F. Many gases are heavier than air and settle in low areas such as trenches and excavations, therefore, additional precautions must be observed in these areas. Specifically, the need for constant 0_2 monitoring, forced ventilation, combustible gas monitoring, respiratory protective equipment, etc. shall be determined by the Contractor. The County may impose additional requirements when deemed necessary for worker safety.

G. Construction equipment must be equipped with a vertical exhaust at least five (5) feet above grade or with spark arrestors.

H. All electric motors and electric controls used in the excavation area will be explosion proof or non-sparking TEFC and meet the requirements for Class 1, Division 1, Group D (methane), and rated equipment in accordance with the National Electric Code (NEC). If the potential for a hazardous location can be eliminated with the use of forced ventilation, then explosion proof equipment is not required.

I. No welding is permitted in, on, or immediately near the excavation area, unless continuously monitored for methane and other combustible gases. In-trench fusion welding of HDPE pipe should only be done as a last resort and only then with the proper precautions taken.

J. Solvent cleaning, gluing or bonding of pipe should be done, to the extent possible, outside the trench.

K. During piping assembly, all valves should be closed immediately after installation to prevent the migration of landfill gases through the pipeline.

L. All exposed trench or excavation shall be covered with an impermeable membrane and plywood or steel plate prior to the end of the working day barriers and warning signs shall be placed around covered excavations.

M. Whenever refuse is encountered during excavations, the work area will be monitored continuously for level of methane, carcinogenic contaminants, hydrogen sulfide and oxygen deficiency.

N. All newly installed piping tied into a gas source shall be capped as soon as possible following installation and at the end of each working day.

END OF SECTION

SECTION 3 - MOBILIZATION

3.1 GENERAL

This contract item shall consist of expenditures for all preparatory work and operations, including but not limited to: bond and insurance costs; those costs necessary for the movement of personnel, equipment, supplies, and incidentals to the project site; and for all other work and operations which must be performed or costs incurred prior to beginning work on the various contract items on the project site.

3.2 MATERIALS

All materials furnished for the execution of the work and purchases made by the County shall remain the property of the County. Any existing property or installations shall be left in a condition that is at least equivalent to the condition prior to construction. Portable toilets provided by the County are available onsite for the use of the Contractor.

3.3 EXECUTION

1) Upon receipt of the Notice to Proceed, the Contractor shall furnish, mobilize, and install such temporary works, materials, equipment, supplies, and personnel as necessary for the successful completion of the work. The Contractor shall also operate and maintain temporary works, and equipment throughout the duration of construction.

2) The Contractor shall obtain all necessary permits and permission to utilize public roads for mobilization, demobilization, and access to the site. Access to the site is available through existing public roads during the hours stated in Section 1.7 of these Special Provisions.

3.4 MEASUREMENT AND PAYMENT

3.4.1 Mobilization

The following schedule will be used to determine **measurement** of mobilization for **Bid Items No. 1.1 through 1.4** and disbursement of the bid price (less retention) for mobilization:

Percent of Contract Work Completed ($ Expended/$ total bid price)	Percent of Mobilization Considered to be Complete
More Than 5%	50%
More Than 10%	75%
More Than 15%	95%
More Than 20%	100%

3.4.1.1 Mobilization for Horizontal Well Construction

Mobilization for horizontal well construction and header/lateral installation or re-location as shown in **Bid item No 1.1** shall consist of all items stated in Section 3.1 of these Special Provisions as well as mobilizing specialized equipment to construct horizontal gas wells.

3.4.1.2 Mobilization for Vertical Well Construction

Mobilization for vertical well construction header/lateral installation or re-location as shown in **Bid item No 1.2** shall consist of all items stated in Section 3.1 of these Special Provisions as well as mobilizing specialized equipment to construct vertical gas wells.

3.4.1.3 Mobilization for Header and Lateral Pipe Installation

Mobilization for header and lateral pipe installation as shown in **Bid item No 1.3** shall consist of all items stated in Section 3.1 of these Special Provisions as well as mobilizing specialized equipment to install header and lateral pipes.

3.4.1.4 Mobilization for Relocating Header and Lateral Pipes

Mobilization for relocating header and lateral pipes as shown in **Bid item No 1.4** shall consist of all items stated in Section 3.1 of these Special Provisions as well as mobilizing specialized equipment to relocate header and lateral pipes

END OF SECTION

SECTION 4 - TRENCHING AND EARTHWORK

4.1 GENERAL

4.1.1 Summary

The work in this section shall include the Contractor furnishing all labor, supervision, tools, equipment, and materials necessary to perform all trenching for horizontal LFG collection wells and road crossings and backfill across bench roads for lateral and header piping This work also includes the excavation of refuse and soil co-mingled with refuse and other unsuitable material, and hauling and disposal at the designated areas as directed by the County.

4.1.2 References

All trenches shall comply with the applicable parts of section 306 of the Standard Specifications for Public Works Construction unless otherwise stated in the Plans and Specifications.

4.1.3 Protection

A. Shoring and Bracing.

1. The Contractor shall provide materials for shoring and bracing necessary for safety of personnel, protection of work, and in compliance with the requirements of government agencies having jurisdiction.

B. De-watering:

1. De-watering equipment shall be provided by the Contractor to remove and dispose of all surface water and groundwater entering excavation or boreholes.

2. The Contractor shall excavate and backfill in a manner and sequence that will provide proper drainage at all times. The Contractor shall remove all water, including runoff and run-on collected from rainwater encountered during excavation, to a location approved by the County, by pumps, drains, and other approved methods. The Contractor shall prevent water from ponding in site excavations and site construction area.

3. The Contractor shall take all necessary precautions to preclude the accidental discharge of fuel, oil, etc. and to prevent such accidents that may endanger the environment. The Contractor will be responsible for the cost of remediation the results of any such discharges or accidents.

C. The Contractor shall provide necessary temporary piping materials, equipment and vehicle for spraying and moisture-conditioning of backfill materials. The Contractor shall provide and pay for the temporary water supply used in construction.

4.1.4 Final Grading

A. After other outside work has been finished and backfilling completed and settled, all areas which are to be graded shall be brought to grade at the indicated elevations, slopes, and contours.

B. All surfaces shall be graded to secure effective drainage. Unless otherwise indicated, a slope of at least three percent shall be provided.

C. Final grading and surfacing shall be smooth, even, and free from clods and stones larger than one inch in greatest dimension, weeds, brush, and other debris.

4.1.5 Settlement

A. The Contractor shall be responsible for all settlement of backfill, fills, and embankments which may occur within the correction period stipulated in the General Conditions.

B. The Contractor shall make, or cause to be made, all repairs or replacements made necessary by settlement within 30 days after notice from the County.

4.1.6 Construction

A. The Contractor shall excavate and backfill in a manner and sequence that will provide proper drainage at all times. The Contractor shall remove all water, including runoff and run-on collected from rain water encountered during excavation, to a location approved by the County, by pumps, drains, and other approved methods. The Contractor shall prevent water from ponding in site excavation and site construction area. The contractor shall control drainage in the vicinity of work to prevent water from accumulating or running into adjacent property.

B. The Contractor shall remove all groundwater encountered during excavation, to a location approved by the County, by pumps, drains, and other approved methods.

C. All excavation shall be performed within the limits of the work to the lines, grades, and elevations indicated and specified herein, the Contractor shall not excavate or remove materials beyond indicated sub-grade elevations or dimensions without the approval of the County. The Contractor shall backfill and compact to 90% relative density for any unauthorized excavation.

D. The Contractor shall take all necessary precautions to preclude the accidental discharge of fuel, oil, etc. and to prevent such accidents that may endanger the environment. The Contractor will be responsible for the cost of remediation the results of any such discharges or accidents. Spilled diesel fuel or oil will require excavation and soil disposal at a Class 1 landfill at the Contractor's expense.

E. The soil cover shall be compacted to a minimum of 90 percent of the maximum density in roadways, and other areas of the site, as determined by ASTM D1557A.

F. The Contractor shall comply with all applicable regulations and shall protect open excavations, trenches, holes, with fences, covers, or railing as required to maintain safe pedestrian and /or vehicular traffic and against accidental or unauthorized entry until backfilled.

G. The Contractor shall notify the County 24 hours in advance of backfilling operations to permit required testing. Density tests shall be determined by ASTM D1557-78. Compaction shall be achieved by using sheeps-foot, walk behind whackers, or vibrating rollers. Heavy impact type equipment such as stompers shall not be permitted for compaction use.

4.1.7 Costs

A. The County shall employ and pay for compaction and moisture testing in completed trenches as the County feels necessary.

B. Re-testing required because of failure of compaction density or moisture content shall be reimbursed by the Contractor to the County.

4.1.8 Excavated Soils

Excavated soils from the trenching operation may be used as trench backfill provided the following:

A. The excavated backfill soil is to be clean, odorless, vegetation free, free of refuse and any other deleterious material and to the satisfaction of the County. If the County decides that the excavated material is unsatisfactory, the County will provide backfill material, at no charge to the contractor, within a designated area within 100 linear feet of the excavation.

4.2 DISPOSAL OF REFUSE AND CONSTRUCTION DEBRIS

4.2.1 Summary

A. During the course of this Contract, excavated refuse, contaminated soil and debris, hereafter referred to as "normal waste material", will require legal disposal and shall not be used as backfill material.

B. The County shall determine whether any excavated material should be classified as waste material or hazardous material.

C. Hazardous Material

1. In the event the County or the Contractor suspects any excavation material may be hazardous (as defined by State and Federal Regulations) the Contractor shall stockpile the suspect material in a separate location from the rest of the excavated material. The suspected hazardous material shall not be used as backfill.

2. The County will make the appropriate analyses to determine if the suspected hazardous material is hazardous by State and Federal Regulations.

3. If hazardous materials are excavated from the landfill, they shall be disposed of by the Contractor in the hazardous waste disposal site designated by the County.

D. Normal waste material and soil cuttings not used as backfill shall be disposed of on site at locations designated by the County.

E. Disposal operations shall not create unsightly or unsanitary nuisances.

4.2.2 Disposal Costs

The cost for handling, transporting, and disposal of normal waste materials on site shall be included in the Contractor's unit bid price for the construction of the horizontal and vertical landfill gas extraction wells and trenching for road crossings. However, there shall be no cost to the Contractor by the County to place excavated material on the working face of the landfill.

4.2.3 Disposal

A. The Contractor shall be responsible for the complete removal and disposal of all waste material and soil cuttings each day.

B. The Contractor shall load waste material and soil cuttings directly into a truck or trailer upon removal from the trench or drilling operation.

C. The Contractor shall ensure that no waste material or soil cuttings shall extend above the sides or rear of the truck or trailer during transport. The Contractor shall provide covers for the truck or trailer during off-site transport and prior to leaving the work area.

D. The Contractor shall keep the landfill surface and all haul roads free of excavated solid materials. Any excavated material dropped during transport shall be immediately picked up and disposed of properly at the designated disposal site.

E. All materials that are listed as hazardous by a Federal or State agency shall be considered "Hazardous Materials" and handled accordingly.

F. All excavated material suspected of being hazardous shall be stockpiled, covered by the Contractor with plastic sheeting, and protected until the final determination of hazardous classification is made by the County.

G. All normal waste materials must be disposed of on a daily basis on site at locations designated by the County and thirty (30) minutes period to closing of disposal operation. Normal waste materials disposed of less than 30 minutes period to closing will be subject to back charges by the County for equipment and overtime costs.

4.3 HORIZONTAL COLLECTION WELL TRENCHING

4.3.1 Scope

Trenching for the horizontal collection wells consists of a trench with dimensions of two feet in width by four feet in depth as shown in the project drawings. The top foot of trench typically will be intermediate cover soil and the remaining three feet consists of refuse. This trenching is located on the current flat working deck of the landfill. All refuse excavated must be hauled to the current dumping area as designated by the County and be in full compliance with section 4.2 of these Provisions.

4.3.2 Backfill

Back fill soil will be provided by the County in the general area that the soil is needed. The Contractor must give the County enough notice and the quantity needed to allow for the landfill operations to schedule the scraper loads of dirt to be delivered to the area for the Contractor's use for backfilling the trench. The compaction of the backfill may be packed in using the wheels of the loader or equivalent equipment for the majority of this backfill. In any areas that the landfill operations is using as an access road for incoming traffic, a 90% relative compaction is required based on the laboratory maximum dry density, determined by ASTM D1557.

4.4 ROAD CROSSINGS

4.4.1 Scope

Road crossings must be trenched across the road and maintain a slope of 10% to make sure of proper drainage of the header or lateral piping. The road crossings trench will vary with depth from a minimum of two feet in depth to a maximum of six feet in depth. The width of the trench for road crossings must be a minimum of 24" for all pipes. The contractor should plan on encountering refuse when trenching any road crossing and perform all required transportation and disposal in compliance with section 4.2 of these specifications.

4.4.2 Backfill

The Backfill around the pipe shall be clean and free of pebbles, rocks, refuse and debris. Backfill shall be placed in lifts or layers not to exceed one foot in loose thickness before being compacted in compliance with section 4.1.6 of these specifications. All road crossings must be compacted to minimum of 90% relative compaction based on the laboratory maximum dry density, determined by ASTM D1557.

4.4.3 Pipe Bedding

A. The trench bottom shall be continuous, relatively smooth and free of rocks and /or refuse material.

B. Compaction shall be at least 90 percent of maximum density.

C. If the trench bottom is within refuse and is uneven, the contractor will add 4" to 6" of clean cover soil to the bottom of the trench before placing the pipe. In these instances the lateral will be allowed a minimum depth reduction of 4" to 6".

4.5 MEASUREMENT AND PAYMENT

Measurement of the final quantity of for **Bid Item No. 2** "Trenching & Earthwork" shall be based on actual linear feet of completed trench. All work to be paid for at a contract price per unit of measurement will be measured by the County in accordance with United States Standard measures.

This work includes excavation of trenches as described in SECTION 4 for trenching in native material, refuse and or cover soil for all 2", 3", 6", 8", 10", 12" and 16" HDPE pipes including soil backfill and compaction. This work also includes the loading, transfer and dumping of all excavated refuse on the working face at the landfill in the area designated by the County. All trenching shall be bid at the same unit price regardless of trench width, depth, or soil/refuse conditions. **Trenching & Earthwork shall be paid for on a per linear foot of completed trench basis.**

END OF SECTION

SECTION 5 - INSTALL HORIZONTAL WELL

5.1 SUMMARY

The work in this section shall include the Contractor furnishing all labor, supervision, tools, and equipment necessary to construct horizontal LFG collection. The horizontal collectors must be constructed in strict accordance with these provisions and the project drawings.

5.2 MATERIALS

5.2.1 HDPE Pipe

The HDPE perforated pipe used in the construction of the horizontal wells must be SDR 11 with 1/2" diameter holes, 6" spacing with four holes every 90 degree interval. All perforations must completely penetrate the thickness of the pipe. All perforated pipe will be supplied by the County and will be located in a strategic locating near the installation area.

5.2.2 Geotextile

All geotextile will be supplied by the County and will be located in a strategic location near the installation area. The geotextile used in the construction of the horizontal wells will have all of the following properties:

A. The geotextile shall be of woven needle punched, polyester fabric, Treviria Spunbound type, type II35 or approved equal.

B. The geotextile fabrics shall be uniform in thickness and surface texture.

C. The geotextile shall be free of any chemical treatment or coating that reduces permeability and shall be inert to chemicals commonly found in soils.

D. The geotextile must be a minimum of 125 mils thick and conform to the minimum physical properties listed below:

Property	Value	Test Method
Fabric weight	10 oz/cy	ASTM D-3776
Grab tensile strength	305 lb.	ASTM D-4632
Grab elongation	60 lb.	ASTM D-4632
Mullen burst strength	510 PSI	ASTM D-3786
Trapezoid strength	100 lb.	ASTM D-4553

5.2.3 Aggregate

The County is supplying the aggregate to be used in the construction of horizontal wells and the Contractor is to install the aggregate supplied by the County. The County will supply 2" to 4" crushed washed rock aggregate for horizontal collection well back-fill. The Contractor will have to retrieve the aggregate from the location that it is stored and install in the trench as needed.

5.3 EXECUTION

1) The work to be performed under the provision of these Specifications shall be conducted in a manner consistent with standard industry practices for such projects. No portion of this Contract shall relieve the Contractor from all applicable Federal, State, and local regulations pertaining to construction of this Project.

2) All perforated 6" HDPE SDR 11 piping shall be joined by slipping a 4' section of 8" perforated pipe over the 6" perforated pipe with 2' of 8" perforated pipe on each section of 6" perforated pipe. As shown in the project drawings.

3) Pipe must be at 10% slope prior to transitioning to the solid lateral piping.

4) Geotextile must be cut to width by the Contractor and shall be laid down on top of the aggregate across the full width of the trench before any fill dirt is placed in the trench.

5) All new horizontal solid pipe well laterals shall be capped with a schedule 40 PVC cap.

6) Pipe cutting in or near the trench shall be done only with mechanical cutters.

5.4 MEASUREMENT AND PAYMENT

Measurement of the final quantity of for **Bid Item No. 3** "Install Horizontal Well" shall be based on actual linear feet of pipe installed based on the 6"& 8" HDPE perforated pipe installed. All work is to be paid for at a contract price per unit of measurement and will be measured by the County in accordance with United States Standard measures. The installation shall be bid at one unit price. **Horizontal well installation shall be paid for on a per linear foot of installed pipe basis.**

END OF SECTION

SECTION 6 - INSTALL AGGREGATE PITS

6.1 SUMMARY

The work in this section shall include the Contractor furnishing all labor, supervision, tools, and equipment necessary to construct one aggregate pit in line with the horizontal collection wells. The dimension of the pits are 10' X 10' X 4' with the horizontal well running through the center. The aggregate and geotextile to be used is to be supplied by the County. The aggregate pits must be constructed in strict accordance with these provisions and the project drawings.

6.2 MATERIALS

6.2.1 Geotextile

The geotextile supplied by the County used in the construction of the horizontal wells will have all of the following properties:

A. The geotextile shall be of woven needle punched, polyester fabric, Treviria Spunbound type, type II35 or approved equal.

B. The geotextile fabrics shall be uniform in thickness and surface texture.

C. The geotextile shall be free of any chemical treatment or coating that reduces permeability and shall be inert to chemicals commonly found in soils.

D. The geotextile must be a minimum of 125 mils thick and conform to the minimum physical properties listed below:

Property	Value	Test Method
Fabric weight	10 oz/cy	ASTM D-3776
Grab tensile strength	305 lb.	ASTM D-4632
Grab elongation	60 lb.	ASTM D-4632
Mullen burst strength	510 PSI	ASTM D-3786
Trapezoid strength	100 lb.	ASTM D-4553

6.2.2 Aggregate

The County is supplying the aggregate to be used in the construction aggregate pits and the Contractor is to install the aggregate supplied by the County. The Contractor will have to retrieve the aggregate from the location that it is stored and install in the pits as needed.

6.3 EXECUTION

1) The work to be performed under the provision of these Specifications shall be conducted in a manner consistent with standard industry practices for such projects. No portion of this Contract shall relieve the Contractor from all applicable Federal, State, and local regulations pertaining to construction of this Project.

2) The pit shall be constructed so that the perforated piping runs directly through the center of the ten feet (10') by ten feet (10') square pit.

3) The aggregate shall be transported from the stock pile and placed in the pit in strict accordance with the project drawings.

4) Geotextile shall be cut to fit by the Contractor and must cover the entire area of the aggregate before backfill soil is placed.

6.4 MEASUREMENT AND PAYMENT

Measurement of the final quantity of for **Bid Item No. 4** "Install Aggregate Pit" is based on a lump sum basis per pit constructed. All work is to be paid for at a contract price per pit constructed. **Aggregate pit installation shall be paid for in lump sum per pit constructed basis.**

END OF SECTION

SECTION 7 - DRILL & INSTALL VERTICAL GAS WELLS

7.1 SUMMARY

1) Construction of the landfill gas extraction wells shall consist of construction and removal of temporary drill pads if required, drilling vertical boreholes and installing HDPE SDR 17 perforated pipe, fittings, HDPE pipe, bentonite and aggregate, all in accordance with details as indicated on the Project Drawings and as specified herein. The drill rig shall have at least 70,000 foot-pounds of torque and a push down thrust force of 25,000 pounds. The County recommends a track mounted IMT AF 10 or equivalent type drill rig.

2) Landfill gas extraction well lengths within each borehole may be changed by the County following drilling. The wells shall then be constructed according to the drilling table shown on the Project Drawings.

3) There shall be one well in each borehole. The drilling table on the Project Drawings shows the corresponding borehole depths, and approximate well depths.

4) All perforated HDPE pipe and fittings used in the construction of the wells shall be 4"or 6" SDR 17 unless shown otherwise on the Project Drawings. The HDPE shall be perforated as indicated on the well details. All HDPE solid pipe and fittings in the wells shall be SDR 17 unless shown otherwise on the Project Drawings.

5) The cost of drill pads, excavation, backfill, storage of excavated material related to the installation of gas extraction wells shall be included in the extraction wells construction costs.

6) The minimum diameter of the hole drilled for the borehole shall be as indicated on the Project Drawings.

7) The Contractor shall comply with all safety procedures for LFG well construction included in these Specifications and Contractor's Health and Safety Plan.

8) The unit price for installation of vertical landfill extraction well shall be per vertical foot of well installed. The measurement of the well for payment shall be from the bottom of the borehole to existing grade.

9) The County must approve the depth measurement procedures used by the contractor. The County may verify measurements as the County deems appropriate.

10) Drilling shall be performed according to the applicable conditions of the SCAQMD Permit to Construct.

11) During drilling, an SCAQMD approved emission control box shall be placed over the well hole to collect landfill gas. The collected gas shall be directed to a 55 gallon carbon absorption unit using an explosion-proof exhaust fan/blower (1/3 hp min.) with a minimum capacity of delivering 100 cfm at 1" static pressure. The 55 gallon carbon absorption unit shall be capable of removing vapor phase hydrogen sulfide (H_2S) by impregnation with potassium hydroxide (KOH). A permit for the emission control box, carbon absorption unit, and related equipment has been obtained by the County from the SCAQMD and may be reviewed by the Contractor at the County's main office during regular business hours. A copy of the permit may be provided to the Contractor upon request for no additional cost.

12) A spare carbon absorption unit shall be available on site for replacement in the event that excessive odor being released to the atmosphere during drilling.

13) The Contractor shall cease drilling if native soil or groundwater is encountered and/or so as directed by the County. The Contractor shall not be compensated for drilling deeper than the indicated depth on the plans or than that specified by the County.

7.2 SCOPE OF WORK

1) The Contractor shall drill and install vertical landfill gas extraction wells as shown on the Project Drawings.

2) The County will stake the actual extraction well locations.

3) The general locations of the extraction wells shall be as shown on the Project Drawings unless otherwise directed by the County.

7.3 MATERIALS

7.3.1 Pipe and Fittings

A. HDPE pipe and fittings in the wells shall be SDR 17 unless otherwise indicated on the Project Drawings.

B. HDPE pipe and fittings in the wells shall be SDR 17 as shown on the Project Drawings.

C. The perforation dimension and the length of the perforated pipes in the vertical extraction wells are shown on the Project Drawings. Each extraction well shall be equipped with an identification tag approved by the County.

7.3.2 Aggregate (vertical wells only)

A. The backfill around the perforated pipe shall consist of clean, washed 1"- 2" crushed aggregate with the dimensions indicated in these Specifications and on the Project Drawings. The County shall provide gravel to the Contractor. The Contractor will have to retrieve the aggregate from the location that it is stored and install in the vertical wells as needed.

B. Aggregate Type - Crushed **Washed** Rock: Natural stone; washed, free of dust, fines, clay, shale, and organic matter; graded in accordance with the following limits: Marble, calcium carbonate or other similar chemically reactive stone shall not be used.

1. Minimum Size: 1 inch

2. Maximum Size: 2 inch

7.3.3 Bentonite

Bentonite chips shall be used for probe seals. Pelletized bentonite may also be used, subject to approval by the County. The bentonite chips shall be hydrated in the bore hole. Bags of bentonite will be provided by the County to the Contractor.

7.4 EXECUTION

1) The bore for the extraction well shall be straight and the gas extraction wells shall be installed as shown on the Project Drawings. The Contractor shall take all necessary precautions to maintain the well pipes vertical during the backfill operation of bore. If the pipe installed is out of plumb, the Contractor at its own expense will correct the alignment.

2) The upper 10 feet of the backfill material around the solid well casings shall be compacted greater than 90 percent of maximum density. Soil shall be placed in one (1) foot loose lifts and compacted.

3) All extraction well pipes shall be suspended from the surface during backfilling. Pipe shall not be allowed to rest on the bottom of the borehole.

4) If during the drilling of extraction well borehole an obstruction is encountered such that the gas well cannot be completed as called for in the Project Drawings, the County shall be consulted whether the borehole has advanced to a sufficient depth. If, in the opinion of the County, the borehole has reached a sufficient depth, the Contractor will be required to complete the gas well, and he will be compensated based on the finished depth actually reached, at the unit price included in the bid. If, in the opinion of the County, the borehole has not reached a sufficient depth to function as an effective gas well, the Contractor will abandon this borehole by backfilling it with soil. The upper 5 feet backfill of soil in the borehole shall be compacted. A bentonite seal one foot thick will be placed in the hole four feet below the surface. The Contractor will not be compensated for abandoned holes.

5) The top of the gas wells shall be capped immediately following installation.

6) Bentonite chips shall be fully hydrated inside of the borehole with approximately 30 gallons of clean water.

7) 6" of pea gravel shall be placed on top of the larger crushed gravel before the bentonite is placed in the hole.

8) Bentonite seals shall be a minimum of 2 feet thick.

9) Landfill bottom and\or Groundwater Encountered.

   1. If during the drilling of a gas well borehole landfill bottom and\or groundwater is encountered, the Contractor shall stop drilling and immediately alert the County. The Contractor shall backfill and seal the borehole with bentonite clay two (2) feet above the bottom of the landfill or five (5) feet above the groundwater table. The Payment shall be based on the maximum depth reached prior to backfill with bentonite, provided the depth was less than the depth shown on the Project Drawings or as requested by the County.

   2. If the groundwater encountered is determined by the County to be the upper aquifer, the Contractor shall seal the borehole with bentonite to an elevation five (5) feet above the water table and construct the gas extraction well above the seal.

10) The Contractor shall re-drill any borehole that caved in due to loose refuse or because it was not completed until the next working day. The Contractor shall not be compensated for caved boring.

11) In the event that a well is not completed by the end of the day and is to be left open, the Contractor shall seal the borehole by placing an impermeable membrane and heavy plywood or steel plate over the opening and lowering the auger over the top of the cover. The Contractor shall post warning signs and shall cordon off the area with safety ribbon and barricades. At all times, the Contractor shall be responsible in enforcing the Health and Safety requirement and secure the construction area.

7.5 MEASUREMENT AND PAYMENT

Measurement of the final quantity of for **Bid Item No. 5** "Drill and Install Vertical Gas Wells" shall be based on based on actual vertical depth in linear feet of well. The installation shall be bid at one unit price. No payment will be made for partially completed wells in the event of refusal or wells drilled deeper than shown in the project drawings unless directed by the County. **Drilling and installing vertical wells shall be paid for on a completed vertical foot of depth of vertical well (linear foot of borehole depth) basis.**

END OF SECTION

SECTION 8 - INSTALL 2" HDPE PIPE

8.1 SUMMARY

The work in this section shall include the Contractor furnishing all labor, supervision, tools, and equipment necessary to install 2" condensate drain pipe. The condensate drain pipe and connections must be constructed in strict accordance with these provisions and the project drawings.

8.2 MATERIALS

8.2.1 HDPE Pipe and Fittings

A. The HDPE pipe supplied in this section shall be 2" diameter SDR 11.

B. HDPE pipe shall conform to the requirements of Section 207-19 of the Standard Specifications unless otherwise indicated on the Plans and Specifications.

C. All landfill gas piping and fittings shall be made from a polyethylene resin Type 3408 except where called out otherwise on the Project Drawings. HDPE pipe shall be protected against U.V. degradation from exposure to the sun.

D. HDPE fittings shall be of material which is compatible with the pipe for the purpose of fusion welding and shall be free from cracks, holes foreign intrusions, voids, or other defects. The minimum "quick-burst" strength of the fittings shall not be less than that of the pipe.

8.2.2 Extra Materials

A. The Contractor shall neatly store for the County, upon verbal request, any extra materials left from the work and paid for in advance by the County. The storage location shall be designated by the County

8.3 EXECUTION

1) The work to be performed under the provision of these Specifications shall be conducted in a manner consistent with standard industry practices for such projects. No portion of this Contract shall relieve the Contractor from all applicable Federal, State, and local regulations pertaining to construction of this Project.

2) All HDPE piping shall be joined by butt fusion and in conformance with the manufacturer's recommendations. Laterals shall be joined to the header pipe by fusion welding branch saddles using a McElroy Sidewinder Chain Clamp Fusion Unit or equivalent or with the use of tees.

3) Fusion welding of HDPE pipe shall be performed by a qualified person. The pipe supplier shall verify the qualifications of the pipe installer, and the Contractor shall submit a copy of this verification to the County. No pipe shall be installed prior to submittal of the verification.

4) Flange alignment shall be perpendicular to pipe center line and shall not exceed plus or minus 1/32 of an inch in tolerance measured at the flange O.D.

5) Pipe cutting shall be done only with mechanical cutters.

6) All pipes 2 inches and larger shall be flanged at the weld ends and welded with full penetration butt welds.

7) When mating to piece of equipment with a flat-face flange, the corresponding pipe flange shall also be flat faced. Otherwise, all flanges shall be raised face.

8) There will be approximately two fittings per one-hundred feet of piping. Fittings are defined as but not limited to: elbows, reducers, flange adapters, tees, and saddles. The cost of this bid item shall include the installation of these fittings.

8.4 MEASUREMENT AND PAYMENT

Measurement of the final quantity of for **Bid Item No. 6** "Install 2" HDPE Pipe" shall be based on actual linear feet of pipe installed. All work is to be paid for at a contract price per unit of measurement and will be measured by the County in accordance with United States Standard measures. The installation shall be bid at one unit price. **Install 2" HDPE pipe shall be paid for on a per linear foot of installed pipe basis.**

END OF SECTION

SECTION 9 - INSTALL 3" HDPE LATERAL PIPE

9.1 SUMMARY

The work in this section shall include the Contractor furnishing all labor, supervision, tools, and equipment necessary to install lateral piping new vertical LFG collection lateral piping. The 3" HDPE lateral pipes must be constructed in strict accordance with these specifications and the project drawings.

9.2 MATERIALS

9.2.1 HDPE Pipe and Fittings

A. The HDPE pipe supplied in this section shall be 3" diameter SDR 11 or 17.

B. HDPE pipe shall conform to the requirements of Section 207-19 of the Standard Specifications unless otherwise indicated on the Plans and Specifications.

C. All landfill gas piping and fittings shall be made from a polyethylene resin Type 3408 except where called out otherwise on the Project Drawings. HDPE pipe shall be protected against U.V. degradation from exposure to the sun.

D. HDPE fittings shall be of material which is compatible with the pipe for the purpose of fusion welding and shall be free from cracks, holes foreign intrusions, voids, or other defects. The minimum "quick-burst" strength of the fittings shall not be less than that of the pipe.

9.2.2 Infra-just Pipe Supports

The Contractor will install one 3" infra-just support for each new lateral pipe near well head as shown in the Project Drawings. The Contractor shall install 1 ¼" black or galvanized pipe to anchor the infra-just support to the ground. An infra-just support is to be installed only at the end of each lateral to anchor near the existing header and the well head. The project drawings show details of the installation.

9.2.3 Extra Materials

A. The Contractor shall be responsible for all extra materials resulting from quantity estimating. The cost of such materials shall be borne by the Contractor.

B. The Contractor shall neatly store for the County, upon verbal request, any extra materials left from the work and paid for in advance by the County. The storage location shall be designated by the County

9.2.4 Miscellaneous Part

All 1 ¼" steel pipe anchors shall be schedule 40 black or galvanized pipe.

9.3 EXECUTION

1) The work to be performed under the provision of these Specifications shall be conducted in a manner consistent with standard industry practices for such projects. No portion of this Contract shall relieve the Contractor from all applicable Federal, State, and local regulations pertaining to construction of this Project.

2) All HDPE piping shall be joined by butt fusion and in conformance with the manufacturer's recommendations. Laterals shall be joined to the header pipe by fusion welding branch saddles using a McElroy Sidewinder Chain Clamp Fusion Unit or equivalent or with the use of tees.

3) Fusion welding of HDPE pipe shall be performed by a qualified person. The pipe supplier shall verify the qualifications of the pipe installer, and the Contractor shall submit a copy of this verification to the County. No pipe shall be installed prior to submittal of the verification.

4) Flange alignment shall be perpendicular to pipe center line and shall not exceed plus or minus 1/32 of an inch in tolerance measured at the flange O.D.

5) Pipe cutting shall be done only with mechanical cutters.

6) All pipes 2 inches and larger shall be flanged at the weld ends and welded with full penetration butt welds.

7) When mating to piece of equipment with a flat-face flange, the corresponding pipe flange shall also be flat faced. Otherwise, all flanges shall be raised face.

8) Infra-just pipe supports and pipe anchors shall be installed at the end of each lateral near the header pipe. Pipe anchors shall be driven into the ground a minimum of 30". Sharp edges on pipe ends shall be filed down.

9) There will be approximately two fittings per one-hundred feet of piping. Fittings are defined as, but not limited to: elbows, reducers, flange adapters, tees, and saddles. The cost of this bid item shall include the installation of these fittings.

9.4 MEASUREMENT AND PAYMENT

Measurement of the final quantity of for **Bid Item No. 7** "Install 3" HDPE pipe" shall be based on actual linear feet of pipe installed. All work is to be paid for at a contract price per unit of measurement and will be measured by the County in accordance with United States Standard measures. The installation shall be bid at one unit price. **Install 3" HDPE lateral pipe shall be paid for on a per linear foot of installed pipe basis.**

END OF SECTION

SECTION 10 - INSTALL 6" HDPE LATERAL PIPE

10.1 SUMMARY

The work in this section shall include the Contractor furnishing all labor, supervision, tools, and equipment necessary to install new 6" lateral piping. The horizontal well lateral pipes must be constructed in strict accordance with these provisions and the project drawings.

10.2 MATERIALS

10.2.1 HDPE Pipe and Fittings

A. The HDPE pipe supplied in this section shall be 6" diameter SDR 11 or 17.

B. HDPE pipe shall conform to the requirements of Section 207-19 of the Standard Specifications unless otherwise indicated on the Plans and Specifications.

C. All landfill gas piping and fittings shall be made from a polyethylene resin Type 3408 except where called out otherwise on the Project Drawings. HDPE pipe shall be protected against U.V. degradation from exposure to the sun.

D. HDPE fittings shall be of material which is compatible with the pipe for the purpose of fusion welding and shall be free from cracks, holes foreign intrusions, voids, or other defects. The minimum "quick-burst" strength of the fittings shall not be less than that of the pipe.

10.2.2 Infra-just Pipe Supports

The Contractor will install one 6" infra-just supports for anchoring each new 6" lateral pipe near the existing or proposed header pipe. The Contractor shall install the 1 ¼" black or galvanized pipe to anchor the infra-just support to the ground. The infra-just support is to be installed only at the end of each lateral to anchor near the existing header. The project drawings show details of the installation.

10.2.3 Extra Materials

A. The Contractor shall be responsible for all extra materials resulting from quantity estimating. The cost of such materials shall be borne by the Contractor.

B. The Contractor shall neatly store for the County, upon verbal request, any extra materials left from the work and paid for in advance by the County. The storage location shall be designated by the County

10.3 EXECUTION

1) The work to be performed under the provision of these Specifications shall be conducted in a manner consistent with standard industry practices for such projects. No portion of this Contract shall relieve the Contractor from all applicable Federal, State, and local regulations pertaining to construction of this Project.

2) All HDPE piping shall be joined by butt fusion and in conformance with the manufacturer's recommendations. Laterals shall be joined to the header pipe by fusion welding branch saddles using a McElroy Sidewinder Chain Clamp Fusion Unit or equivalent or with the use of tees.

3) Fusion welding of HDPE pipe shall be performed by a qualified person. The pipe supplier shall verify the qualifications of the pipe installer, and the Contractor shall submit a copy of this verification to the County. No pipe shall be installed prior to submittal of the verification.

4) Flange alignment shall be perpendicular to pipe center line and shall not exceed plus or minus 1/32 of an inch in tolerance measured at the flange O.D.

5) Pipe cutting shall be done only with mechanical cutters.

6) All pipes 2 inches and larger shall be flanged at the weld ends and welded with full penetration butt welds.

7) Infra-just pipe supports and pipe anchors shall be installed the end of each lateral pipe. Pipe anchors shall be driven into the ground a minimum of 30". Sharp edges on pipe ends shall be filed down.

8) 6" Schedule 40 PVC caps shall be slipped on the end of each lateral pipe.

9) There will be approximately two fittings per one-hundred feet of piping. Fittings are defined as, but not limited to: elbows, reducers, flange adapters, tees, and saddles. The cost of this bid item shall include the installation of these fittings.

10.4 MEASUREMENT AND PAYMENT

Measurement of the final quantity of for **Bid Item No. 8** "Install 6" HDPE pipe" shall be based on actual linear feet of pipe installed. All work is to be paid for at a contract price per unit of measurement and will be measured by the County in accordance with United States Standard measures. The installation shall be bid at one unit price. **Install 6" HDPE pipe shall be paid for on a per linear foot of installed pipe basis.**

END OF SECTION

SECTION 11 - INSTALL 8" HEADER PIPE

11.1 SUMMARY

The work in this section shall include the Contractor furnishing all labor, supervision, tools, and equipment necessary to install 8" HDPE SDR 17 mostly above grade header pipe.

11.2 MATERIALS

11.2.1 HDPE Pipe and Fittings

A. The HDPE pipe supplied in this section shall be 8" diameter SDR 17.

B. HDPE pipe shall conform to the requirements of Section 207-19 of the Standard Specifications unless otherwise indicated on the Plans and Specifications.

C. All landfill gas piping and fittings shall be made from a polyethylene resin Type 3408 except where called out otherwise on the Project Drawings. HDPE pipe shall be protected against U.V. degradation from exposure to the sun.

D. HDPE fittings shall be of material which is compatible with the pipe for the purpose of fusion welding and shall be free from cracks, holes foreign intrusions, voids, or other defects. The minimum "quick-burst" strength of the fittings shall not be less than that of the pipe.

E. If the butterfly valve's disk interferes with the inside diameter of the pipe, the Contractor has the option to either remove excess material from the ID of the pipe flange adapter by machining, add spacers as recommended by supplier, or use a flange adapter with a thickness that will allow the valve to clear the pipe

11.2.2 Infra-just Pipe Supports

The Contractor will install 8" infra-just supports for anchoring the new 8" header pipe in place. The Contractor shall install the 1 ¼" black or galvanized pipe to anchor the infra-just supports to the ground. The infra-just supports are to be installed every 70' along the new section of header to secure the pipe in place. The project drawings show details of the installation.

11.2.3 Rebar

The Contractor shall install minimum of #4 (1/2" diameter) rebar on the downhill side of the pipe every 10' along the relocated header pipe. The rebar shall be driven into the ground a minimum of 18" and shall extend several inches above the header pipe. The Contractor is to install plastic safety caps on each rebar installed.

11.2.4 Valves

A. Butterfly valves used in the landfill gas collection system, supplied by the County, shall be 150 lb. Full lug cast iron body with stainless steel disk, 316 stainless steel stem, and Viton liner or approved equal. Valve bodies may be painted.

B. All bolting for valves shall be 316 SS.

C. The 8" butterfly valve shall have a gear operator with a valve position indicator.

D. All butterfly valves shall be installed so that the valve stem is located on the vertical axis and the operator is located at the top of the valve.

E. Valve installation shall be per the manufacturer's specifications.

11.2.5 Extra Materials

A. The Contractor shall neatly store for the County, upon verbal request, any extra materials left from the work and paid for in advance by the County. The storage location shall be designated by the County.

11.2.6 Miscellaneous Part

A. All bolts, washers and nuts shall be 316 stainless steel.

B. All flange gaskets shall be made of Neoprene.

C. Rebar stakes shall be billet steel conforming to ASTM A 615 and shall be either Grade 40 or 60. The rebar shall be ½' diameter (#4) and three feet long.

D. Plastic rebar safety caps shall be per OSHA approved industrial standards.

E. All 1 ¼" steel pipe anchors shall be schedule 40 black or galvanized pipe.

11.3 EXECUTION

1) The work to be performed under the provision of these Specifications shall be conducted in a manner consistent with standard industry practices for such projects. No portion of this Contract shall relieve the Contractor from all applicable Federal, State, and local regulations pertaining to construction of this Project.

2) All HDPE piping shall be joined by butt fusion and in conformance with the manufacturer's recommendations. Laterals shall be joined to the header pipe by fusion welding branch saddles using a McElroy Sidewinder Chain Clamp Fusion Unit or equivalent or with the use of tees.

3) Fusion welding of HDPE pipe shall be performed by a qualified person. The pipe supplier shall verify the qualifications of the pipe installer, and the Contractor shall submit a copy of this verification to the County. No pipe shall be installed prior to submittal of the verification.

4) Flange alignment shall be perpendicular to pipe center line and shall not exceed plus or minus 1/32 of an inch in tolerance measured at the flange O.D.

5) All bolts and nuts must be easily accessible for installation and tightening. All nuts, washers and bolts shall be 316 stainless steel.

6) Pipe cutting shall be done only with mechanical cutters.

7) All pipes 2 inches and larger shall be flanged at the weld ends and welded with full penetration butt welds.

8) When mating to piece of equipment with a flat-face flange, the corresponding pipe flange shall also be flat faced. Otherwise, all flanges shall be raised face.

9) The 8" header pipe shall be held horizontally in place by installing #4 rebar stakes as shown in the project drawings. After placement, the rebar shall be capped with plastic safety caps.

10) Infra-just pipe supports and pipe anchors shall be installed on the average of every 70 linear feet or as instructed by the engineer. Pipe anchors shall be driven into the ground a minimum of 30". Sharp edges on pipe ends shall be filed down.

11) There will be approximately two fittings per one-hundred feet of piping. Fittings are defined as but not limited to: elbows, reducers, flange adapters, tees, valves and saddles. The cost of this bid item shall include the installation of these fittings

11.4 MEASUREMENT AND PAYMENT

Measurement of the final quantity of for **Bid Item No. 9** "Install 8" HDPE Header pipe" shall be based on actual linear feet of pipe installed. All work is to be paid for at a contract price per unit of measurement and will be measured by the County in accordance with United States Standard measures. The installation shall be bid at one unit price. **Install 8" HDPE header pipe shall be paid for on a per linear foot of installed pipe basis.**

END OF SECTION

SECTION 12 - INSTALL 10" HEADER PIPE

12.1 SUMMARY

The work in this section shall include the Contractor furnishing all concrete, re-bar, labor, supervision, tools, and equipment necessary to install 10" HDPE SDR 17 below grade and above grade header pipe.

This work also includes the installation of elevated 10" header pipe with two adjustable support posts, footings, pipe saddle support and U-bolt.

12.2 MATERIALS

12.2.1 HDPE Pipe and Fittings

A. The HDPE pipe supplied in this section shall be 10" diameter SDR 17.

B. HDPE pipe shall conform to the requirements of Section 207-19 of the Standard Specifications unless otherwise indicated on the Plans and Specifications.

C. All landfill gas piping and fittings shall be made from a polyethylene resin Type 3408 except where called out otherwise on the Project Drawings. HDPE pipe shall be protected against U.V. degradation from exposure to the sun.

D. HDPE fittings shall be of material which is compatible with the pipe for the purpose of fusion welding and shall be free from cracks, holes foreign intrusions, voids, or other defects. The minimum "quick-burst" strength of the fittings shall not be less than that of the pipe.

E. If the butterfly valve's disk interferes with the inside diameter of the pipe, the Contractor has the option to either remove excess material from the ID of the pipe flange adapter by machining, add spacers as recommended by supplier, or use a flange adapter with a thickness that will allow the valve to clear the pipe

12.2.2 Infra-just Pipe Supports

The Contractor will install 10" infra-just supports for anchoring the new 10" header pipe in place. The Contractor shall install the 1 ¼" black or galvanized pipe to anchor the infra-just supports to the ground. The infra-just supports are to be installed every 70' along the new section of header to secure the pipe in place. The project drawings show details of the installation.

12.2.3 Rebar

The Contractor shall install minimum of #4 (1/2" diameter) rebar on the downhill side of the pipe every 10' along the relocated header pipe. The rebar shall be driven into the ground a minimum of 18" and shall extend several inches above the header pipe. The Contractor is to install plastic safety caps on each rebar installed.

The Contractor shall install minimum of #4 (1/2" diameter) rebar one foot on center on pipe support footings

12.2.4 Valves

A. Butterfly valves used in the landfill gas collection system, supplied by the County, shall be 150 lb. Full lug cast iron body with stainless steel disk, 316 stainless steel stem, and Viton liner or approved equal. Valve bodies may be painted.

B. All bolting for valves shall be 316 SS.

C. All butterfly valves shall be installed so that the valve stem is located on the vertical axis and the operator is located at the top of the valve.

D. Valve installation shall be per the manufacturer's specifications.

12.2.5 Extra Materials

A. The Contractor shall neatly store for the County, upon verbal request, any extra materials left from the work and paid for in advance by the County. The storage location shall be designated by the County.

12.2.6 Miscellaneous Part

A. All bolts, washers and nuts shall be 316 stainless steel.

B. All flange gaskets shall be made of Neoprene.

C. Rebar stakes shall be billet steel conforming to ASTM A 615 and shall be either Grade 40 or 60. The rebar shall be ½' diameter (#4) and three feet long.

D. Plastic rebar safety caps shall be per OSHA approved industrial standards.

E. All 1 ¼" steel pipe anchors shall be schedule 40 black or galvanized pipe.

12.2.7 Concrete

A. Two concrete post footing shall be installed as shown in the drawings.

B. Concrete shall consist of Portland cement, aggregates, water and admixtures when approved for use.

C. Materials used in concrete shall conform the Section 201-1.2 of the Standard Specifications.

D. Reinforcements shall conform to Section 201-2 of the Standard Specifications.

E. Concrete curing compounds shall be used and shall meet Federal Specifications TT-c-800, Type I. Class 1 non yellowing with minimum 18 percent solids and maximum unit moisture loss of 0.039gm/cm2. Approved manufacturer shall be Gifford-Hill "Sealco 800", ProSoCo "Kure and Seal", Protex "Acychlor, Sonneborn "Kure-N-Seal" or approved equal or the Contractor shall use 6 mil. Polyethylene film for protection during curing.

F. The minimum concrete compressive strength shall be 3000 PSI unless otherwise specified. The slump shall not exceed 4 inches at the time it is being placed in conformance with ASTM C150.

12.3 EXECUTION

1) The work to be performed under the provision of these Specifications shall be conducted in a manner consistent with standard industry practices for such projects. No portion of this Contract shall relieve the Contractor from all applicable Federal, State, and local regulations pertaining to construction of this Project.

2) All HDPE piping shall be joined by butt fusion and in conformance with the manufacturer's recommendations. Laterals shall be joined to the header pipe by fusion welding branch saddles using a McElroy Sidewinder Chain Clamp Fusion Unit or equivalent or with the use of tees.

3) Fusion welding of HDPE pipe shall be performed by a qualified person. The pipe supplier shall verify the qualifications of the pipe installer, and the Contractor shall submit a copy of this verification to the County. No pipe shall be installed prior to submittal of the verification.

4) Flange alignment shall be perpendicular to pipe center line and shall not exceed plus or minus 1/32 of an inch in tolerance measured at the flange O.D.

5) All bolts and nuts must be easily accessible for installation and tightening. All nuts, washers and bolts shall be 316 stainless steel.

6) Pipe cutting shall be done only with mechanical cutters.

7) All pipes 2 inches and larger shall be flanged at the weld ends and welded with full penetration butt welds.

8) When mating to piece of equipment with a flat-face flange, the corresponding pipe flange shall also be flat faced. Otherwise, all flanges shall be raised face.

9) The 10" header pipe shall be held horizontally in place by installing #4 rebar stakes as shown in the project drawings. After placement, the rebar shall be capped with plastic safety caps.

10) Infra-just pipe supports and pipe anchors shall be installed on the average of every 70 linear feet or as instructed by the engineer. Pipe anchors shall be driven into the ground a minimum of 30". Sharp edges on pipe ends shall be filed down.

11) There will be approximately two fittings per one-hundred feet of piping. Fittings are defined as but not limited to: elbows, reducers, flange adapters, tees, valves and saddles. The cost of this bid item shall include the installation of these fittings.

12) Each pipe stand shall include a four hole steel base, 3" diameter steel pipe, adjustable steel support, steel pipe saddle and U-bolt. Red-head anchor concrete bolts shall be supplied by the County and installed by the Contractor.

12.4 MEASUREMENT AND PAYMENT

Measurement of the final quantity of for **Bid Item No. 10** "Install 10" HDPE Header pipe" shall be based on actual linear feet of pipe installed. All work is to be paid for at a contract price per unit of measurement and will be measured by the County in accordance with United States Standard measures. The installation shall be bid at one unit price. **Install 10" HDPE header pipe shall be paid for on a per linear foot of installed pipe basis.**

END OF SECTION

SECTION 13 - INSTALL 12" HEADER PIPE

13.1 SUMMARY

The work in this section shall include the Contractor furnishing all labor, supervision, tools, and equipment necessary to install 12" HDPE SDR 17 mostly above grade header pipe.

13.2 MATERIALS

13.2.1 HDPE Pipe and Fittings

A. The HDPE pipe supplied in this section shall be 12" diameter SDR 17.

B. HDPE pipe shall conform to the requirements of Section 207-19 of the Standard Specifications unless otherwise indicated on the Plans and Specifications.

C. All landfill gas piping and fittings shall be made from a polyethylene resin Type 3408 except where called out otherwise on the Project Drawings. HDPE pipe shall be protected against U.V. degradation from exposure to the sun.

D. HDPE fittings shall be of material which is compatible with the pipe for the purpose of fusion welding and shall be free from cracks, holes foreign intrusions, voids, or other defects. The minimum "quick-burst" strength of the fittings shall not be less than that of the pipe.

E. If the butterfly valve's disk interferes with the inside diameter of the pipe, the Contractor has the option to either remove excess material from the ID of the pipe flange adapter by machining, add spacers as recommended by supplier, or use a flange adapter with a thickness that will allow the valve to clear the pipe

13.2.2 Infra-just Pipe Supports

The Contractor will install 12" infra-just supports for anchoring the new 12" header pipe in place. The Contractor shall supply the 1 ¼" black or galvanized pipe to anchor the infra-just supports to the ground. The infra-just supports are to be installed every 70' along the new section of header to secure the pipe in place. The project drawings show details of the installation.

13.2.3 Rebar

The Contractor shall install minimum of #4 (1/2" diameter) rebar on the downhill side of the pipe every 10' along the relocated header pipe. The rebar shall be driven into the ground a minimum of 18" and shall extend several inches above the header pipe. The Contractor is to install plastic safety caps on each rebar installed.

13.2.4 Valves

A. Butterfly valves used in the landfill gas collection system, supplied by the County, shall be 150 lb. Full lug cast iron body with stainless steel disk, 316 stainless steel stem, and Viton liner or approved equal. Valve bodies may be painted.

B. All bolting for valves shall be 316 SS.

C. 12" butterfly valves shall have a gear operator with a valve position indicator.

D. All butterfly valves shall be installed so that the valve stem is located on the vertical axis and the operator is located at the top of the valve.

E. Valve installation shall be per the manufacturer's specifications.

13.2.5 Extra Materials

A. The Contractor shall neatly store for the County, upon verbal request, any extra materials left from the work and paid for in advance by the County. The storage location shall be designated by the County.

13.2.6 Miscellaneous Part

A. All bolts, washers and nuts shall be 316 stainless steel.

B. All flange gaskets shall be made of Neoprene.

C. Rebar stakes shall be billet steel conforming to ASTM A 615 and shall be either Grade 40 or 60. The rebar shall be ½' diameter (#4) and three feet long.

D. Plastic rebar safety caps shall be per OSHA approved industrial standards.

E. All 1 ¼" steel pipe anchors shall be schedule 40 black or galvanized pipe.

13.3 EXECUTION

1) The work to be performed under the provision of these Specifications shall be conducted in a manner consistent with standard industry practices for such projects. No portion of this Contract shall relieve the Contractor from all applicable Federal, State, and local regulations pertaining to construction of this Project.

2) All HDPE piping shall be joined by butt fusion and in conformance with the manufacturer's recommendations. Laterals shall be joined to the header pipe by fusion welding branch saddles using a McElroy Sidewinder Chain Clamp Fusion Unit or equivalent or with the use of tees.

3) Fusion welding of HDPE pipe shall be performed by a qualified person. The pipe supplier shall verify the qualifications of the pipe installer, and the Contractor shall submit a copy of this verification to the County. No pipe shall be installed prior to submittal of the verification.

4) Flange alignment shall be perpendicular to pipe center line and shall not exceed plus or minus 1/32 of an inch in tolerance measured at the flange O.D.

5) All bolts and nuts must be easily accessible for installation and tightening. All nuts, washers and bolts shall be 316 stainless steel.

6) Pipe cutting shall be done only with mechanical cutters.

7) All pipes 2 inches and larger shall be flanged at the weld ends and welded with full penetration butt welds.

8) When mating to piece of equipment with a flat-face flange, the corresponding pipe flange shall also be flat faced. Otherwise, all flanges shall be raised face.

9) The 12" header pipe shall be held horizontally in place by installing #4 rebar stakes as shown in the project drawings. After placement, the rebar shall be capped with plastic safety caps.

10) Infra-just pipe supports and pipe anchors shall be installed on the average of every 70 linear feet or as instructed by the engineer. Pipe anchors shall be driven into the ground a minimum of 30". Sharp edges on pipe ends shall be filed down.

11) There will be approximately two fittings per one-hundred feet of piping. Fittings are defined as but not limited to: elbows, reducers, flange adapters, tees, valves and saddles. The cost of this bid item shall include the installation of these fittings

13.4 MEASUREMENT AND PAYMENT

Measurement of the final quantity of for **Bid Item No. 11** "Install 12" HDPE Header Pipe" shall be based on actual linear feet of pipe installed. All work is to be paid for at a contract price per unit of measurement and will be measured by the County in accordance with United States Standard measures. The installation shall be bid at one unit price. **Install 12" HDPE header pipe shall be paid for on a per linear foot of installed pipe basis.**

END OF SECTION

SECTION 14 - INSTALL 16" HEADER PIPE AND CONDENSATE KNOCKOUT VESSEL

14.1 SUMMARY

The work in this section shall include the Contractor furnishing all concrete, re-bar, labor, supervision, tools, and equipment necessary to install 16" HDPE SDR 17 above and below grade header pipe and condensate knock-out vessel. This work shall include:

1. The excavation of an existing 12" diameter header pipe and installation of a 16" HDPE SDR 17 fabricated tee with two (2) 16" x 12" HDPE SDR concentric reducing coupling attached to the 12" header pipe with two (2) 12" diameter electro-fusion couplings. See drawings.

2. Trench 300 feet and install 16" diameter HDPE SDR 17 header pipe in trench. Install one 16" diameter 90 degree HDPE SDR 17 elbow. Cut and cap existing buried 8" header pipe on north if need be. Trenching and earthwork to be measured as part of Bid Item No. 2, Trenching and Earthwork. See drawings.

3. Install 16" HDPE SDR 17 tee, daylight pipe to surface and extend 300 feet north above grade to flare station area. See drawings.

4. Install 16" x 8" HDPE SDR 17 eccentric reducer coupling and trench and extend 8" HDPE SDR 11 pipe south and wye into existing buried 8" diameter HDPE header pipe using two (2) 8' diameter electro-fusion couplings. Trenching and earthwork to be measured as part of Bid Item No. 2, Trenching and Earthwork. See drawings.

5. Install 16" flange adapter and back-up ring to above grade header 16" header pipe and attach to south side flange of above ground condensate knock-out vessel using supplied gasket and bolts. Work includes the supply an installation of a 7' x 7' x 8" concrete pad and ten and one-half (10 ½) tall by three (3) feet wide condensate knock-out vessel as shown in the drawings.

6. Install 20 feet of above ground elevated 16" HDPE pipe with 16" x 10" reducing tee, flange adapter and blind flange. On south side install 16" flange adapter with ring and attach to condensate knock-out vessel flange. Work to include the construction of adjustable pipe supports stands and two concrete footings as seen in the drawings. Concrete to be supplied by the Contractor.

14.2 MATERIALS

14.2.1 HDPE Pipe and Fittings

A. The HDPE pipe supplied in this section shall be 16" diameter SDR 17.

B. HDPE pipe shall conform to the requirements of Section 207-19 of the Standard Specifications unless otherwise indicated on the Plans and Specifications.

C. All landfill gas piping and fittings shall be made from a polyethylene resin Type 3408 except where called out otherwise on the Project Drawings. HDPE pipe shall be protected against U.V. degradation from exposure to the sun.

D. HDPE fittings shall be of material which is compatible with the pipe for the purpose of fusion welding and shall be free from cracks, holes foreign intrusions, voids, or other defects. The minimum "quick-burst" strength of the fittings shall not be less than that of the pipe.

E. If the butterfly valve's disk interferes with the inside diameter of the pipe, the Contractor has the option to either remove excess material from the ID of the pipe flange adapter by

machining, add spacers as recommended by supplier, or use a flange adapter with a thickness that will allow the valve to clear the pipe

14.2.2 Infra-just Pipe Supports

The Contractor will install 16" infra-just supports for anchoring the new 16" header pipe in place. The Contractor shall supply the 1 ¼" black or galvanized pipe to anchor the infra-just supports to the ground. The infra-just supports are to be installed every 70' along the new section of header to secure the pipe in place. The project drawings show details of the installation.

14.2.3 Rebar

The Contractor shall install minimum of #4 (1/2" diameter) rebar on the downhill side of the pipe every 10' along the relocated header pipe. The rebar shall be driven into the ground a minimum of 18" and shall extend several inches above the header pipe. The Contractor is to install plastic safety caps on each rebar installed.

The Contractor shall install minimum of #4 (1/2" diameter) rebar one foot on center on pipe support footings and on 7' x 7' concrete pad for condensate knock-out vessel.

14.2.4 Valves

A. Butterfly valves used in the landfill gas collection system, supplied by the County, shall be 150 lb. Full lug cast iron body with stainless steel disk, 316 stainless steel stem, and Viton liner or approved equal. Valve bodies may be painted.

B. All bolting for valves shall be 316 SS.

C. All butterfly valves shall be installed so that the valve stem is located on the vertical axis and the operator is located at the top of the valve.

D. Valve installation shall be per the manufacturer's specifications.

14.2.5 Extra Materials

A. The Contractor shall neatly store for the County, upon verbal request, any extra materials left from the work and paid for in advance by the County. The storage location shall be designated by the County.

14.2.6 Miscellaneous Part

A. All bolts, washers and nuts shall be 316 stainless steel.

B. All flange gaskets shall be made of Neoprene.

C. Rebar stakes shall be billet steel conforming to ASTM A 615 and shall be either Grade 40 or 60. The rebar shall be ½' diameter (#4) and three feet long.

D. Plastic rebar safety caps shall be per OSHA approved industrial standards.

E. All 1 ¼" steel pipe anchors shall be schedule 40 black or galvanized pipe.

14.2.7 Concrete

A. Concrete shall consist of Portland cement, aggregates, water and admixtures when approved for use. Unless otherwise indicated, concrete shall have a 28 day compressive strength of 3000 psi.

B. Materials used in concrete shall conform to Section 201-1.2 of the Standard Specifications.

C. Reinforcements shall conform to Section 201-2 of the Standard Specifications.

D. Concrete curing compound shall be used and shall meet Federal Specification TT-C-800, Type I, Class 1 non yellowing with minimum 18 percent solids and a maximum unit moisture loss of 0.039 gm/cm^2. Approved manufacturer shall be Gifford-Hill "Sealco 800", ProSoCo "Kure and Seal", Protex "Acrychlor", Sonneborn "Kure-N-Seal" or approved equal or the Contractor shall use a 6 mil. polyethylene film for protection during curing.

E. The minimum concrete compressive strength shall be 3000 psi unless otherwise specified. The slump shall not exceed 4 inches at the time it is being placed in conformance with ASTM C150.

14.3 EXECUTION

1) The work to be performed under the provision of these Specifications shall be conducted in a manner consistent with standard industry practices for such projects. No portion of this Contract shall relieve the Contractor from all applicable Federal, State, and local regulations pertaining to construction of this Project.

2) All HDPE piping shall be joined by butt fusion and in conformance with the manufacturer's recommendations. Laterals shall be joined to the header pipe by fusion welding branch saddles using a McElroy Sidewinder Chain Clamp Fusion Unit or equivalent or with the use of tees.

3) Fusion welding of HDPE pipe shall be performed by a qualified person. The pipe supplier shall verify the qualifications of the pipe installer, and the Contractor shall submit a copy of this verification to the County. No pipe shall be installed prior to submittal of the verification.

4) Flange alignment shall be perpendicular to pipe center line and shall not exceed plus or minus 1/32 of an inch in tolerance measured at the flange O.D.

5) All bolts and nuts must be easily accessible for installation and tightening. All nuts, washers and bolts shall be 316 stainless steel.

6) Pipe cutting shall be done only with mechanical cutters.

7) All pipes 2 inches and larger shall be flanged at the weld ends and welded with full penetration butt welds.

8) When mating to piece of equipment with a flat-face flange, the corresponding pipe flange shall also be flat faced. Otherwise, all flanges shall be raised face.

9) The 12" header pipe shall be held horizontally in place by installing #4 rebar stakes as shown in the project drawings. After placement, the rebar shall be capped with plastic safety caps.

10) Infra-just pipe supports and pipe anchors shall be installed on the average of every 70 linear feet or as instructed by the engineer. Pipe anchors shall be driven into the ground a minimum of 30". Sharp edges on pipe ends shall be filed down.

11) There will be approximately two fittings per one-hundred feet of piping. Fittings are defined as but not limited to: elbows, reducers, flange adapters, tees, valves and saddles. The cost of this bid item shall include the installation of these fittings.

12) Each pipe stand shall include four hole steel base, 3" diameter steel pipe, adjustable steel support, steel pipe saddle and U-bolt. Red-head anchor concrete bolts shall be supplied by the County and installed by the Contractor.

14.4 MEASUREMENT AND PAYMENT

Measurement of the final quantity of for **Bid Item No. 12** "Install 16" HDPE Header pipe and Condensate Knock-out Vessel" shall be based on actual linear feet of pipe installed. All work is to be paid for at a contract price per unit of measurement and will be measured by the County in accordance with United States Standard measures. The installation shall be bid at one unit price. **Install 16" HDPE header pipe shall be paid for on a per linear foot of installed pipe basis.**

END OF SECTION

SECTION 15 - RELOCATE 2" HDPE PIPE

15.1 SUMMARY

The work in this section shall include the Contractor furnishing all labor, supervision, tools, and equipment necessary to relocate existing 2" HDPE SDR 11 pipe. The contractor shall cut out and remove all existing reducers, and elbows from the pipe. The pipe shall be re-secured in the new location with infra-just supports and rebar that will be supplied by the County. The Contractor shall make an effort to salvage and re-use rebar and infra-just supports. Existing 2" butterfly valves will need to be relocated and re-installed by the Contractor.

15.2 MATERIALS

15.2.1 HDPE Pipe and fittings

A. HDPE pipe shall conform to the requirements of Section 207-19 of the Standard Specifications unless otherwise indicated on the Plans and Specifications.

B. All landfill gas piping and fittings shall be made from a polyethylene resin Type 3408 except where called out otherwise on the Project Drawings. HDPE pipe shall be protected against U.V. degradation from exposure to the sun.

C. HDPE fittings shall be of material which is compatible with the pipe for the purpose of fusion welding and shall be free from cracks, holes foreign intrusions, voids, or other defects. The minimum "quick-burst" strength of the fittings shall not be less than that of the pipe.

D. If the butterfly valve's disk interferes with the inside diameter of the pipe, the Contractor shall remove excess material from the ID of the pipe flange adapter by machining, until the valve is clear from hitting the pipe.

15.2.2 Infra-just pipe supports

The pipe supports for the relocation of the 2" header pipe may be salvaged from the existing location of the pipe and installed with new 1 ¼" schedule 40 pipe supplied by the Contractor. The infra-just supports are to be installed every 70' along the relocated header to secure the pipe in place. The project drawings show details of the installation.

15.2.3 Rebar

The Contractor shall supply and install minimum of #4 (1/2" diameter) rebar on the downhill side of the pipe every 10' along the relocated header pipe. The rebar shall be driven into the ground a minimum of 18" and shall extend several inches above the header pipe. The Contractor is to install plastic safety caps on each rebar installed.

15.3 EXECUTION

1) The work to be performed under the provision of these Specifications shall be conducted in a manner consistent with standard industry practices for such projects. No portion of this Contract shall relieve the Contractor from all applicable Federal, State, and local regulations pertaining to construction of this Project.

2) All HDPE piping shall be joined by butt fusion and in conformance with the manufacturer's recommendations. Laterals shall be joined to the header pipe by fusion welding branch saddles using a McElroy Sidewinder Chain Clamp Fusion Unit or equivalent or with the use of tees.

3) Fusion welding of HDPE pipe shall be performed by a qualified person. The pipe supplier shall verify the qualifications of the pipe installer, and the Contractor shall submit a copy of this verification to the County. No pipe shall be installed prior to submittal of the verification.

4) Flange alignment shall be perpendicular to pipe center line and shall not exceed plus or minus 1/32 of an inch in tolerance measured at the flange O.D.

5) All bolts and nuts must be easily accessible for installation and tightening. All nuts, washers and bolts shall be 316 stainless steel.

6) Pipe cutting shall be done only with mechanical cutters.

7) All pipes 2 inches and larger shall be flanged at the weld ends and welded with full penetration butt welds.

8) When mating to piece of equipment with a flat-face flange, the corresponding pipe flange shall also be flat faced. Otherwise, all flanges shall be raised face.

9) The 6" header pipe shall be held horizontally in place by installing #4 rebar stakes as shown in the project drawings. After placement, the rebar shall be capped with plastic safety caps.

10) Infra-just pipe supports and pipe anchors shall be installed on the average of every 70 linear feet or as instructed by the engineer. Pipe anchors shall be driven into the ground a minimum of 30". Sharp edges on pipe ends shall be filed down.

11) There will be approximately two fittings per one-hundred feet of piping. Fittings are defined as, but not limited to: elbows, reducers, flange adapters, tees, and saddles. The cost of this bid item shall include the installation of these fittings

15.4 MEASUREMENT AND PAYMENT

Measurement of the final quantity of for **Bid Item No. 13** "Relocate 2" HDPE header pipe" shall be based on actual linear feet of pipe relocated and installed. All work is to be paid for at a contract price per unit of measurement and will be measured by the County in accordance with United States Standard measures. The installation shall be bid at one unit price. **Relocation of 2" HDPE header pipe shall be paid for on a per linear foot of relocated pipe basis.**

END OF SECTION

SECTION 16 - RELOCATE 3" LATERAL PIPE

16.1 SUMMARY

The work in this section shall include the Contractor furnishing all labor, supervision, tools, and equipment necessary to relocate existing 3" HDPE SDR 11 or 17 lateral pipe. The contractor shall cut out and remove all existing saddles, reducers, and elbows from the pipe. The pipe shall be re-secured in the new location with infra-just supports and rebar that will be supplied by the County. The Contractor shall make an effort to salvage and re-use re-bar and infra-just supports.

16.2 MATERIALS

16.2.1 HDPE Pipe and fittings

A. HDPE pipe shall conform to the requirements of Section 207-19 of the Standard Specifications unless otherwise indicated on the Plans and Specifications.

B. All landfill gas piping and fittings shall be made from a polyethylene resin Type 3408 except where called out otherwise on the Project Drawings. HDPE pipe shall be protected against U.V. degradation from exposure to the sun.

C. HDPE fittings shall be of material which is compatible with the pipe for the purpose of fusion welding and shall be free from cracks, holes foreign intrusions, voids, or other defects. The minimum "quick-burst" strength of the fittings shall not be less than that of the pipe.

16.2.2 Infra-just pipe supports

The pipe supports for the relocation of the 3" header pipe may be salvaged from the existing location of the pipe and installed with new 1 ¼" schedule 40 pipe supplied by the Contractor. The infra-just supports are to be installed every 70' along the relocated header to secure the pipe in place. The project drawings show details of the installation.

16.2.3 Rebar

The Contractor shall supply and install minimum of #4 (1/2" diameter) rebar on the downhill side of the pipe every 10' along the relocated header pipe. The rebar shall be driven into the ground a minimum of 18" and shall extend several inches above the header pipe. The Contractor is to install plastic safety caps on each rebar installed.

16.3 EXECUTION

1) The work to be performed under the provision of these Specifications shall be conducted in a manner consistent with standard industry practices for such projects. No portion of this Contract shall relieve the Contractor from all applicable Federal, State, and local regulations pertaining to construction of this Project.

2) All HDPE piping shall be joined by butt fusion and in conformance with the manufacturer's recommendations. Laterals shall be joined to the header pipe by fusion welding branch saddles using a McElroy Sidewinder Chain Clamp Fusion Unit or equivalent or with the use of tees.

3) Fusion welding of HDPE pipe shall be performed by a qualified person. The pipe supplier shall verify the qualifications of the pipe installer, and the Contractor shall submit a copy of this verification to the County. No pipe shall be installed prior to submittal of the verification.

4) Flange alignment shall be perpendicular to pipe center line and shall not exceed plus or minus 1/32 of an inch in tolerance measured at the flange O.D.

5) All bolts and nuts must be easily accessible for installation and tightening. All nuts, washers and bolts shall be 316 stainless steel.

6) Pipe cutting shall be done only with mechanical cutters.

7) All pipes 2 inches and larger shall be flanged at the weld ends and welded with full penetration butt welds.

8) When mating to piece of equipment with a flat-face flange, the corresponding pipe flange shall also be flat faced. Otherwise, all flanges shall be raised face.

9) The 3" lateral pipe shall be held horizontally in place by installing #4 rebar stakes as shown in the project drawings. After placement, the rebar shall be capped with plastic safety caps.

10) Infra-just pipe supports and pipe anchors shall be installed on the average of every 70 linear feet or as instructed by the engineer. Pipe anchors shall be driven into the ground a minimum of 30". Sharp edges on pipe ends shall be filed down.

11) There will be approximately two fittings per one-hundred feet of piping. Fittings are defined as, but not limited to: elbows, reducers, flange adapters, tees, and saddles. The cost of this bid item shall include the installation of these fittings

16.4 MEASUREMENT AND PAYMENT

Measurement of the final quantity of for **Bid Item No. 14** "Relocate 3" HDPE pipe" shall be based on actual linear feet of pipe relocated and installed. All work is to be paid for at a contract price per unit of measurement and will be measured by the County in accordance with United States Standard measures. The installation shall be bid at one unit price. **Relocate 3" HDPE pipe shall be paid for on a per linear foot of relocated pipe basis.**

END OF SECTION

SECTION 17 - RELOCATE 6" HEADER PIPE

17.1 SUMMARY

The work in this section shall include the Contractor furnishing all labor, supervision, tools, and equipment necessary to relocate existing 6" HDPE SDR 17 header pipe. The contractor shall cut out and remove all existing saddles, reducers, and elbows from the pipe. The pipe shall be re-secured in the new location with infra-just supports and rebar that will be supplied by the County. The Contractor shall make an effort to salvage and re-use re-bar and infra-just supports. Existing 6" butterfly valves will need to be relocated and re-installed by the Contractor.

17.2 MATERIALS

17.2.1 HDPE Pipe and fittings

A. HDPE pipe shall conform to the requirements of Section 207-19 of the Standard Specifications unless otherwise indicated on the Plans and Specifications.

B. All landfill gas piping and fittings shall be made from a polyethylene resin Type 3408 except where called out otherwise on the Project Drawings. HDPE pipe shall be protected against U.V. degradation from exposure to the sun.

C. HDPE fittings shall be of material which is compatible with the pipe for the purpose of fusion welding and shall be free from cracks, holes foreign intrusions, voids, or other defects. The minimum "quick-burst" strength of the fittings shall not be less than that of the pipe.

D. If the butterfly valve's disk interferes with the inside diameter of the pipe, the Contractor shall remove excess material from the ID of the pipe flange adapter by machining, until the valve is clear from hitting the pipe.

17.2.2 Infra-just pipe supports

The pipe supports for the relocation of the 6" header pipe may be salvaged from the existing location of the pipe and installed with new 1 ¼" schedule 40 pipe supplied by the Contractor. The infra-just supports are to be installed every 70' along the relocated header to secure the pipe in place. The project drawings show details of the installation.

17.2.3 Rebar

The Contractor shall supply and install minimum of #4 (1/2" diameter) rebar on the downhill side of the pipe every 10' along the relocated header pipe. The rebar shall be driven into the ground a minimum of 18" and shall extend several inches above the header pipe. The Contractor is to install plastic safety caps on each rebar installed.

17.3 EXECUTION

1) The work to be performed under the provision of these Specifications shall be conducted in a manner consistent with standard industry practices for such projects. No portion of this Contract shall relieve the Contractor from all applicable Federal, State, and local regulations pertaining to construction of this Project.

2) All HDPE piping shall be joined by butt fusion and in conformance with the manufacturer's recommendations. Laterals shall be joined to the header pipe by fusion welding branch saddles using a McElroy Sidewinder Chain Clamp Fusion Unit or equivalent or with the use of tees.

3) Fusion welding of HDPE pipe shall be performed by a qualified person. The pipe supplier shall verify the qualifications of the pipe installer, and the Contractor shall submit a copy of this verification to the County. No pipe shall be installed prior to submittal of the verification.

4) Flange alignment shall be perpendicular to pipe center line and shall not exceed plus or minus 1/32 of an inch in tolerance measured at the flange O.D.

5) All bolts and nuts must be easily accessible for installation and tightening. All nuts, washers and bolts shall be 316 stainless steel.

6) Pipe cutting shall be done only with mechanical cutters.

7) All pipes 2 inches and larger shall be flanged at the weld ends and welded with full penetration butt welds.

8) When mating to piece of equipment with a flat-face flange, the corresponding pipe flange shall also be flat faced. Otherwise, all flanges shall be raised face.

9) The 6" header pipe shall be held horizontally in place by installing #4 rebar stakes as shown in the project drawings. After placement, the rebar shall be capped with plastic safety caps.

10) Infra-just pipe supports and pipe anchors shall be installed on the average of every 70 linear feet or as instructed by the engineer. Pipe anchors shall be driven into the ground a minimum of 30". Sharp edges on pipe ends shall be filed down.

11) There will be approximately two fittings per one-hundred feet of piping. Fittings are defined as, but not limited to: elbows, reducers, flange adapters, tees, and saddles. The cost of this bid item shall include the installation of these fittings.

17.4 MEASUREMENT AND PAYMENT

Measurement of the final quantity of for **Bid Item No. 15** "Relocate 6" HDPE header pipe" shall be based on actual linear feet of pipe relocated and installed. All work is to be paid for at a contract price per unit of measurement and will be measured by the County in accordance with United States Standard measures. The installation shall be bid at one unit price. **Relocation of 6" HDPE header pipe shall be paid for on a per linear foot of relocated pipe basis.**

END OF SECTION

SECTION 18 - RELOCATE 8" HEADER PIPE

18.1 SUMMARY

The work in this section shall include the Contractor furnishing all labor, supervision, tools, and equipment necessary to relocate existing 8" HDPE SDR 17 header pipe. The contractor shall cut out and remove all existing saddles, reducers, and elbows from the pipe. The pipe shall be re-secured in the new location with infra-just supports and rebar that will be supplied by the County. The Contractor shall make an effort to salvage and re-use re-bar and infra-just supports. Existing 8" butterfly valves will need to be relocated and re-installed by the Contractor.

18.2 MATERIALS

18.2.1 HDPE Pipe and fittings

A. HDPE pipe shall conform to the requirements of Section 207-19 of the Standard Specifications unless otherwise indicated on the Plans and Specifications.

B. All landfill gas piping and fittings shall be made from a polyethylene resin Type 3408 except where called out otherwise on the Project Drawings. HDPE pipe shall be protected against U.V. degradation from exposure to the sun.

C. HDPE fittings shall be of material which is compatible with the pipe for the purpose of fusion welding and shall be free from cracks, holes foreign intrusions, voids, or other defects. The minimum "quick-burst" strength of the fittings shall not be less than that of the pipe.

D. If the butterfly valve's disk interferes with the inside diameter of the pipe, the Contractor shall remove excess material from the ID of the pipe flange adapter by machining, until the valve is clear from hitting the pipe.

18.2.2 Infra-just pipe supports

The pipe supports for the relocation of the 6" header pipe may be salvaged from the existing location of the pipe and installed with new 1 ¼" schedule 40 pipe supplied by the Contractor. The infra-just supports are to be installed every 70' along the relocated header to secure the pipe in place. The project drawings show details of the installation.

18.2.3 Rebar

The Contractor shall supply and install minimum of #4 (1/2" diameter) rebar on the downhill side of the pipe every 10' along the relocated header pipe. The rebar shall be driven into the ground a minimum of 18" and shall extend several inches above the header pipe. The Contractor is to install plastic safety caps on each rebar installed.

18.3 EXECUTION

1) The work to be performed under the provision of these Specifications shall be conducted in a manner consistent with standard industry practices for such projects. No portion of this Contract shall relieve the Contractor from all applicable Federal, State, and local regulations pertaining to construction of this Project.

2) All HDPE piping shall be joined by butt fusion and in conformance with the manufacturer's recommendations. Laterals shall be joined to the header pipe by fusion welding branch saddles using a McElroy Sidewinder Chain Clamp Fusion Unit or equivalent or with the use of tees.

3) Fusion welding of HDPE pipe shall be performed by a qualified person. The pipe supplier shall verify the qualifications of the pipe installer, and the Contractor shall submit a copy of this verification to the County. No pipe shall be installed prior to submittal of the verification.

4) Flange alignment shall be perpendicular to pipe center line and shall not exceed plus or minus 1/32 of an inch in tolerance measured at the flange O.D.

5) All bolts and nuts must be easily accessible for installation and tightening. All nuts, washers and bolts shall be 316 stainless steel.

6) Pipe cutting shall be done only with mechanical cutters.

7) All pipes 2 inches and larger shall be flanged at the weld ends and welded with full penetration butt welds.

8) When mating to piece of equipment with a flat-face flange, the corresponding pipe flange shall also be flat faced. Otherwise, all flanges shall be raised face.

9) The 6" header pipe shall be held horizontally in place by installing #4 rebar stakes as shown in the project drawings. After placement, the rebar shall be capped with plastic safety caps.

10) Infra-just pipe supports and pipe anchors shall be installed on the average of every 70 linear feet or as instructed by the engineer. Pipe anchors shall be driven into the ground a minimum of 30". Sharp edges on pipe ends shall be filed down.

11) There will be approximately two fittings per one-hundred feet of piping. Fittings are defined as, but not limited to: elbows, reducers, flange adapters, tees, and saddles. The cost of this bid item shall include the installation of these fittings.

18.4 MEASUREMENT AND PAYMENT

Measurement of the final quantity of for **Bid Item No. 16** "Relocate 8" HDPE header pipe" shall be based on actual linear feet of pipe relocated and installed. All work is to be paid for at a contract price per unit of measurement and will be measured by the County in accordance with United States Standard measures. The installation shall be bid at one unit price. **Relocation of 8" HDPE header pipe shall be paid for on a per linear foot of relocated pipe basis.**

END OF SECTION

SECTION 19 - INSTALL OR RE-LOCATE WELL MONITORING ASSEMBLY

19.1 SUMMARY

The work in this section shall include the Contractor furnishing all labor, supervision, tools, and equipment and necessary to install new or relocate existing monitoring assemblies. The new monitoring assemblies will be provided by the County and installed by the Contractor. The Contractor shall install any saddles, additional elbows, or any other required fittings for this installation. The well monitoring assemblies must be installed in strict accordance with these provisions and the project drawings.

19.2 MATERIALS

19.2.1 HDPE Pipe and Fittings

A. HDPE pipe shall conform to the requirements of Section 207-19 of the Standard Specifications unless otherwise indicated on the Plans and Specifications.

B. All landfill gas piping and fittings shall be made from a polyethylene resin Type 3408 except where called out otherwise on the Project Drawings. HDPE pipe shall be protected against U.V. degradation from exposure to the sun.

C. HDPE fittings shall be of material which is compatible with the pipe for the purpose of fusion welding and shall be free from cracks, holes foreign intrusions, voids, or other defects. The minimum "quick-burst" strength of the fittings shall not be less than that of the pipe.

19.3 EXECUTION

1) The work to be performed under the provision of these Specifications shall be conducted in a manner consistent with standard industry practices for such projects. No portion of this Contract shall relieve the Contractor from all applicable Federal, State, and local regulations pertaining to construction of this Project.

2) All HDPE piping shall be joined by butt fusion and in conformance with the manufacturer's recommendations. Laterals shall be joined to the header pipe by fusion welding branch saddles using a McElroy Sidewinder Chain Clamp Fusion Unit or equivalent or with the use of tees.

3) Fusion welding of HDPE pipe shall be performed by a qualified person. The pipe supplier shall verify the qualifications of the pipe installer, and the Contractor shall submit a copy of this verification to the County. No pipe shall be installed prior to submittal of the verification.

4) Flange alignment shall be perpendicular to pipe center line and shall not exceed plus or minus 1/32 of an inch in tolerance measured at the flange O.D.

5) Pipe cutting shall be done only with mechanical cutters.

6) All pipes 2 inches and larger shall be flanged at the weld ends and welded with full penetration butt welds.

7) When mating to piece of equipment with a flat-face flange, the corresponding pipe flange shall also be flat faced. Otherwise, all flanges shall be raised face.

8) Rubber 3" X 2" and 4" x 2" reducer couplings with stainless steel clamps are included with the monitoring assemblies and should be properly connected by the Contractor.

19.4 MEASUREMENT AND PAYMENT

Measurement of the final quantity of for **Bid Item No. 17** "Install or re-locate monitoring assembly" shall be based on lump sum for each monitoring assembly installed. The installation shall be bid at one unit price. **Install or re-locating well monitoring assemblies shall be paid for on lump sum basis for each assembly installed.**

END OF SECTION

SECTION 20 - DEMOBILIZATION

20.1 GENERAL

Demobilization shall include but not be limited to cleaning installations and the removal of equipment as required by the County. Throughout all phases of construction, including suspension of work and until final acceptance of the project, the Contractor shall keep the work areas clean and free of refuse generated as a result of the Contractor's operations. Any such refuse shall be disposed of in the designated disposal area or as directed by the County.

20.2 MATERIALS

The final condition of the construction site shall be subject to approval by the County.

20.3 EXECUTION

The Contractor shall remove and properly dispose of all refuse from the construction site. The County shall have the right to determine what is refuse, and to determine the manner and placement of on-site disposal. Any hydrocarbon-impacted soils found at the site as a result of the construction operation, such as equipment maintenance, shall be removed and properly disposed of at the Contractor's expense.

20.4 MEASUREMENT AND PAYMENT

Demobilization as shown in **Bid Item No. 18** shall be done on a **lump sum** basis and shall, at a minimum, consist of removal of excess materials, proper cleanup of construction generated debris and removal of construction equipment. Payment will be made at the completion of the contract.

Appendix A – Project Drawings

Appendices B through E

Digital Appendix B through E
Construction of LFG Collection System Expansion
FY 2010/11 at the Badlands and Lamb Canyon Landfills