Section 99999, Section 01010 Summary of Work, Part 1.07 (B) is attached.**

7. QUESTION: When going across the top deck in order to maintain 5% grade would require trenching depths between 13-19 feet. Is 5% grade mandatory and if so, where should the cost of the extra depth be applied or is it possible to add line items to the bid sheet for the extra depth?

   **RESPONSE: Bidder shall prepare their bid in accordance with the Invitation for Bid; there will be no Items added to the Bid Form. Costs for all excavations should be included in the per foot price for the pipe that will be graded and buried.**

8. QUESTION: During the site inspection, it was noticed that the site has a considerable amount of soil materials. Is it possible for these materials to be utilized for the backfill required when trenching?

   **RESPONSE: No, soil will not be available from onsite sources. The contractor shall provide all bedding and soil backfill material excavated and stockpiled onsite.**

9. QUESTION: During the site inspection, it was noticed that there are water filling stations. Would these stations be usable by the contractors for water requirements?

   **RESPONSE: Yes. The contractor will have access and use of the water filling stations.**

10. QUESTION: For all tie-ins, is the existing pipe depth information available?

    **RESPONSE: The exact depth of the tie-in is not available; however, it is anticipated that no tie-in will be greater than 5 feet in depth.**

11. QUESTION: Drawing 11 shows the entire trench uses clean soil for backfill but there are numerous mentions of bedding in the contract documents. Can you please clarify the backfill/bedding and compaction requirements needed at the site?

    **RESPONSE: The bedding material and the clean soil backfill can be the same material as defined in Supplemental Specification Section 99999, Section 02221 Trenching, Bedding and Backfill for Pipe, Parts 2.01 and 2.03. Bedding shall be placed in the trenches prior to the pipe as shown in the drawings and then backfill material placed over the pipe and compacted in accordance with Supplemental Specification Section 99999, Section 02221 Trenching, Bedding and Backfill for Pipe, Part 3.07.**

12. QUESTION: Can tracked equipment (e.g., Cat 320 Excavator) be used for compaction requirements?

    **RESPONSE: Compaction shall be performed in accordance with Supplemental Specification Section 99999 Section 02221 Trenching, Bedding and Backfill for Pipe, Part 3.07. Note: Part 3.07G allows for the use of an excavator bucket for compaction.**

13. QUESTION: For the wellhead replacements, are all existing wells 6" HDPE? Are all well risers 8" HDPE with 8"x6" reducers? How should the old wellheads be handled?

    **RESPONSE: Existing wellheads and vacuum risers are as shown in Detail 1 on Drawing 12 with existing wells 6-inch diameter HDPE and existing vacuum Risers 8-inch HDPE with 8-inch by 6-inch reducers. Old wellheads shall be stored in the contractor staging area and County will provide disposition from that location.**

14. QUESTION: Can site plans showing contours of the top deck be provided?

    **RESPONSE: The contours on the plans shall be used for bidding of the project. Contours have been made darker to increase visibility. Revised Plan Sheets 4 and 5 attached.**

15. QUESTION: The Information conference was held on Friday the 25th, unfortunately we were unable to make the trip in time. Are there any meeting notes or addendums we might have missed?

    **RESPONSE: All additional information is provided via addendum. It is a prerequisite for award for bidders to visit the project site. Contact Bryon White, 941-792-8811 extension 8008 for schedule availability.**

16. QUESTION: The specs reference a geotextile in the measurement/payment section for bid item 3A – 36" bore/Well Casing. The plans and details do not show any mention of it. Is a geotextile wrap required in this item or anywhere else on this project? If so, please provide a detail and location?

    **RESPONSE: The Geotextile in measurement and payment section 3A refers to the geocomposite ring shown in Detail 1 on Drawing 7 between the stone and the clean fill when completing the extraction well. We have updated the Supplemental Specifications 99999 Section 33217 LFG Extraction Wells and Wellheads to Add Part 2.08 for Geocomposite "Donut" as well to ensure all bidders are bidding the same products. There is no other geotextile material on the project.**

Bids will be received at Manatee County Procurement, 1112 Manatee Avenue West, Suite 803, Bradenton, Florida 34205 until **October 4, 2017 at 3:00 P.M.**

Sincerely,

Chris Daley, CPPB, CPPO
Buyer Manager

/dcr

## SECTION 99999 – SUPPLEMENTAL SPECIFICATIONS

Revised September 28, 2017

The following document contains supplemental specifications for the 2016 Phase III GCCS Expansion at Lena Road Landfill. This document is prepared for Manatee County on behalf of SCS Engineers.

**SECTION 01005 – GENERAL REQUIREMENTS**

Remove from **Part 1.03 D** – Installation of Equipment

**SECTION 01010 – SUMMARY OF WORK**

**Remove** from **Part 1.05** – County Occupancy and **Part 1.06** – Partial County Occupancy.

**Add:**

## 1.07 CONTRACTOR USE OF PREMISES

A. Limit use of premises for work, storage, and access to allow work by other contractors, owner occupancy, and normal landfill operations.

B. Work Days: Allowable work times shall be Monday through ~~Saturday~~ Friday from 7:00 a.m. to 5:00 p.m., except some Legal holidays. Lena Road Landfill accepts waste from 8:00 a.m. to 5:00 p.m. Monday through Saturday. CONTRACTOR shall request in writing to the PROJECT MANAGER ~~48~~ 72 hours notice prior to ~~Sunday~~ Saturday, Sunday, or Legal holiday work, and work shall be limited to 8 hours maximum on such days, if approved by the COUNTY.

C. Access: No later than 5 days after notice to proceed, the CONTRACTOR shall arrange with the COUNTY a sequence of procedures, means of access, space for storage of materials and equipment, and use of approaches and roadways. CONTRACTOR's use of the premises shall be confined to the areas approved by the COUNTY.

D. Smoking: Smoking is prohibited at the Lena Road Landfill

E. CONTRACTOR shall not dispose any refuse on site without approval of the COUNTY and in accordance with Section 02 41 16, Refuse Handling, Storage, and Disposal.

## 1.08 COUNTY OCCUPANCY AND LANDFILL OPERATIONS

The CONTRACTOR shall cooperate with the COUNTY during construction operations to minimize conflicts with COUNTY work and facilitate COUNTY usage. The CONTRACTOR shall perform the WORK so as not to interfere with the COUNTY's operations, maintenance, environmental monitoring, and other COUNTY activities at the site.

## 1.09 SITE CONDITIONS

A. Existing Grades: The existing grades may vary from those indicated on the Plans due to landfill settlement.

B. Existing Features: The Contract Documents require the CONTRACTOR to field verify the location of existing features, see Section 01 50 00, Site Conditions Surveys. Existing features include but may not be limited to the following: stormwater drainage structures and underground pipes, stormwater terraces and swales, leachate collection system manholes and underground piping, roads,

downslope drainage culverts, underground laterals and header pipe, and extraction wells.

C. The CONTRACTOR shall enforce safety procedures to minimize hazards to workers, the public, and the environment.

## 1.10 ERRORS AND/OR OMISSIONS IN PLANS AND SPECIFICATIONS

The intent of the Specifications is to outline or indicate the items of work, or both, which cannot be readily shown on the Drawings and, further to indicate the types and qualities of materials. Drawings and specifications shall be considered as being complimentary and items or work mentioned or indicated in one and not in the other shall be included as if mentioned in both. Should Drawings disagree in themselves or with the Specifications the better quality or greater quantity of work or materials shall be estimated upon, and shall be provided.

**END OF SECTION**

## SECTION 01050 – FIELD ENGINEERING AND SURVEYING

**Add:**

### 1.01 SECTION INCLUDES

A. Field engineering and surveying services provided by the CONTRACTOR: The CONTRACTOR shall perform, or obtain other professional subcontractors, to complete topographic surveys that meet the minimum standards of Chapter 61-G17 of the Florida Administrative Code, to document elevations, grades, locations, and perform related field engineering as specified in the Contract Documents.

### 1.06 RECORD DRAWINGS (AS-BUILT DRAWINGS)

B. Submitted record documents shall include the following:

1 At various stages of the project, submit a site survey. The record drawing information shall be submitted on 24 inch by 36 inch sheets, as well as AutoCAD, Inc. (Version 2010 or higher) drawing files electronically.

2 AutoCAD drawing file requirements: Contour lines shall be continuous, unbroken polylines with a width of zero and an elevation (z-coordinate) assigned according to the elevation of the contour line. All spot elevations shall have horizontal controls with vertical z coordinates. Drawing files shall be saved and formatted into AutoCAD Version 2010 or higher files. The scale of the files shall be equal to a ratio of 1:1.

3 All survey information submitted shall be on the Local Coordinate System based upon the local monuments.

4 All submitted record drawings shall have survey control monuments shown on the Drawings for the purposes of orientation, both horizontally and vertically.

5 Contours shall be at 1 foot intervals, with index contours at every fifth interval.

6 A scale of the record document shall be equal to 1 inch equals 40 feet.

7 The scale of the north arrow shall be equal to 1 inch equals 40 feet.

8 If multiple sheets are required, each sheet shall include match lines.

### 1.07 SUBMITTALS

A. The CONTRACTOR shall submit name and address of surveyor to the ENGINEER.

B. Upon request of the ENGINEER, the CONTRACTOR shall submit documentation signed by a professional land surveyor, licensed in the State of Florida, certifying that elevations and locations of improvements are in conformance with the Contract Documents, or if not in conformance, certify as to variances from the Contract Documents.

C. RECORD DRAWINGS – The CONTRACTOR shall provide and submit to the ENGINEER, for approval, signed and sealed, record drawing surveys for all WORK (to include any areas outside of limits of construction disturbed by CONTRACTOR) as follows:

1 Prior to performing any earthwork, a pre-construction survey of the WORK within and 25 feet beyond the limits of construction as defined in the Contract Documents.

2 A topographic excavation survey. The survey shall represent the limits, horizontally and vertically, of the maximum vertical extent of excavation.

3 A location map of all piping and buried utility lines.

D. All Partial Field Surveys to include xerox copies of the field surveyor's log which have been signed and dated by the surveyor performing the survey.

## 3 EXECUTION

### 3.01 CONTRACTORS RESPONSIBILITIES

A. The CONTRACTOR shall retain the services of a registered land surveyor licensed in the State of Florida to identify existing control points and maintain survey control during construction.

B. The CONTRACTOR shall identify survey reference points.

C. The CONTRACTOR shall provide civil, structural or other professional engineering services specified or required to execute the CONTRACTOR'S construction methods.

D. The CONTRACTOR shall be responsible for the preservation of all benchmarks, stakes, and marks. If any benchmarks, stakes, or marks are disturbed by the CONTRACTOR, the CONTRACTOR shall not proceed with any WORK until he has established such points, marks, lines and elevations as may be necessary for the prosecution of the WORK.

1 The accuracy of any method of staking shall be the responsibility of the CONTRACTOR. All engineering for vertical and horizontal control shall be the responsibility of the CONTRACTOR.

E. The surveyors shall maintain a complete, accurate log of all control and survey WORK as it progresses. This log shall be available for periodic review by the ENGINEER.

F. Grade elevations and locations will be required at certain phases (or stages) of construction.

G. All surveys shall be topographic surveys that meet the minimum standards of Chapter 61-G17 of the Florida Administrative Code. Surveys shall include (but are

not limited to) grading, extent of liner system, structure locations and elevations (of slabs), pipe inverts, piping, and other permanent structures.

H. The elevation and grades shall be within an accuracy of 0.2 feet vertical and 0.5 feet horizontal as shown in the contract documents. Unless otherwise stated, all survey drawings shall be at a scale of 1"=40', with contours at one foot intervals.

I. The topographic information collected shall be taken on a 50 foot by 50-foot grid, at a minimum, and as necessary (i.e., spot elevations, grade breaks, ditches, mounds, etc.) so as to provide an accurate representation of the contour topography. For ditches and stormwater collection trenches, spot elevations shall be taken, at a minimum, every 50 linear feet, to include, at a minimum, the centerline of the ditch, the toe and top of ditch slopes, and any grade breaks.

**END OF SECTION**

**SECTION 01200 – PROJECT MEETINGS**

**Add:**

### 1.03 PROGRESS MEETINGS

During the course of the Contract, progress meetings will be organized and conducted by the PROJECT MANAGER and/or ENGINEER to discuss the progress of the Work weekly. Depending on the project progress and schedule, the COUNTY reserves the right to request meetings every other week instead of weekly. The CONTRACTOR and Project Superintendent shall attend these meetings.

The suggested agenda for these meetings:

A. Review summary of previous meeting

B. Work progress

1. Since last meeting
2. Expected progress during next work period

C. Field observations, problems, conflicts

D. Construction schedule

1. Problems which impede the construction schedule
2. Revisions to schedule
3. Critical/long-lead items
4. Off-site fabrication and delivery schedules

E. Coordination of work items with County activities

F. Shop drawing submittals

1. Status of reviews
2. Submittal requirements
3. Remaining submittals

G. Record documents

1. Well logs, pipe installation records
2. Photographs
3. Red-line mark-ups

4. Survey Notes

H. Maintenance of quality standards

I. Pending changes and substitutions

1. Effect on construction schedule and on completion date

2. Effect on other Contracts of the project

J. Other Business

**END OF SECTION**

**Add:**

**SECTION 01400 – QUALITY CONTROL**

## PART 1 - GENERAL

### 1.01 SITE INVESTIGATION AND CONTROL

A. CONTRACTOR shall verify all dimensions in the field and check field conditions continuously during construction. CONTRACTOR shall be solely responsible for any inaccuracies built into the WORK due to CONTRACTOR's failure to comply with this requirement.

B. CONTRACTOR shall inspect related and appurtenant WORK and report in writing to PROJECT MANAGER any conditions which will prevent proper completion of the WORK. Failure to report any such conditions shall constitute acceptance of all site conditions, and any required removal, repair, or replacement caused by unsuitable conditions shall be performed by the CONTRACTOR at CONTRACTOR's sole cost and expense.

### 1.02 INSPECTION OF THE WORK

A. All work performed by the CONTRACTOR shall be inspected by the CONTRACTOR and PROJECT MANAGER and nonconforming WORK shall be noted and promptly corrected. The CONTRACTOR is responsible for the WORK conforming to the Contract Documents.

B. The WORK shall be conducted under the general observation of the PROJECT MANAGER and is subject to inspection by representatives of the COUNTY acting on behalf of the COUNTY to ensure compliance with the requirements of the Contract Documents. Such inspection may include mill, plant, shop, or field inspection, as required. The PROJECT MANAGER or any inspector(s) shall be permitted access to all parts of the WORK, including plants where materials or equipment are manufactured or fabricated.

C. The presence of the PROJECT MANAGER or any inspector(s), however, shall not relieve the CONTRACTOR of the responsibility for the proper execution of the WORK in accordance with all requirements of the Contract Documents. Compliance is a duty of the CONTRACTOR, and said duty shall not be avoided by any act or omission on the part of the PROJECT MANAGER or any inspector(s). Inspection of WORK later determined to be nonconforming shall not be cause or excuse for acceptance of the nonconforming WORK. The acceptance of nonconforming WORK shall be approved by the COUNTY when adequate compensation is offered and it is in the COUNTY's best interest.

D. All materials and articles furnished by the CONTRACTOR shall be subject to inspection, and no materials or articles shall be used in the WORK until they have been inspected and accepted by the PROJECT MANAGER or other designated representative. No WORK shall be backfilled, buried, cast in concrete, hidden, or otherwise covered until it has been inspected. Any WORK so covered in the absence of inspection shall be subject to uncovering at the

CONTRACTOR's expense. Where uninspected WORK cannot be uncovered, such as in concrete cast over reinforcing steel, all such WORK shall be subject to demolition, removal, and reconstruction under proper inspection, and no additional payment will be allowed.

## 1.03 TIME OF INSPECTION AND TESTS

A. Any samples and test specimens required under these Specifications shall be furnished and prepared for testing in ample time for the completion of the necessary tests and analyses before said articles or materials are to be used. CONTRACTOR shall furnish and prepare all required test specimens at CONTRACTOR's own expense. Whenever the CONTRACTOR is ready to backfill, bury, cast in concrete, hide, or otherwise cover any WORK under this Contract, the PROJECT MANAGER shall be notified not less than 24 hours in advance to request inspection before beginning any such WORK of covering. Failure of the CONTRACTOR to notify the PROJECT MANAGER at least 24 hours in advance of any such inspections shall be reasonable cause for the PROJECT MANAGER to order a sufficient delay in the CONTRACTOR's schedule to allow time for such inspection, any remedial, or corrective work required, and all costs of such delays, including its impact on other portions of the WORK, shall be borne by the CONTRACTOR.

## 1.04 SAMPLING AND TESTING

A. When not otherwise specified, all sampling and testing shall be in accordance with the methods prescribed in the current standards of the ASTM, as applicable to the class and nature of the article or materials considered. However, the COUNTY reserves the right to use any generally-accepted system of inspection which, in the opinion of the ENGINEER, will ensure the COUNTY that the quality of the workmanship is in full accord with the Contract Documents.

B. Any waiver of any specific testing or other quality assurance measures, whether or not such waiver is accompanied by a guarantee of substantial performance as a relief from the specified testing or other quality assurance requirements as originally specified, and whether or not such guarantee is accompanied by a performance bond to assure execution of any necessary corrective or remedial work, shall not be construed as a waiver of any technical or qualitative requirements of the Contract Documents.

C. Notwithstanding the existence of such waiver, the ENGINEER shall reserve the right to make independent investigations and tests as specified in the following paragraph and, upon failure of any portion of the WORK to meet any of the qualitative requirements of the Contract Documents, shall be reasonable cause for the ENGINEER to require the removal or correction and reconstruction of any such WORK.

D. In addition to any other inspection or quality assurance provisions that may be specified, the ENGINEER shall have the right to independently select, test, and analyze, at the expense of the COUNTY (only with prior approval by the COUNTY), additional test specimens of any or all of the materials to be used. Results of such tests and analyses shall be considered along with the tests or

analyses made by the CONTRACTOR to determine compliance with the applicable specifications for the materials so tested or analyzed provided that wherever any portion of the WORK is discovered, as a result of such independent testing or investigation by the ENGINEER, which fails to meet the requirements of the Contract Documents, all costs of such independent inspection and investigation and all costs of removal, correction, reconstruction, or repair of any such WORK shall be borne by the CONTRACTOR.

## 1.05 RIGHT OF REJECTION

A. The PROJECT MANAGER or designated representative, acting for the COUNTY, shall have the right at all times and places to reject any articles or materials to be furnished hereunder which, in any respect fail to meet the requirements of the Contract Documents, regardless of whether the defects in such articles or materials are detected at the point of manufacture or after completion of the WORK at the site. If the PROJECT MANAGER or designated representative, through an oversight or otherwise, has accepted materials or WORK which is defective or which is contrary to the Contract Documents, such material, no matter in what stage or condition of manufacture, delivery, or erection, may be rejected.

B. CONTRACTOR shall promptly remove or replace rejected articles or materials from the site of the WORK after notification of rejection.

C. All costs of removal and replacement of rejected articles or materials, as specified herein, shall be borne by the CONTRACTOR.

D. Failure to promptly remove and replace rejected work shall be considered a breech of this specification and the COUNTY may after 7 days notice, terminate the CONTRACTOR'S right to proceed with the affected work and remove and replace the WORK and issue a backcharge to cover the cost of the WORK.

## PART 2 - PRODUCTS (Not Used)

## PART 3 - EXECUTION (Not Used)

**END OF SECTION**

**Add:**

**SECTION 01500 – SITE CONDITION SURVEY**

## PART 1 - GENERAL

### 1.01 SUMMARY

A. The CONTRACTOR shall perform, or obtain other professional subcontractors to complete surveys that meet the minimum standards of Chapter 61-G17 of the Florida Administrative Code, to document elevations, grades, locations, maintain survey control during construction, and perform related field engineering as specified in the Contract Documents.

B. The CONTRACTOR shall provide civil, structural or other professional engineering services specified or required to execute the CONTRACTOR'S construction methods.

### 1.02 SURVEY REFERENCE POINTS

A. The CONTRACTOR shall locate reference points prior to starting WORK, and shall protect and preserve all permanent reference points during construction. The control elevations and coordinates for the reference points to be used by CONTRACTOR are shown on the drawings.

1. CONTRACTOR shall make no changes or relocate any reference point without prior written notice to the ENGINEER.

2. CONTRACTOR shall report to the ENGINEER when any reference point is lost or destroyed, or requires relocation because of necessary changes in grades or locations.

3. CONTRACTOR, at no additional cost to the COUNTY, shall replace and resurvey reference points that have been lost or destroyed. The replaced reference point shall be surveyed by a registered, professional land surveyor. Replacement will be based on original survey control.

B. Prior to any work It is the CONTRACTOR'S responsibility to verify the reference points and the CONTRACTOR shall immediately notify the ENGINEER and PROJECT MANAGER of any discrepancies with the reference points from the coordinates and elevations provided.

### 1.03 RECORD DRAWINGS

A. All survey record documents, submitted to the ENGINEER for approval, shall be signed and sealed by a Florida Licensed Land Surveyor.

B. Submitted survey record documents shall include the following:

1. The Record Drawing information shall be submitted in AutoCAD drawing files in electronic format.

2. AutoCAD drawing file requirements: Contour lines shall be continuous, unbroken polylines with a width of zero and an elevation (z-coordinate) assigned according to the elevation of the contour line. All spot elevations shall have horizontal controls with vertical z-coordinates. Contours shall be at 1-foot intervals, with index contours at every fifth interval. Objects in the drawing shall be drawn to scale.

3. All survey information submitted shall be on the State Plane Coordinate System based on the monuments provided by the COUNTY.

4. All submitted Record Drawings shall have the COUNTY-provided monuments shown on the drawings for the purposes of orientation, both horizontally and vertically.

5. If multiple sheets are required, each sheet shall include match lines.

### 1.04 SUBMITTALS

A. The CONTRACTOR shall submit the name and address of the surveyor to the ENGINEER at least one week prior to the pre-construction survey.

B. Upon request of the ENGINEER, the CONTRACTOR shall submit documentation signed by a Florida Licensed Land Surveyor, certifying that elevations and locations of improvements are in conformance with the Contract Documents, or if not in conformance, certifying variances from the Contract Documents.

C. All Partial Field Surveys are to include photocopies of the field surveyor's log that has been signed and dated by the surveyor performing the survey.

## PART 2 – PRODUCTS (Not Used)

## PART 3 - EXECUTION

### 3.01 SURVEYING

A. The CONTRACTOR shall be responsible for the preservation of all benchmarks, stakes, and marks. If any benchmarks, stakes, or marks are disturbed by the CONTRACTOR, the CONTRACTOR shall not proceed with any WORK until he has established such points, marks, lines and elevations as may be necessary for the prosecution of the WORK.

The accuracy of any method of staking shall be the responsibility of the CONTRACTOR. All engineering for vertical and horizontal control shall be the responsibility of the CONTRACTOR.

B. All surveys shall meet the minimum standards of Chapter 61-G17 of the Florida Administrative Code. Surveys shall include (but are not limited to) grading, structure locations and pavement elevations, pipe inverts, piping, and other permanent structures.

C. The topographic information collected shall be taken one point directly above the previous, as necessary to provide an accurate representation of the contour topography (i.e., spot elevations, grade breaks, ditches, mounds, etc.).

## 3.02 RECORD KEEPING/AS-BUILTS

A. The surveyor shall maintain a complete, accurate log of all control and survey WORK as it progresses. This log shall be available for periodic review by the ENGINEER.

B. Grade elevations and locations will be required at certain phases (or stages) of construction. The CONTRACTOR'S Florida Licensed Land Surveyor will provide and maintain as-built notes and a finished as-built drawing at the completion of each phase as listed in Paragraph 1.03 of this Section. Each phase must be accepted by the ENGINEER in writing before the start of the next phase. Record Drawings reflecting elevations and location information shall be submitted to the ENGINEER.

## 3.03 TOLERANCES

A. General elevations and grade shall have a tolerance of 0.1 feet vertical and 0.01 feet horizontal with the following exceptions:

1. A stated specific elevation shall be constructed to that exact elevation.

2. If a minimum thickness of material is required then that thickness shall be met and not subject to a tolerance.

## 3.04 PARTIAL SURVEYS

A. Should sequence of construction selected by the CONTRACTOR or the COUNTY be such that the WORK is to be completed in phases (or stages) then, copies of the surveyor's official field notes for each phase (or stage) shall be submitted to the ENGINEER for approval. The field notes shall be signed and dated by the surveyor performing the survey. The field notes shall include the design elevation, the as-built information, and the differences in elevation. Upon completion of each layer (i.e. all surveys as outlined in Part 1.03), a complete record drawing, reflecting the submitted field note information and meeting the requirements outlined for Record Drawings in this Section, shall be submitted to the ENGINEER for approval.

**END OF SECTION**

**SECTION 01580 – PROJECT IDENTIFICATION AND SIGNS**

Remove from **Part 1.02 A** – Project Identification Sign (County)

"Two painted signs, of not less than 32 square feet…"

Add to **Part 1.02 A** – Project Identification Sign (County)

"One painted sign, of not less than 32 square feet…"

Remove **Part 1.05** – Public Notification

**SECTION 01710 – CLEANING**

Remove **Part 3.01 C**, and replace with “Waste from construction activities should be disposed of at the working face, per direction from the County.”

**SECTION 01720 – PROJECT RECORD DOCUMENTS**

**Add:**

## 2.06 CONSTRUCTION PHOTOGRAPHS

A. Progress Photos: The CONTRACTOR shall provide a photographic record of construction progress every other week to the COUNTY. For each submittal, at a minimum, the photographic record shall consist of one set of at least12 color photographs in electronic file form. The ENGINEER and PROJECT MANAGER shall reserve the right to select the views to be photographed. The photographs shall be of good quality as determined by the ENGINEER and PROJECT MANAGER, and camera date stamped. Each photograph shall have the following items identified in a caption:

- County project name and number
- Date photograph was taken
- Detailed description identifying location and name of feature photographed
- Name of Contractor

B. Photographs shall be taken weekly or during execution of individual WORK items, whichever is more frequent, beginning prior to the start of construction and continuing through the completion of all construction.

C. Photographs shall be taken to document each major WORK item, including:

1. Pre-construction conditions.

2. Mobilization and storage of materials. Materials photographed shall include the rock, pipe (perforated and solid-wall), and fittings to be used in the WORK.

3. Installation of the gas lateral piping, including pipe fusion.

4. Connection of gas lateral piping to header.

5. Tie-ins of laterals to the header to the existing header systems.

6. Backfilling of installed pipe, including placement of warning tape and compaction.

7. Road crossings, ditch crossings, and stormwater swale crossings.

8. Installation of isolation valves.

9. Pressure testing.

10. Site cleaning and demobilization.

## 2.07 RECORD DOCUMENTS

A. Label each document “RECORD DOCUMENTS” in large printed letters.

B. Maintain Blueline set of Drawings and specifications legibly annotated to show all changes made during construction.

1. Graphically depict changes by modifying or adding to plans, details, sections, elevations, or schedules.

2. Make changes on each sheet affected by changes.

C. Record information concurrently with construction progress.

D. Record Drawings shall include the following:

1. Title Sheet (includes COUNTY project name and number, site location map, site address and phone number, and names, addresses and phone numbers of design engineer and CONTRACTOR).

2. Lateral Layout (as-built and drawn using surveyed horizontal and vertical coordinates) shown with most recent site topography. Site plan layout shall include existing and new features, identification of pipe locations and sizes, and callouts of all surveyed points (wellhead locations, pipe tie-ins, fittings, appurtenances, road crossings, changes in pipe direction and slope, etc.). The header layout site plan shall be at a scale providing appropriate clarity to the drawing as approved by the ENGINEER.

3. Record Construction Pipe Route Survey Table showing coordinates and elevations of surveyed top of pipe, fittings, tie-ins and appurtenances, length of pipe segments, pipe slope between each surveyed station, and ground surface elevation. Each pipe segment shall be given a unique description as approved in advance by the ENGINEER. Pipe Route Survey data shall be provided in a tabular format, which shall be approved by the ENGINEER. An example format is provided below.

| STATION | GRID COORDINATES (north) | (east) | Surveyed Top of Pipe (ft) | Ground Elev. (ft) | Header Depth (ft) | Header Slope | Const. Notes and Fittings | Pipe Info. |
|---|---|---|---|---|---|---|---|---|
| Line F-F 0+00 | 5078.45 | 22997.65 | 1235.58 | 1239.66 | 3.8 | -2.13% | Sta 0+02 Line E-E' 12"x4" Branch Saddle | 31 ft of 4" Dia HDPE at 2.13% |
| 0+04 | 50704.56 | 22997.42 | 1235.74 | 1240.40 | 4.47 | | Begin 8" CMP Road Casing | |
| 0+26 | 50694.44 | 22977.80 | 1235.28 | 1239.09 | 3.8 | | End 8" CMP Road Casing | |
| 0+31 | 50712.65 | 22981.02 | 1235.17 | 123.54 | 3.4 | | Sta 1+28 C-C' 4" Tee and Riser | |
| Lateral to EW-A | | | | | | | | |
| 0+00 | 50601.26 | 23272.90 | 1274.62 | 1278.90 | 4.3 | 2.00% | Sta 2+00 Line A-A' 6"x4" Branch Saddle | 5 ft of 4" Dia HDPE at 2.00% |
| 0+05 | 50606.27 | 23271.25 | 1274.72 | 1278.66 | 3.9 | | Well EW-A | |
| Lateral to EW-B | | | | | | | | |
| 0+00 | 50591.22 | 23078.87 | 1264.31 | 1268.29 | 4.0 | 2.00% | Sta 4+00 Line A-A' 6"x4" Branch Saddle | 5 ft of 4" Dia HDPE at 2.00% |
| 0+05 | 50595.82 | 23081.00 | 1264.41 | 1268.86 | 4.5 | | Well EW-B | |

4. As-Built Typical Details.

5. Pipe profiles of all header and lateral pipes. Profiles shall include pipe diameter, slope, grade breaks, section view of ground surface along pipe segment, location and description of existing utilities encountered, pipe crossings and vertical and horizontal scale bar.

E. Project Documentation Manual:

1. Each copy of the Project Manual shall be bound, consist of clean legible copies or originals, and at the minimum consist of the following information:

    a. Cover Sheet

    b. Table of Contents

    c. List of Addenda

    d. Project Contact List - includes the names, phone numbers and address of the following:

        Project Manager
        Site Representative
        Pipe Contractor
        Surveyor
        Record Documenter

    e. Project Vendor List including list of materials provided by each vendor, and address, phone, fax number of each vendor.

    f. Project Record Drawing Summary

    g. Route Survey Data Table - referencing pipeline station with appropriate grid coordinates, ground surface elevation, depth of cover soil, top of pipe elevation at a minimum of every 50 feet, slope at all major line, angle and grade change points, valves, tees, and other appurtenances, and connection locations.

    h. Pressure Test Reports

    i. Contractor's Daily Work Logs

    j. Construction Meeting Notes/Status Reports

Project Document appendices shall include:

    k. HDPE pipe specifications
        - Pipe Installation Manual
        - Engineering Characteristics Manual
        - Pipe Material Data Sheet
        - Fabricated fittings specification sheets

    l. Perforated pipe details

    m. Valve specifications
        - Ball valves
        - Monitoring ports

n. Flexible hose and clamp specifications and manufacture's literature

o. Wellhead installation and operations manual

p. Photographs

F. General File Requirements:

1. Drawings shall be generated using AutoCAD Release 2010 or later software. The Record Drawings shall be drawn to include the following:

   a. 3-dimensional, 1:1 format.
   b. Existing survey reference points.
   c. Breaklines that define all surface features.
   d. Contours and spot elevations must be at correct elevation.

2. Electronic copies of the Contract Documents drawings will only be available to the CONTRACTOR in AutoCAD Release 2010 or later format. Neither the COUNTY nor ENGINEER shall be responsible for conversion of files to other file formats.

3. Record Document electronic files shall be supplied along with each set of Record Documents.

4. Label each file with COUNTY project name and number, CONTRACTOR's name, address and phone number, date of submittal, and file reference names.

**END OF SECTION**

**Add:**

**SECTION 01800 – HEALTH AND SAFETY PLAN**

## PART 1 - GENERAL

### 1.01 GENERAL

A. The CONTRACTOR will use only site crew members on the landfill footprint that are currently trained in accordance with the United States Occupational Safety and Health Administration (OSHA) regulations 29 CFR 1910.120. The workers also need to have completed the minimum 40-hour Hazardous Materials training course and necessary refresher courses. The area within the landfill footprint is included as that is the area where workers could be exposed to open refuse. A copy of the current training certificate will be provided to the COUNTY and the ENGINEER for each site worker prior to the start of site work. These certificates shall be submitted with the Health and Safety Plan, and whenever new workers are assigned to the job. This applies to both the CONTRACTOR's workers and any Subcontractor site workers. No workers will be permitted to work on the site without these certificates.

B. All site workers that work on the landfill footprint must be under a Medical Monitoring Program as outlined in 29 CFR 1910.120, and be physically capable of wearing a respirator, if necessary. Proof of participation in this program must be provided to the PROJECT MANAGER and the ENGINEER prior to the start of work.

C. No smoking will be allowed at the Lena Road Landfill.

D. Actions that potentially endanger workers shall be stopped immediately and brought to the PROJECT MANAGER's attention. Health and Safety for the CONTRACTOR's and subcontractor's forces is the responsibility of the CONTRACTOR.

### 1.02 SITE-SPECIFIC HEALTH AND SAFETY PLAN

A. The CONTRACTOR shall prepare a written site-specific Health and Safety Plan (Plan) for use by the CONTRACTOR and Subcontractor site workers. This plan must be prepared to meet the 29 CFR 1910.120 OSHA regulations and shall include as a minimum, the following:

1. Organizational Structure; to include general supervision, Health and Safety officer, lines of authority, and responsibility and communication. The Health and Safety Officer shall be a worker who will be present at all times during site construction, in addition to his/her other site duties.

2. Comprehensive Work Plan; to include the work tasks and objectives, resources needed, and training requirements for workers (health and safety, machine operations license, etc.). This shall also include a section on safety procedures to be followed for excavation and well drilling.

3. Asbestos Work Plan; to include approach for workers to excavation and in environments possibly containing asbestos material. Plan shall include the WORK tasks and objective and resources needed.

4. Health and Safety; to include identification of possible site hazards, training levels for each category of site workers, personal protective equipment and medical surveillance needed, site control measures, and confined space entry procedures.

5. Emergency Response Plans; to include all emergency telephone numbers, a highlighted map showing the quickest route to the nearest emergency care facility, and directions to such facility.

6. Air/Gas Monitoring Procedures; to include frequency and type of air/gas monitoring of exposed refuse and site worker areas, calibration of air/gas monitoring equipment, and action levels of air/gas contaminants for site worker protection. All equipment calibration and field gas measurements shall be recorded with the date and time of sample, and the sampler's name. Sampling shall be done by a CONTRACTOR worker trained in the use of the gas sampling equipment. These trained workers shall be designated in the CONTRACTOR's Plan.

7. Respiratory Protection Program; to include written documentation of the CONTRACTOR's respiratory program.

8. A signature page for all site workers covered by the Plan (CONTRACTOR and Subcontractor site workers).

B. The CONTRACTOR shall consider the various materials disposed of (municipal solid waste) that may be encountered during excavation in preparing the Health and Safety Plan.

C. Special consideration shall be made for the potential dangers of hydrogen sulfide, which may be present in landfill gas.

## 1.03 SUBMITTALS

CONTRACTOR shall submit copies of the site-specific Health and Safety Plan to the ENGINEER at the pre-construction meeting. The ENGINEER will review the plan for information purposes only. It is the CONTRACTOR's responsibility to prepare and implement a Health and Safety Plan appropriate for the work to be conducted at the landfill.

## 1.04 SITE OPERATIONS

A. The Plan shall be kept on site in a known and easily accessible spot during all site operating hours. All site workers shall be notified of the location of the Plan.

B. A Safety Meeting shall be held by the CONTRACTOR and attended by all CONTRACTOR site workers prior to starting construction. At this safety meeting,

the Plan will be reviewed with the site workers, and all site workers will sign the Plan indicating that they have been apprised of the Plan's contents. New site workers must review the Plan with the CONTRACTOR's Health and Safety Officer prior to beginning work on site, and must sign that they have been apprised of the Plan's contents.

C. Site operations will take place in conditions of adequate light only.

D. Areas of open refuse (i.e., excavations, trenches, and boreholes) shall be monitored by the CONTRACTOR for combustible gases, methane, volatile organics, hydrogen sulfide and oxygen through the use of field gas meters or Drager-type colorimetric tubes. Respiratory protection for acid gases and organic vapors shall be used by the worker while monitoring gas levels. Appropriate respiratory protection shall be taken by other workers as necessary.

E. No workers shall be allowed in any trench or excavation while excavation of the area is in progress. Entry into the excavation shall be made only after the CONTRACTOR's site worker has monitored the air in the excavation and determined the appropriate level of personal protection required for entry into the excavation. Site workers in excavations must be supervised at all times.

F. Site workers shall limit their dermal exposure to excavated refuse. Minimal skin protection includes safety-toe boots, long pants, long-sleeved shirts, safety glasses, hard hats, and rubber gloves to be used when handling refuse.

G. Start-up and shutdown of engines shall not be done in areas of excavated refuse.

H. "A Compilation of Landfill Gas Field Practices and Procedures", Solid Waste Association of North America (SWANA), August 2011, shall be reviewed by the CONTRACTOR for further safety information and requirements.

## PART 2 - PRODUCTS (Not used)

## PART 3 - EXECUTION (Not used)

**END OF SECTION**

**SECTION 02064 – MODIFICATIONS TO EXISTING STRUCTURES, PIPING AND EQUIPMENT**

Remove **Part 3.04 –** In-place Grouting of Existing Pipe and **Part 3.05** – Spray-Applied Liners

**SECTION 02221 – TRENCHING, BEDDING, AND BACKFILL FOR PIPE**

Remove **Part 1.03 B –** Dewatering, Drainage, and Floatation

Remove **Part 2.01** Replace with:

**2.01 PIPE BEDDING AND SOIL BACKFILL**

A. Beyond the reusable quantities of soil described above, the CONTRACTOR shall provide all bedding and soil backfill material excavated and stockpiled on-site.

B. These soils shall generally be free of sticks, roots, organic matter, and stones larger than 1-inch in any dimensions. Pipe bedding and backfill soils shall be approved by the ENGINEER.

C. Pipe bedding material shall be appropriate for spreading with hand tools and compaction with vibratory compactor to provide a level and stable surface for pipe placement. Pipe bedding and backfill soils shall be approved by the ENGINEER.

**2.02 NON-CALCAREOUS STONE**

A. Stone backfill shall be hard, durable non-calcareous rock. Stone shall be washed as a component of the manufacturing process and be free of organics, lumps or balls of clay, and other deleterious materials.

Stone shall be FDOT No. 4 and conform to the following gradation requirements:

| Sieve Size | % Passing (by Weight) |
|---|---|
| 2-inch | 100 |
| 1½-inch | 90-100 |
| 1-inch | 20-55 |
| 3/4-inch | 0-15 |
| 3/8-inch | 0-5 |

**2.03 CLEAN SOIL BACKFILL MATERIALS**

A. Soil material may be reused for clean soil backfill provided it is free of sticks, roots, organic matter, MSW, and stones larger than 1-inch in any dimension. Remove any material that cannot be made to compact readily and replace with suitable material. If new material must be imported for use as clean soil backfill it must meet the criteria of this Specification and the testing requirements below.

B. Material shall be well-graded (SW), poorly graded (SP) or clayey sands (SC) as classified by the Unified Soil Classification System (USCS), or other soil as approved by the ENGINEER.

C. General Fill shall be used in the following areas of work and as shown on the Drawings:

1. Any location on Drawings that calls for “general fill” or “clean soil backfill” if excavated material is waste or is otherwise not suitable for reuse.

D. Clean soil backfill must be provided by CONTRACTOR and stockpiled for use on-site.

**2.04 SUBGRADE SOIL MATERIALS**

A. Subgrade soils are natural, in-place materials. Soils shall be well-drained and reasonably free of sticks, roots, debris, organic matter, and MSW. CONTRACTOR shall remove material that cannot be made to compact readily and replace with ENGINEER-approved soil.

B. Soils which yield or exhibit pumping due to excessive moisture shall be excavated and replaced with general fill or materials as approved by the ENGINEER.

**2.05 TOPSOIL**

A. Material shall be fertile, natural soil, typical of the locality, free from MSW, stones (exceeding 2-inch in any dimension), roots or sticks (exceeding 1-inch diameter), clay, and weeds, and obtained from naturally well drained areas. It shall not be excessively acid or alkaline nor contain material harmful to plant growth. The material shall comply with the requirements of FDOT’s Standard Specifications for Road and Bridge Construction (2000), Section 987 for Topsoil.

**2.06 PIPELINE LOCATOR/WARNING TAPE**

A. For LFG header and laterals as shown on the Drawings, tape shall be a standard locator/warning tape imprinted with the words “Caution Gas Line Buried Below,” as supplied by Reef Industries, Inc. (800-231-6074), or approved equal.

Remove **Part 3.01, 3.02, and 3.03** Replace with:

**3.01 PREPARATION**

A. Identify required lines, levels, contours and datum locations.

B. Locate, identify and protect utilities from damage.

C. Protect benchmarks, survey control points, monitoring wells, existing structures and fences from excavating equipment and vehicular traffic.

**3.02 PRE-CONSTRUCTION LAYOUT**

A. Prior to trenching and pipe installation, CONTRACTOR and CONTRACTOR's surveyor shall stake out the entire proposed trench alignment. The proposed alignment must be approved by the ENGINEER and PROJECT MANAGER prior to the CONTRACTOR beginning excavation activities. This pipeline route staking for both header and lateral pipes must meet the minimum pipe slopes listed in this Section and on the Drawings.

B. Survey notes with proposed pipe slope calculations shall be submitted to the ENGINEER for approval prior to pipe installation. Notes of pre-construction survey shall identify conflicts between the proposed WORK and existing features.

## 3.03 EXCAVATION

A. Refuse materials shall be handled as directed in Section 02 41 16, Refuse Handling, Storage, and Disposal.

B. Excavate to lines, grades and dimensions necessary to complete the WORK.

C. Trenching Tolerances:

1. Excavate to install pipes in straight runs at a uniform grade, without sags or humps, between vertical and horizontal control points in accordance with the Contract Drawings.

2. Minimum trench width shall be as shown on the Drawings.

3. Maintain thickness of soil cover over the top of the pipe, as shown on the Drawings, or approved by the ENGINEER.

D. CONTRACTOR may not excavate more trench daily than can be completely backfilled after installation of the pipe the same day. Excavations shall not be left open overnight. In the event that a trench must be left open overnight the CONTRACTOR must get permission from the COUNTY to leave trench open and trench must be encircled in safety/warning tape attached to stakes placed along the perimeter on all edges of the trench. In the event that the trench has exposed refuse, all refuse must be covered with a tarp that is secured on all corners and along its perimeter.

E. CONTRACTOR shall use appropriate survey/level instrumentation during excavation to ensure proper trench slope. Verification of installed pipe slope shall be as specified in Part 3.06.

F. Minimum trench slopes shall be at least 5 percent as shown on the Drawings or approved by the ENGINEER.

## 3.04 DEWATERING

A. Water that enters excavations into refuse shall be considered landfill leachate and shall not be discharged to the ground or other means that are typical for stormwater. Water in trench excavations into refuse shall be pumped into sealed tanks, hauled to the main leachate pump station, or as directed by the PROJECT MANAGER, and discharged into the leachate collection system. The CONTRACTOR must notify the COUNTY prior to dewatering, and allow the COUNTY to witness the dewatering and discharge to the leachate collection system.

B. The CONTRACTOR shall at all times during construction provide and maintain proper equipment and facilities to remove water entering excavations. CONTRACTOR shall keep such excavations dry so as to obtain a satisfactory foundation condition for all WORK.

C. 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 or gravel as required by the ENGINEER at the CONTRACTOR’s expense. The bottom of excavations shall be 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.

D. Disposal of Water Removed by Dewatering System:

1. Water conveyed away from excavations which has not contacted refuse materials shall be discharged to areas approved by the ENGINEER.

2. Dispose of water by procedures approved by the ENGINEER in such a manner as to cause no inconvenience to the COUNTY, the ENGINEER, or others involved in work about the site.

3. Water conveyed away from excavations which has contacted refuse materials shall be pumped into spill-proof containers and discharged into the leachate collection system as directed by the PROJECT MANAGER.

E. If pipe trench becomes watered-in after placement of pipe, but before backfilling, CONTRACTOR shall dewater the trench, demonstrate that the pipe bedding and pipe slope remain satisfactory, and upon approval by the ENGINEER, backfill the pipe with clean dry soil in accordance with Part 2.01 of this Section.

## 3.05 ROAD CROSSINGS

A. CONTRACTOR shall schedule and coordinate all road crossings with the COUNTY to minimize disruption of the COUNTY’s operations.

B. HDPE pipes shall be encased in a larger diameter casing for protection. The inner diameter of the casing shall be a minimum of six (6) inches larger than the

cumulative outside diameters of the HDPE pipes encased. See Drawings for road crossing details.

## 3.06 PIPE SURVEY

A. CONTRACTOR shall verify that pipe slope meets the requirements specified in this Section and on the Drawings at 10-foot intervals along LFG laterals and header and record such information in the project notes. Station numbering shall be used and marked on the pipe, as approved by the ENGINEER.

1. CONTRACTOR shall measure each length of installed pipe and mark the 10-foot stations. Stationing of laterals shall begin with 0+00 at the header, ending at the riser for the well.

2. Stationing of the header shall begin with 0+00 at a location approved by the ENGINEER. Station numbering for pipe installed each day shall be consecutive with pipe installed on previous days. The CONTRACTOR shall not restart station numbering at 0+00 for any header segment without advance approval from the ENGINEER.

3. Survey equipment shall be used to measure the change in relative elevation between each 10-foot station prior to burial of any pipe.

4. The surveyed elevations and calculated change in elevation and slope for each 10-foot section shall be recorded in the CONTRACTOR's project notes.

5. A trench laser will not be considered acceptable survey equipment for the purpose of verifying pipe slope.

B. The project notes detailing the required pipe slope confirmation shall be provided daily to the ENGINEER.

C. An as-built survey shall be conducted on all installed pipe prior to backfilling the trench.

1. The survey shall document the horizontal and vertical location of the top of the landfill gas lateral and header pipes at minimum 50-foot intervals and at each change in pipe direction, ground surface grade break, change in pipe grade, fitting, connection, pipe crossover, and tie-in along the entire pipeline routes.

2. If a run of pipe is 100 feet or less in length, CONTRACTOR shall provide survey shots at a 20-foot interval or less. For a run of pipe of 50 feet or less, CONTRACTOR shall provide survey shots at a 10-foot interval or less to document the pipe as-built conditions.

3. The survey shall also document the type of pipe, location (horizontal and vertical coordinate) of structures and appurtenances such as, but not limited to road crossing casing, pipe crossing, and tie-ins.

4. This surveying shall be sealed by a Florida Licensed Land Surveyor as described in Project Record Documents.

## 3.07 BACKFILLING

A. Backfill materials shall be as described in Part 2 of this Section.

B. CONTRACTOR shall notify the ENGINEER prior to beginning backfilling. The ENGINEER shall inspect all pipe, fittings and connections prior to approving backfilling. If CONTRACTOR backfills pipe without inspection of the pipe while pipe is installed in the open trench, CONTRACTOR shall uncover all uninspected buried pipe so that it may be properly inspected. This shall be done at no additional cost to the COUNTY or ENGINEER.

C. Place bedding material in trench to the lines and grades shown on the Drawings.

D. Bedding material shall be placed in the trench ensuring material is placed under the haunch of the pipe. The bedding shall be poured into place, not pushed, and shall be raked by hand and then compacted, using a mechanical compaction, in a loose lift not to exceed six (6) inches above the top of the pipe.

E. Backfilling procedures shall be modified as necessary as approved by the ENGINEER in order to not displace (either horizontally or vertically) piping installed in the trench during backfill or bedding placement.

F. Pipeline Locator/Warning Tape shall be placed in trench at least 1-foot below grade and at least 1-foot above the casing of all buried LFG pipe.

G. Place soil backfill in maximum 6 inch lifts above pipe bedding to the existing grade. CONTRACTOR shall compact soil backfill in 6-inch lifts with mechanical compaction such as an excavator bucket. Compaction shall be to a density where subsequent passes with the mechanical compaction device will not reduce the surface elevation of the bedding material by more than three-quarters of an inch.

## 3.08 REFUSE DISPOSAL

A. The CONTRACTOR shall be responsible for loading and transporting refuse to the working face. No excavated waste shall be left overnight at any excavation at any time.

## 3.09 GRADING DISTURBED AREAS

A. CONTRACTOR shall regrade and return to their original condition, as determined by the PROJECT MANAGER and ENGINEER, all areas disturbed by CONTRACTOR's work. This includes, but is not limited to ruts caused by construction equipment, soil stockpile areas, and landfill benches and terraces used for access.

## 3.10 TESTING REQUIREMENTS DURING PLACMENT

B. The CONTRACTOR shall place backfill and fill materials to achieve an equal or "higher" degree of compaction than undisturbed materials adjacent to the work;

however, in no case shall the degree of compaction fall below minimum compaction specified in this Section.

C. Where laboratory or field testing is specified herein to verify that the constructed, in-place WORK meets the specifications and quality control requirements herein, the CONTRACTOR shall employ and bear the expense for an independent testing laboratory to conduct such tests. The CONTRACTOR shall pay for the costs of all retests required due to the initial testing not passing the requirements herein. Laboratory shall be on the approved vendors list of the COUNTY.

Where laboratory testing is specified to verify that any individual material of construction or product meets certain quality control requirements (i.e. size, gradation, mix formula, hardness, shape, inherent strength, etc.), the CONTRACTOR shall employ and bear all expenses for an independent testing laboratory to sample the material or product and to conduct such tests and retests if necessary or required by the COUNTY.

**END OF SECTION**

**SECTION 02260 – FINISH GRADING**

**Remove Part 3.02 A.**

Replace with:

**Part 3.02**

A. The Contractor shall place topsoil in areas where hydroseeding, sodding, and planting is to be performed, as needed to establish vegetation.

**Add:**

**SECTION 24116 – REFUSE HANDLING, STORAGE, AND DISPOSAL**

## PART 1 - GENERAL

### 1.01 NOTIFICATION

A. The CONTRACTOR shall notify the COUNTY in advance of planned excavation of landfill refuse.

B. No excavated materials shall be removed from the site or disposed of by the CONTRACTOR except as specified below and approved by the COUNTY.

## PART 2 - REFUSE HANDLING AND DISPOSAL

### 2.01 REQUIREMENT

A. Excavated refuse shall be loaded onto dump trucks or other vehicles and moved to working face as soon as possible after excavation for disposal.

B. In the event that refuse is excavated and cannot be immediately taken to the working face in Stage II, the refuse may be stored adjacent to the excavation until it can be taken to the working face before the end of the same working day. Refuse shall remain within close proximity to the location from which it was removed. All refuse must be removed from all locations at the end of each working day.

## PART 3 – EXECUTION

### 3.01 REQUIREMENT

A. The COUNTY has specified that all excavated refuse should be moved from the excavation zone directly to the working face in Stage II. The CONTRACTOR is not required to record the excavated waste tonnages at the scalehouse. The CONTRACTOR shall not disrupt other onsite COUNTY operations at the landfill with the use of trucks or other equipment moving waste to the working face. It is the CONTRACTORS responsibility to coordinate with the COUNTY all refuse disposal actions before excavation work begins.

**END OF SECTION**

**SECTION 02485 – SEEDING AND SODDING**

**Add** to Part 3.01

D. All disturbed or trenched side slopes shall be sodded. The flat top deck of Stage III shall be seeded.

**Add:**

## SECTION 33 21 70 – LFG EXTRACTION WELLS AND WELLHEADS

## PART 1 - GENERAL

### 1.01 DESCRIPTION

A. Scope of Work: The CONTRACTOR shall provide all labor, equipment, materials, and appurtenances necessary to drill, install and make ready landfill gas (LFG) extraction wells and wellheads as specified herein and as indicated on the Drawings.

B. The perforated pipe, stone, geotextile, bentonite, and soil backfill shall be set at depths and thicknesses shown on the Drawings or as designated in the field by the ENGINEER. It is expected that combustible and asphixiant gases will be venting from boreholes drilled in to waste within the footprint of the landfill. The CONTRACTOR's bid price shall include provision for all equipment and procedures necessary to safely install wells and borings under this condition. All Work shall be performed by qualified workers in accordance with the best standards and practices available.

C. Upon completion of each new extraction well or boring, CONTRACTOR shall dispose of all construction and drilling refuse materials as specified in Section 24116 or as directed by the PROJECT MANAGER.

D. Related Work Described Elsewhere:

1. Section 24116: Refuse Handling, Storage, and Disposal
2. Section 02221: Trenching, Bedding, and Backfill for Pipe
3. Section 33511: Pipe, Valves, and Pipe Fittings

### 1.02 REFERENCES

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

STANDARD TEST METHODS/PRACTICE

| | |
|---|---|
| ASTM D 420-98 | Standard Guide to Site Characterization for Engineering, Design, and Construction Purposes |
| ASTM D 422-63 | Standard Method for Particle-Size Analysis of Soils |
| ASTM D 1452-80 | Standard Practice for Soil Investigation and Sampling by Auger Borings |

| | |
|---|---|
| ASTM D 2487-00 | Standard Classification of Soils for Engineering Purposes (Unified Classification System) |
| ASTM D 2488-00 | Standard Practice for Description and Identification of Soils (Visual-Manual Procedure) |

## 1.03 SUBMITTALS

A. The CONTRACTOR shall prepare and submit to the ENGINEER, for review and approval, Certificates of Compliance on materials furnished, and manufacturer's brochures containing complete information and instructions pertaining to the storage, handling, installation, and inspection of pipe and appurtenances furnished as described in Section 01340, Shop Drawings, Project Data, and Samples.

B. The CONTRACTOR shall prepare and submit to the ENGINEER for review and approval, Shop Drawings showing dimensions, materials, and manufacturer's information for pipe, pipe perforations, fittings, bentonite, and wellhead components.

C. One week prior to well drilling, CONTRACTOR shall submit an example well boring log and construction log. The example log shall be completed with all of the required descriptions and pertinent information required under Part 3.04 of this Section.

D. At least two weeks prior to construction, the CONTRACTOR shall submit to the ENGINEER for review and approval, results of the sieve analysis for the soil backfill, samples of all well backfill materials (if requested), the name of the vendor(s), and source of backfill materials furnished.

E. At the end of each day, CONTRACTOR shall provide copies of the handwritten well boring and completion logs for each well drilled on that day. Information to be included on the well logs is listed in Part 3.04 of this Section.

F. Final boring logs based on field information shall be typewritten and submitted with the Record Documents, as stated in Section 01720. Description of the boring and excavated material shall be according to the guideline sheet at the end of this Section.

## 1.04 QUALITY ASSURANCE

A. A professional experienced in installation of LFG wells shall be responsible for observing and documenting information related to all boring and installation activities. The OWNER will contract with the quality assurance professional that will oversee and observe the extraction well installation.

B. Inspect well materials for cleanliness, deformations, and imperfections, and ensure conformance with Specifications prior to use.

## PART 2 - PRODUCTS

### 2.01 SOIL

Soil backfill material shall be granular material free of clay, sticks, roots organic material from an off-site source, as specified in Section 02221, Trenching, Bedding, and Backfill for Pipe.

### 2.02 STONE

Stone shall be FDOT No. 4 stone as specified in Section 02221 Part 2.02

### 2.03 BENTONITE

A. "Bentonite Plug" as used in the Drawings, shall refer to a well seal comprised of hydrated sodium bentonite pellets or chips of a thickness as indicated on the Drawings. Bentonite material shall consist of clay greater than 85% sodium montmorillonite, without additives.

B. Bentonite shall be hydrated per manufacturer's instructions prior to backfilling with soil. Bentonite shall be hydrated in 6-inch lifts as per Paragraph 3.05 B of this Section.

C. Under no circumstances will the use of granular bentonite be permitted for the vertical extraction wells.

### 2.04 HDPE PIPE

A. Pipe for extraction wells shall be 6-inch Standard Dimension Ration (SDR) 11 high density polyethylene pipe as shown on the Drawings.

B. The perforations in the extraction well piping shall be as specified on the Drawings. Perforations may be pre-fabricated or fabricated by the CONTRACTOR.

### 2.05 WELLHEAD MATERIALS

A. Wellheads shall be Precision Quick-Change™ orifice plate wellheads provided by QED.

### 2.06 MONITORING PORTS

Monitoring ports shall be ¼ inch NPT polypropylene male barb monitoring ports, Parker P4MLBA Tubing Barb, with McMaster Carr 9753K38 vinyl cap or approved equivalent.

### 2.07 WELL IDENTIFICATION

Upon completion of piping installation, CONTRACTOR shall apply printed yellow stickers with the designated collection ID point on the collection pipe casing. The sticker shall contain the following information: collection point ID, and the words "Manatee County Lena Road Landfill" and "Landfill Gas Extraction Well", like the example shown below:


## 2.08 GEOCOMPOSITE "DONUT"

Geocomposite ring or donut to be placed between stone and clean soil backfill in well shall be a 36'' diameter 250 mil biplaner Geocomposite manufactured by GSE (1-800-435-2008) or approved equal.

## PART 3 - EXECUTION

## 3.01 PRE-CONSTRUCTION SERVICES

A. The CONTRACTOR shall survey and stake the well and horizontal collector boring locations prior to drilling. Pre-construction layout surveying shall be done by a Florida Licensed Professional Surveyor.

B. CONTRACTOR shall supply surveyed ground elevations of the proposed new extraction wells to the ENGINEER so that the design well depths may be confirmed at least one week prior to drilling.

C. Extraction well and boring locations must be approved and may be adjusted by the ENGINEER prior to beginning drilling.

## 3.02 DRILLING

A. The CONTRACTOR shall coordinate the start of drilling with the ENGINEER and PROJECT MANAGER.

B. The CONTRACTOR shall provide at all times a thoroughly experienced, competent driller during all operations at the drill site.

C. The CONTRACTOR must use dry drilling equipment.

D. Wells are to be drilled to the depth and diameter as shown on the Drawings. The boring depths shown on the Drawings may be adjusted in the field by the ENGINEER. Under no circumstances are the drilling depths from the well

schedule on the Drawings to be exceeded unless approved by the ENGINEER in advance.

1. Wet Borings:

   a. The PROJECT MANAGER and ENGINEER shall be notified of wet boring conditions.

   b. If water is encountered in a boring, the CONTRACTOR may be directed by the PROJECT MANAGER and ENGINEER to drill beyond the point at which it was encountered. If wet conditions remain, at the direction of the PROJECT MANAGER and ENGINEER, the boring may be terminated (after driller has attempted to advance boring for 2 hours) and the length of perforated pipe adjusted by the ENGINEER. If wet conditions cease (e.g., due to a perched water layer), then drilling will continue to the design depth.

   c. If water is encountered in a boring at a shallow depth, the ENGINEER may decrease the well depth and length of perforated pipe, or relocate the well.

2. Abandoned Borings:

   a. If, in the opinion of the PROJECT MANAGER and ENGINEER, the borehole has not reached a sufficient depth to function as an effective extraction well, the CONTRACTOR shall abandon this borehole by backfilling it with cuttings removed during drilling. Soil shall be backfilled and compacted to ground surface. CONTRACTOR shall supply additional soil backfill to refill any settlement within the abandoned borehole, as approved by the ENGINEER.

   b. If cuttings are unsuitable as backfill (for example, box springs, tires, etc.) the CONTRACTOR shall use soil backfill material.

   c. Compensation for abandoned borings shall be at the unit price for boring refusal.

E. The bore for the well shall be straight and the well pipe shall be installed in the center of the borehole.

1. The CONTRACTOR shall take all necessary precautions to maintain the well pipe vertically plumb during the entire backfill operation of the borehole to the satisfaction of the ENGINEER.

2. The grate over the borehole that is used to keep the well casing plumb shall not be removed until the borehole is backfilled to within 2 feet of ground surface.

3. If the pipe is installed out of plumb, as determined by the ENGINEER, the CONTRACTOR, at his own expense, shall correct the alignment.

4. The well casing shall extend above ground surface as shown on the drawing. No pipe couplings shall be installed above grade or within 10 feet of ground surface below grade.

## 3.03 WELL LOGS

A. CONTRACTOR shall keep detailed well logs for all wells drilled. Information recorded on the well logs shall include the following:

1. Total depth of well.

2. Visual description of refuse at 5-foot intervals:

a. Type of refuse encountered including the estimated percentage of the following components (by volume) on visual inspection:

- Paper/Cardboard
- Plastic
- Yard refuse
- Construction debris
- Textiles
- Tires
- Sludge
- Dirt

b. Moisture content (in percentages) based on the guidelines attached to the end of this Section.

c. State of decomposition based on the guidelines attached to the end of this Section.

d. Temperature of excavated refuse

3. Occurrence, depth, and thickness of water-bearing zones

4. Length of slotted pipe and solid pipe below grade.

5. Thickness, description and depth from ground surface of backfill layers.

6. Length of above ground riser stick-up pipe.

B. CONTRACTOR shall use the well borings description sheet provided at the end of this Section as a guideline for describing excavated materials.

C. Field copies of the well logs shall be provided to the ENGINEER. If the CONTRACTOR fails to provide field copies of well logs to the PROJECT MANAGER at the end of each day, the CONTRACTOR will not be allowed to conduct any further drilling activities until the logs have been submitted and reviewed by the ENGINEER.

D. Typed final copies of the well logs shall be submitted with the Record Drawings in accordance with Section 01720. Handwritten logs will not be acceptable for submittal with the Record Drawings. See Attachment 1 – Well Log Template and Attachment 2 – Borehole Log Supplement.

## 3.04 JOINING OF PIPES

A. Pipes shall be joined as specified in Section 33511, Pipes, Valves, and Pipe Fittings. In addition, lag screws shall be installed at each PVC coupling to secure vertical piping during placement in well boring.

1. Four lag screws per coupling or two lag screws per bell fitting shall be installed.

2. The length of the lag screws shall equal, but not exceed, the sum of the pipe and coupling (or bell fitting) wall thicknesses. Under no circumstances may the screw length exceed the sum of the pipe and coupling wall thickness.

B. At the end of each day, CONTRACTOR shall cap the ends of all joined pipes longer than 20 feet to prevent entry by animals and debris.

## 3.05 BACKFILLING

A. Backfilling of the well shall commence immediately after well drilling is completed and the well piping has been installed in the borehole.

1. Backfill materials shall be placed carefully within the wells to the dimensions shown on the Drawings and as approved by the ENGINEER.

2. Soil backfill containing foreign material may be rejected by the PROJECT MANAGER or ENGINEER on the basis of a visual examination.

3. Both well piping and backfill shall be installed with a safety grate installed over the boring. The safety grate shall remain in place until backfill is within 2 feet of existing ground surface.

B. Bentonite Plug shall be backfilled and hydrated in 6-inch lifts. The CONTRACTOR shall soak each lift according to the manufacturer's instructions prior to filling the next one. A minimum of 6 bags of bentonite shall be poured into the center of the borehole per 6-inch lift.

C. Soil backfill shall be rodded in the boring to provide even distribution and compaction.

## 3.06 REFUSE DISPOSAL

The CONTRACTOR shall dispose of excavated refuse as specified in Section 24116 - Refuse Handling, Storage, and Disposal.

## 3.07 TEMPORARY CAP

The CONTRACTOR shall temporarily cap the riser pipe of the vertical extraction well immediately after well pipe installation to prevent venting of LFG into the atmosphere. The CONTRACTOR shall remove this cap during the installation of the wellheads. Lag screws may be necessary due to the internal gas pressure within the well.

## 3.08 WELLHEAD INSTALLATION

A. Vertical extraction well and horizontal collector wellheads shall be installed in accordance with manufacturer's recommendations. PVC pipe sections of the wellhead shall be air-tight. Any leaks shall be repaired by CONTRACTOR at no additional cost to the COUNTY.

B. Install flexible Kanaflex hose on all wells so that hose has no sags, as shown on the Drawings. However, flexible hose shall not be taut. Provide enough slack to accommodate minor pipe settlement, as approved by the ENGINEER.

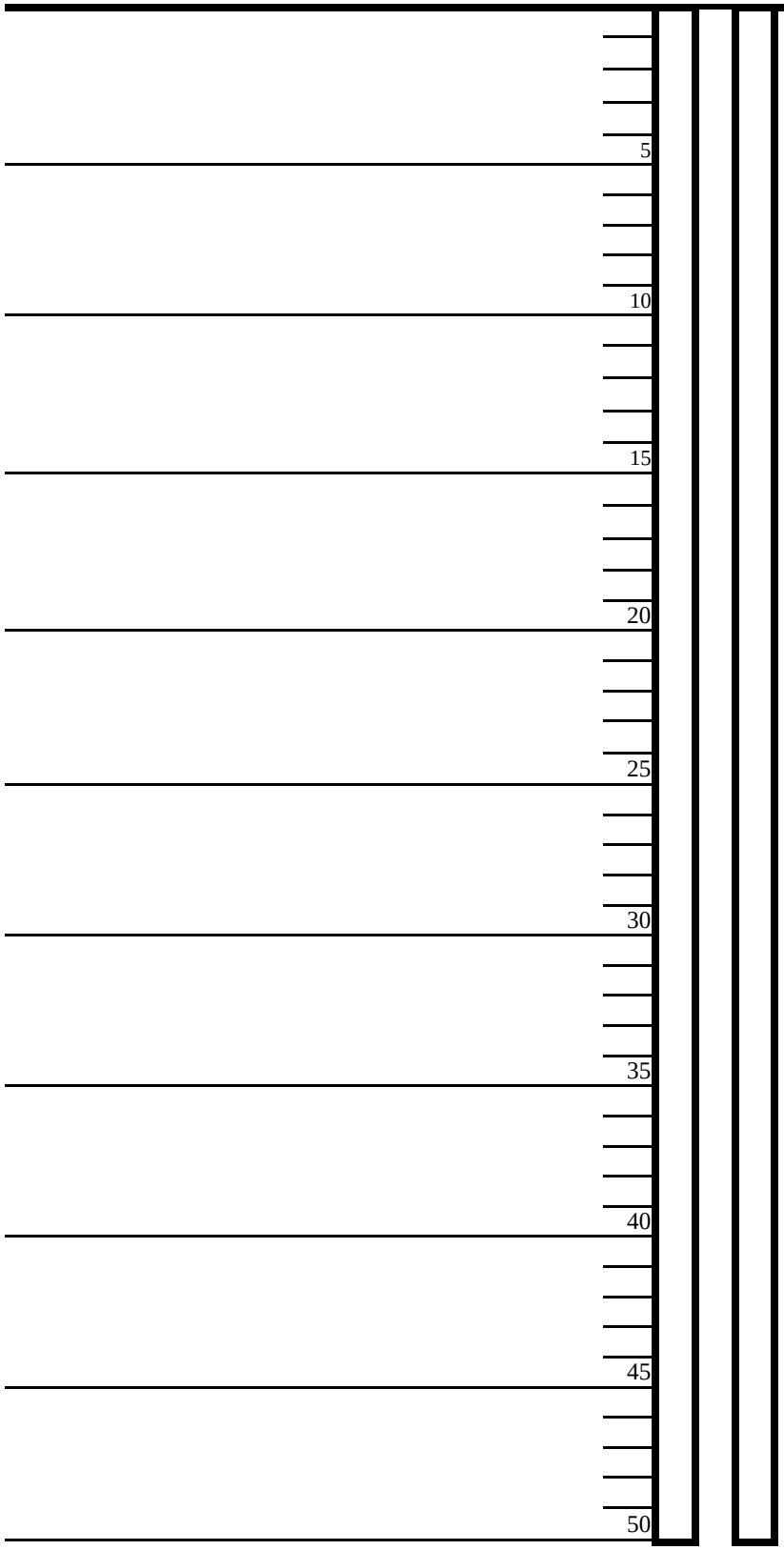
**Attachment 33217 – 1 Well Log Template**

**Attachment 33217 – 2 Borehole Log Supplement**

**END OF SECTION**

# Well Log - SCS Engineers

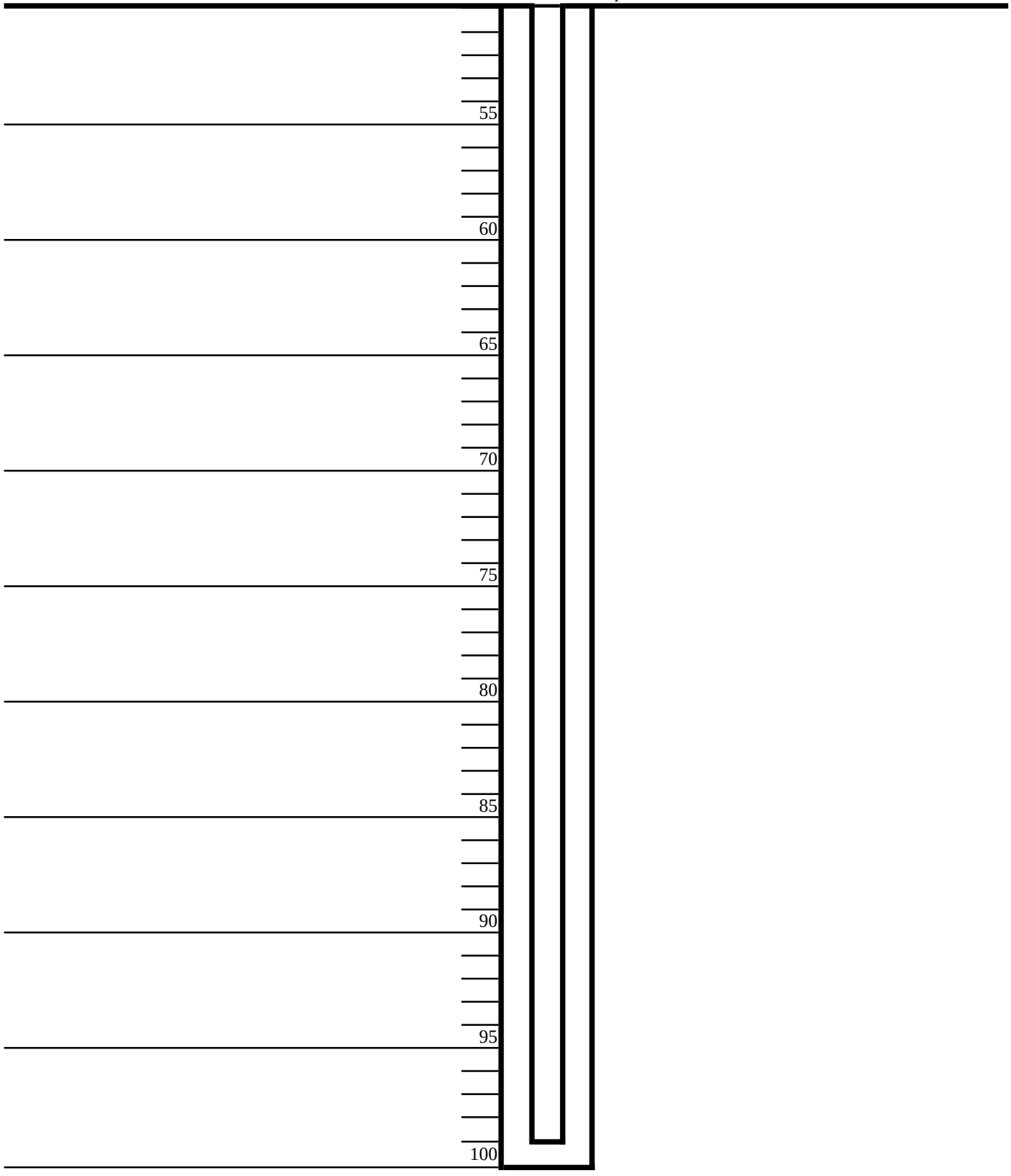
| | |
|---|---|
| Site Name: Lena Road Landfill - Manatee County | Well Number: |
| Project #: 09214113.05 | Coordinates: |
| Start Date: | Surface Elevation: |
| Completed: | Top of Casing Elevation: |
| Contractor: | Boring Diameter: |
| Inspector: | Pipe Material Diameter |
| Driller: | Total Depth Drilled: |
| | Completion: |




| COMPLETION LOG | |
|---|---|
| RISER STICK UP | |
| RISER BELOW | |
| PERF. PIPE | |
| BACKFILL | |
| BENTONITE #1 | |
| SILICA SAND 20/30 | |
| BENTONITE #2 | |
| BACKFILL | |
| GRAVEL PACK | |
| BACKFILL LOG | |
| Stone | |
| Structural fill | |
| Bentonite fill | |
| MATERIALS LIST | |
| TOP CAP | |
| SOLID PIPE | |
| PERF PIPE | |
| BOTTOM CAP | |
| BENTONITE | |
| BACKFILL | |
| STONE | |

# Well Log - SCS Engineers

| | |
|---|---|
| Site Name: | Well Number: |
| Project #: 09206066.10 | Coordinates: |
| Start Date: | Surface Elevation: |
| Completed: | Top of Casing Elevation: |
| Contractor: | Boring Diameter: |
| Inspector: | Pipe Material Diameter |
| Driller: | Total Depth Drilled: |
| | Completion: |



**ATTACHMENT 33217-2**

# LANDFILL BOREHOLE AND WELL LOGGING GUIDANCE – REFUSE

## Moisture Content Scale

| 15%<br>Dry Refuse | 20-25%<br>Normal | 25-35%<br>Damp | 35-50%<br>Wet | 50%<br>Saturated |
|---|---|---|---|---|
| Rock, dirt, etc; no trace of moisture<br>paper will be fuzzed up | Newspaper, etc; still not noticeably wet but normal moisture | Paper shows dampness lawn clippings, tree branches, stiff & hold together | Paper saturated but no free water, just getting sloppy; water emanates when squeezed | Mud or free water present |

## Decomposition Scale

| Little | Some | Moderate | Much | Severe |
|---|---|---|---|---|
| Newspaper readable; refuse looks new | | Newspaper not legible; branches intact | | Newspaper not legible; crumble; black/brown mucky material |

**Log the following (in 5' intervals):**

- Note apparent Intermediate cover thickness and presence of intermediate cell cover
- Ratio of refuse to cover soil
- Degree of compaction (i.e., loose, moderate, tight)
- Composition description (i.e., household, garden, commercial, demolition, sludge, medical, or other)
- Percent of refuse components (plastic, metal, yard waste, etc.)
- Note color and unusual odors or appearances
- Degree of decomposition
- Percent of moisture
- Approximate dates of refuse as an indicator (only) of dates of placement (i.e., newspaper, etc.)
- Refuse temperature
- Gas presence and relative pressure and temperature
- Presence of perched or free liquid
- Note elevations and observations of changes in refuse/soil/liquid conditions

**Add:**

## SECTION 33511– PIPES, VALVES, AND PIPE FITTINGS

## PART 1 - GENERAL

### 1.01 DESCRIPTION

A. Scope of Work: The CONTRACTOR shall supply all materials, equipment, and labor needed to install complete and make ready for use all pipe, pipe fittings, and valves as specified herein and as indicated on the Drawings.

B. Related Work Described Elsewhere

1. Section 02221 – Trenching, Bedding, and Backfill for Pipe
2. Section 33217 – LFG Extraction Wells and Wellheads
3. Section 33512 – LFG Header Isolation Valves

### 1.02 SUBMITTALS

A. The CONTRACTOR shall prepare and submit to the ENGINEER, for review and approval prior to commencement of construction, certificates of compliance on materials furnished and manufacturer's brochures containing complete information and instructions pertaining to the storage, handling, installation, inspection, maintenance, and repair of each type of pipe, pipe fitting, and valve furnished.

B. The CONTRACTOR shall prepare and submit Shop Drawings to the ENGINEER for review and approval. The Shop Drawings shall show the following:

1. All dimensions, slopes, and invert elevations at connections to existing pipes.

2. All tie-ins to the existing leachate collection system shall be field-verified and shown on the Shop Drawings. This shall include pipe size and burial depth at a minimum.

3. Pipe Dimensions for each pipe size used:

   a. Average outside diameter.
   b. Average inside diameter.
   c. Minimum average wall thickness.

4. Each pipe and fitting size to be used.

### 1.03 REFERENCE

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. Use of the most recent version is required.

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

| | |
|---|---|
| ASTM D 1248 | Standard Specification for Polyethylene Plastics Molding and Extrusion Materials |
| ASTM D 1784 | Standard Specification for Rigid Poly (Vinyl Chloride) (PVC) Compounds and Chlorinated Poly (Vinyl Chloride) (CPVC) Compounds |
| ASTM D 1785 | Standard Specification for Poly (Vinyl Chloride) (PVC) Plastic Pipe, Schedules 40, 80, and 120 |
| ASTM D 2321 | Standard Practice for Underground Installation of Thermoplastic Pipe for Sewers and other gravity-flow applications. |
| ASTM D 2467 | Standard Specification for Poly (Vinyl Chloride) (PVC) Plastic Pipe Fittings, Schedule 80 |
| ASTM D 2513 | Standard Specification for Thermoplastic Gas Pressure Pipe Tubing and Fittings |
| ASTM D 2564 | Standard Specification for Solvent Cements for Poly (Vinyl Chloride) (PVC) Plastic Piping Systems |
| ASTM D 2774 | Standard Practice for Underground Installation of Thermoplastic Pressure Piping |
| ASTM D 2855 | Standard Practice for Making Solvent-Cemented Joints with Poly (Vinyl Chloride) (PVC) Pipe and Fittings |
| ASTM D 3350 | Standard Specification for Polyethylene Plastics Pipe and Fittings Materials |

AMERICAN NATIONAL STANDARD INSTITUTE (ANSI)

| | |
|---|---|
| ANSI B 31.8 | Code for Pressure Piping |

## PART 2 - PRODUCTS

### 2.01 FLEXIBLE PVC PIPE ON WELLHEADS

A. Flexible PVC pipe shall be as manufactured by Kanaflex Corporation, Compton, California (310-637-1616), Series 101-PS, or approved equal.

B. Fasteners for flexible PVC pipe shall be Kanaflex 101-PS power lock clamps, or approved equal.

### 2.02 HIGH DENSITY POLYETHYLENE (HDPE) PIPE

A. General:

1. All HDPE pipe and fittings 4-inch diameter and greater as indicated on the Drawings shall be Standard Dimension Ratio (SDR) 17 high density polyethylene pipe using a 3608 type resin or approved equal.

2. Pipe shall be extruded from a Type III, Class C, Category 5, Grade P36 compound as described in ASTM D 1248. It shall be classified as cell 345464C according to ASTM D 3350 and have the material designation of PE 3408. The pipe shall be manufactured to meet the requirements of ASTM D 2513. Manufacturer's literature shall be adhered to when "manufacturer's recommendations" are specified. All pipe and fittings shall be provided by one manufacturer. Acceptable manufacturers include Performance Pipe (800-527-0662), or approved equal.

B. HDPE Fittings

1. Fittings shall be manufactured from polyethylene compound having cell classification equal to or exceeding the compound used in the pipe.

2. All fittings 12 inches and smaller shall be molded, unless approved by the ENGINEER.

C. All pipe and fittings must be supplied by the same manufacturer.

### 2.03 FLANGES FOR HDPE PIPE

A. Flanges for HDPE pipe shall be convoluted ductile iron back-up rings with a minimum thickness of 1-inch, as manufactured by Improved Piping Products, Inc. (800) 969-0962, or approved equal. Back-up rings shall be finished with blue primer, hot dipped galvanized, ~~and~~ or epoxy coated.

B. The studs, nuts, and washers for the flanges shall be hot dipped galvanized steel. Stainless steel bolts and nuts are not an acceptable alternative. All below grade studs, nuts, and washers shall be thoroughly coated with Polyken 1027 Primer, or rubberized emulsion undercoating spray, or approved substitute, with no gaps in coverage. Below grade flanges shall be wrapped in 5-mil polyethylene sheeting just after installation and prior to backfilling to help prevent corrosion.

C. Flange gaskets shall be full-face Neoprene.

## 2.04 PIPE MARKINGS

All HDPE pipe shall be stamped by the manufacturer with the following information at five foot intervals:

A. Manufacturer name or trademark
B. Nominal pipe size
C. Type of plastic (e.g., PE 3608)
D. Standard dimension ration (SDR)
E. ASTM designations (i.e., ASTM D 2513)

## 2.05 VALVES

A. Valves shall be manufactured by Asahi-America, Inc. or approved equal.

B. Back-up rings shall be finished with blue primer, hot dipped galvanized, and epoxy coated.

C. All valves shall be complete with all necessary operators and other accessories or appurtenances which are required for the proper completion of the WORK. Operators and other accessories shall be sized and furnished by the valve supplier and factory mounted.

D. Valves and operators shall be suitable for the exposure they are subject to, e.g., buried and landfill gas. Valves shall have all safety features required by OSHA.

E. Unless otherwise shown, valves shall be the same size as the adjoining pipe.

F. Valve position indicators shall be installed correctly to properly identify the valve position.

G. Valve spacers shall be used for all valves 6 inches and larger.

H. Header isolation valves shall be butterfly bubble tight, wafer design, with a PVC body, polypropylene disc, nitrile seats and seals, 316 SS valve stem, and compatible with a flat face flange. Valves shall be Asahi-America Type 56 series (12-inch) and Type 75 series (18-inch).

I. Stem extensions shall be stainless steel in an epoxy coated carbon steel outer housing with a die cast aluminum alloy gear box assembly mounted on top and equipped with a removable manual operating wheel.

## 2.06 PIPELINE LOCATOR/WARNING TAPE

A. For LFG header and laterals as shown on the Drawings, tape shall be a standard locator/warning tape imprinted with the words “Caution Gas Line Buried Below,” as supplied by Reef Industries, Inc. (800-231-6074), or approved equal.

## PART 3 - EXECUTION

### 3.01 GENERAL

A. Pipe shall be stored or stacked so as to prevent damage by marring, crushing, or piercing. Maximum stacking height shall be limited to 6 feet.

B. Pipe and pipe fittings shall be handled carefully in loading and unloading. They shall be lifted by hoists and lowered on skidways in such a manner as to avoid shock. Derricks, ropes, or other suitable equipment shall be used for lowering the pipe into the extraction well borings. Pipe and pipe fittings shall not be dropped or dumped.

### 3.02 FIELD QUALITY CONTROL

A. Pipe may be rejected for failure to conform to the Specifications or for the following reasons:

1. Fractures or cracks passing through pipe wall, except single crack not exceeding 2 inches in length at either end of the pipe which could be cut off and discarded. Pipes within one shipment shall be rejected if defects exist in more than 5 percent of shipment or delivery.

2. Cracks sufficient to impair strength, durability or serviceability of pipe.

3. Defects indicating improper proportioning, mixing, or molding.

4. Damaged ends, where such damage prevents making a satisfactory joint.

5. Scratches or gouges of depth greater than 10 percent of pipe wall thickness.

B. Acceptance of fittings, stubs, or other specially fabricated pipe sections shall be based on visual inspection at job site and documentation of conformance to these Specifications.

C. The ENGINEER shall be notified by CONTRACTOR prior to burial of pipe.

D. The PROJECT MANAGER and ENGINEER reserve the right to require destructive testing of any fusion weld on HDPE pipe.

### 3.03 FLEXIBLE PVC PIPE CONNECTIONS

Connections to pipe shall be made with clamps in accordance with manufacturer's step-by-step procedures and recommendations, and as approved by the ENGINEER.

### 3.04 HDPE PIPE HANDLING

A. HDPE pipe shall not be bent more than the minimum radius recommended by the manufacturer for type, grade, and SDR. Care shall be taken to avoid imposing strains that will overstress or buckle the HDPE piping or impose excessive stress on the joints.

B. Joining HDPE Pipe:

1. Only two methods shall be utilized to join HDPE pipe: heat fusion and mechanical joining.

a. Mechanical Joining shall be accomplished with HDPE flange adapters, neoprene gaskets, and ductile iron back-up flanges, and shall be used only where shown on the Drawings. Refer also to Part 3.09 for Test Failure of this Section.

b. Heat Fusion joints shall be made in accordance with manufacturer's step-by-step procedures and recommendations.

1) Fusion equipment and a trained operator shall be provided by the CONTRACTOR. Pipe fusion equipment shall be of the size and nature to adequately weld all pipe sizes and fittings necessary to complete the project (refer to Part 2.10).

2) Branch saddle fusions shall be made in accordance with manufacturer's recommendations and step-by-step procedures. Branch saddle fusion equipment shall be of the size to facilitate saddle fusion within the pipe trench.

3) Heat fusion shall be performed outside of the trench whenever practical.

4) Before heat fusing pipe, each length shall be inspected for the presence of dirt, sand, mud, shavings, and other debris, and any foreign material shall be completely removed.

5) At the end of each day, all open ends of fused pipe shall be capped or otherwise covered.

6) As per the manufacturer's instructions, no fusion shall be performed in precipitation unless a shelter is provided.

## 3.05 HDPE PIPE INSTALLATION

A. Pipe installation shall comply with the requirements of ASTM D 2321, PPI TR-31/9-79, and the manufacturer's recommendations.

B. Lengths of fused pipe to be handled as one segment shall not exceed 500 feet.

C. The PROJECT MANAGER or the ENGINEER shall be notified prior to any pipe being installed in the trench in order to have an opportunity to inspect the following items:

1. All butt and saddle fusions.
2. Pipe integrity.

3. Trench excavation and bedding material for rocks and foreign material.
4. Proper trench slope.
5. Trench contour to ensure the pipe will have uniform and continuous support.
6. Proposed backfill sand and soil.

D. Any irregularities found by the ENGINEER during this inspection must be corrected before lowering the pipe into the trench. Pipe shall be allowed sufficient time to adjust to trench temperature prior to any testing, segment tie-ins, and/or backfilling.

E. Tie-ins shall be made out of the trench whenever possible. When tie-ins are to be made in a trench, a bell hole shall be excavated large enough to ensure an adequate and safe work area.

F. Below grade piping shall be marked with warning tape to be buried in the trench above the pipe as indicated on the Drawings.

G. CONTRACTOR shall collect all pipe shavings and discard in a trash receptacle. Shavings shall not be left on the ground.

H. All installed HDPE pipe shall be marked in 10-foot intervals corresponding to the stationing required for slope confirmation and conformance surveying. For main pipeline, station numbering shall be continuous and sequential. Station numbering shall be referenced in daily logs to document pipe installation progress.

## 3.06 FLANGED CONNECTIONS

A. For flanged connections in virgin soil, the CONTRACTOR shall wrap and tape the flanges and bolts in 5 mil polyethylene sheeting prior to backfilling to help protect the assembly from corrosion.

B. Flanges shall be joined with hot dipped galvanized steel studs and nuts. Stud lengths shall accommodate the required distance between flanges including valve spacers, if necessary. Stainless steel studs and nuts are not an acceptable alternative.

C. For flanged connections within the limits of refuse, all below grade back-up rings, studs, nuts and washers shall be thoroughly coated with Polyken Technologies 1027 Primer, or rubberized emulsion undercoating spray, or approved substitute.

D. The CONTRACTOR shall wrap and tape the flanges and bolts in 5 mil polyethylene sheeting prior to backfilling.

## 3.07 PIPE SUPPORTS

All piping and valves shall be supported in such a manner as to prevent any stress being transmitted between sections and connected equipment and appurtenances.

## 3.08 SEGMENT TESTING

**A.** The HDPE laterals and connections to LFG header pipelines shall be subjected to pressure tests as described herein to detect any leaks in the piping. Testing shall be performed below grade (inside the trench). The CONTRACTOR shall accept the responsibility for locating, uncovering (if previously backfilled), and repairing any leaks detected during testing. **A standard HDPE pressure test protocol is attached as Attachment 33511 – 1 Pipe Pressure Test Data Log.**

B. Polyethylene piping shall be butt welded together into testing segments. Segments shall be connected to a testing apparatus on one end and fitted with fusion-welded caps on all openings.

C. The segment to be tested shall be allowed time to reach constant and/or ambient temperature before initiating the test.

D. The test must be performed during a period when the pipe segment will be out of direct sunlight; i.e., early morning, late evening, or cloudy days. This will minimize the pressure changes which will occur during temperature fluctuations. No testing will be allowed during the middle of the day or when pipe segments are exposed to sunlight.

E. The test pressure for LFG laterals and header shall be 10 psig. The test pressure for air supply and condensate/dewatering pipes shall be 100 psig.

F. Pressure drop during the test shall not exceed one percent of the testing gauge pressure over a period of one hour. This pressure drop shall be corrected for temperature changes before determining pass or failure. (See Section 3.09 for test failures). The ENGINEER shall sign off on a test form to indicate test compliance.

G. The ENGINEER shall be notified prior to commencement of the testing procedure and shall be present during the test.

H. All equipment for this testing procedure, including an adequately sized air compressor, fittings, caps/pipe plugs, etc., shall be furnished by the CONTRACTOR. Other necessary equipment includes a flange adaptor with a steel or brass blind flange. Tapped and threaded into the blind flange will be a temperature gauge with a scale of 0 to 100 degrees C with 1-deg. intervals, a pressure gauge with a scale that spans the test pressure range with increments equal to 0.1 percent of the test pressure, an appropriate valve to facilitate an air compressor hose, and a ball valve to release pipe pressure at completion of test. Pipe reducers shall be utilized to adapt test flange to size of pipe being tested.

## 3.09 TEST FAILURE

A. The following steps shall be performed when a pipe segment fails the one percent/one hour test described in Part 3.08 F, above.

1. The pipe and all fusions shall be inspected for cracks, pinholes, or perforations.

2. All blocked risers and capped ends shall be inspected for leaks.

3. Leaks shall be located and/or verified by applying a soapy water solution and observing soap bubble formation.

B. All pipe and fused joint leaks shall be repaired by cutting out the leaking area and refusing the pipe.

C. After all leaks are repaired, a retest shall be performed in accordance with Part 3.08.

## 3.10 TEST REPORTING

A. Each test (pass or failure) shall be reported in writing on a form approved by the ENGINEER.

B. If failure occurs, CONTRACTOR shall note the following:
1. Location of failure segment.
2. Nature of leaks.
3. Repairs performed.

**Attachment 33511 – 1 Pipe Pressure Test Data Log**

**END OF SECTION**

# ATTACHMENT 33511

## HDPE PIPE PRESSURE TEST PROCEDURE

This protocol describes the method for testing the installation of HDPE pipelines and components using a low-pressure air test.

## PROCEDURE

1. Isolate the section of HDPE pipe to be tested using fusion welded caps. Cap the ends of all branches, laterals, tees, wyes, and stubs included in the test to prevent air leakage. All caps shall be securely braced to prevent blowout.

2. Contractor shall install a temperature gauge, pressure gauge and fittings for connection of an air compressor hose and a ball valve to release the pressure at the completion of the test.

    - Temperature gauge shall have a range of 0 to 100 ºC.
    - Pressure gauge shall have increments equal to 1% of the test pressure.

Contractor shall not install new holes in pipeline for the exclusive purpose of performing the air test. However, tapped holes shown on the Plans for items such as header isolation valve monitoring ports may be utilized.

3. Connect the hose to the inlet tap and portable air supply source. Add air slowly to the test section until the pressure inside the pipe reaches the required level as shown below:

    - LFG header, laterals and condensate dewatering discharge lines: 4 psig
    - Air supply line and leachate forcemain: 100 psig

4. Once pressurized and the pressure has stabilized, record the initial temperature (ºC) and pressure of the air inside the pipe on the test report form.

5. Begin timing the test. At ten-minute intervals, record the temperature (ºC) and pressure of the air inside the pipe on the test report form. Record this data for 6 intervals, until the total time equals 60 minutes.

6. For pipe segments that include an isolation valve, the pressure test must be performed to demonstrate the integrity of the valve. Contractor shall close the valve and perform pressure tests on the header segments on both sides of the valve. This will serve to identify if the valve is airtight.

**CALCULATIONS**

In order to determine if the section of pipe tested is acceptable, the following calculations must be made.

1. Calculate the final theoretical pressure.

$$P_{final,\ theoretical}(psi) = \frac{[P_{initial}(psi) + 14.7] * [T_{final}(°C) + 273]}{T_{initial}(°C) + 273}$$

where,

$P_{final,\ theoretical}$ (psi) = the theoretical acceptable gauge air pressure in the pipe at the end of the 10 min. interval

$P_{initial}$ (psi) = the gauge air pressure in the pipe at the start of the 10 min. interval

$T_{initial}$ (ºC) = the air temperature in the pipe at the beginning of the 10 min. interval

$T_{final}$ (ºC) = the air temperature in the pipe at the end of the 10 min. interval

2. Calculate the gauge pressure ($P_c$) corrected for the temperature at the end of the 10-minute interval using the following equation and the value for $P_{final,\ theoretical.}$ calculated above:

$$P_c = P_{final,\ theol}(psi) - 14.7\ psi$$ alculate

the actual Percent Pressure Drop using the following equation:

$$\text{Percent Pressure Drop} = \frac{P_c - P_{f,\ actual}}{P_c} * 100\%$$

where,

$P_{f,\ actual}$ = the final gauge pressure in the pipe at the end of the interval

4. If the percent pressure drop is less than or equal to 1%, the pipe segment passes for that particular interval. If the percent pressure drop is greater than 1%, then the following steps shall be performed.

   a) All blocked risers and capped ends shall be inspected for leaks.

b) The pipe and all fusions in the section tested shall be inspected for cracks, pinholes, or perforations.

c) Air pressure leaks shall be located and/or verified by applying a soapy water solution and observing soap bubble formation.

d) All confirmed pipe and joint leaks shall be repaired by cutting out the leaking area and rewelding the pipe.

e) After all leaks are repaired, a retest shall be performed. This process shall be repeated until a successful test is achieved.

5. Each test (passed or failed) shall be reported in writing.

6. For each test failure, Inspector shall note the following:

a) Location of failure segment
b) nature of leaks
c) Repairs performed
d) Results of test

Upon completion of the test, open the ball valve and allow air to escape. Caps must not be removed until air pressure in all of the test sections has been reduced to atmospheric pressure.

**DATA LOG**

**DATE:** _____
**TIME:** _____

**PROJECT NAME/NO:** _____
**CONTRACTOR:** _____
**PERSON PERFORMING TEST:** _____
**OWNER REPRESENTATIVE:** _____

**DESCRIPTION/LOCATION OF TEST SEGMENT:** _____

| Interval # | Time (min) | $T_{initial}$ (ºC) | $T_{final}$ (ºC) | $P_{g,\ initial}$ (in-$H_2O$) | $P_{i,\ absolute}$ (in-$H_2O$) | $P_{theoretical}$* (in-$H_2O$) | $P_c$* (in-$H_2O$) | $P_{f,\ actual}$ (in-$H_2O$) | % Pressure Drop* | Retest? |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 10 | | | | | | | | | |
| 2 | 20 | | | | | | | | | |
| 3 | 30 | | | | | | | | | |
| 4 | 40 | | | | | | | | | |
| 5 | 50 | | | | | | | | | |
| 6 | 60 | | | | | | | | | |

* See equations in procedure

PIPE SIZE: _____
SDR: _____
LENGTH: _____

DESCRIPTION/NATURE OF LEAKS & REPAIRS OF RETEST SEGMENT:

_____

_____

**Add:**

## SECTION 33512 – LFG HEADER ISOLATION VALVES

## PART 1 - GENERAL

### 1.01 DESCRIPTION

A. Scope of Work: The CONTRACTOR shall provide all materials, equipment, and labor needed to install complete and ready-for-use all header isolation valves as specified herein and as indicated on the Plans.

B. Related Work Described Elsewhere

1. Section 33511: Pipes, Valves, and Pipe Fittings

### 1.02 SUBMITTALS

The CONTRACTOR shall prepare and submit to the ENGINEER, for review and approval, certificates of compliance on materials furnished and manufacturer's brochures containing complete information and instructions pertaining to the storage, handling, installation, inspection, maintenance, operation, and repair of each type of valve furnished. Shop drawings shall be submitted for butterfly valve assemblies requiring spacers per paragraph 3.01 B of this Section.

## PART 2 - MATERIALS

### 2.01 BUTTERFLY VALVES

A. All valves shall be complete with all necessary operators, actuators, handwheels, extension stems, worm gear operators, operating nuts, wrenches, and other accessories or appurtenances which are required for the proper completion of the Work. Operators and other accessories shall be sized and furnished by the valve supplier and factory mounted.

B. Valves shall be suitable for the intended service. Renewable parts including discs, packing, and seats shall be of types recommended by valve manufacturer for intended service, but not of a lower quality than specified herein.

C. Valves and operators shall be suitable for burial within a landfill.

D. Unless otherwise shown, valves shall be the same size as the adjoining pipe.

E. Header isolation valves shall be butterfly bubble tight, wafer design, with a PVC body, polypropylene disc, nitrile seats and seals, 316 SS valve stem, and compatible with a flat face flange. Valves shall be Asahi-America Type 56 series (12-inch) and Type 75 series (18-inch).

F. Stem extensions shall be stainless steel in an epoxy coated carbon steel outer housing with a diecast aluminum alloy gear box assembly mounted on top and equipped with a removable manual operating wheel.

## 2.02 MONITORING PORTS

Monitoring ports shall be installed at each isolation valve and shall include the following items, or approved substitutes. Monitoring hose shall be stainless steel with outer braid Swagelok (407-894-7191) flexible metal hose, part no. SS-FM4PM4PF4, of adequate length to extend above grade as shown on the Plans. The male NPT end shall be threaded into the top of the header. Sampling end shall have a ¼-inch NPT polypropylene male barb port by Parker P4MCB4 tubing barb with a McMaster-Carr 9753K38 vinyl cap, or approved equal. The hose shall be secured to the valve stem inner boring by stainless steel brackets.

## 2.03 IDENTIFICATION TAGS

A. CONTRACTOR shall supply and affix to each valve an adhesive sticker marked with pre-printed letters designating the valve number (e.g., V-3, V-4, V-5, etc.). Tags shall not be marked with pen or marker.

B. Tags shall be yellow adhesive sticker with black lettering. The sticker shall contain the following information: valve point ID, and the words “Manatee County Lena Road Landfill”.

# PART 3 - EXECUTION

## 3.01 INSTALLATION

A. Valves shall be installed in accordance with the manufacturer’s recommendations and the following:

1. Butterfly valves shall be installed between two flanges as shown on the Drawings; care shall be taken to avoid stripping studs when tightening.

2. Flanges shall be joined with hot dipped galvanized steel studs and nuts. Stud lengths shall accommodate the required distance between flanges including spacers, if necessary. Stainless steel studs and nuts are not acceptable substitutes.

3. All below grade back-up rings, studs, nuts and washers shall be thoroughly coated with Polyken Technologies 1027 Primer (508-261-6200), or rubberized emulsion undercoating spray, or approved substitute. There shall be no “holidays”, or areas where the coating is not completely applied.

4. The CONTRACTOR shall wrap and tape the valve, flanges, and bolts in 5 mil polyethylene sheeting prior to backfilling.

B. Flanged butterfly valves may require spacers between the flange adapters and the valve body in order to allow full travel of the internal disk. If spacers are

necessary for any butterfly valve, the CONTRACTOR shall install valve spacers subject to approval by the ENGINEER.

**END OF SECTION**