SECTION 33 00 06
LANDFILL GAS EXTRACTION WELLS

PART 1 - GENERAL

1.1 DESCRIPTION OF WORK

A. Furnish all necessary labor, materials, transportation, tools, equipment and appurtenances necessary for the complete and satisfactory drilling and construction of 11 vertical municipal landfill gas extraction wells hereinafter specified, and as shown on the Plans and Details. Variance from the gas well profile and location shown on the Plans and Details shall only be made with the approval of the Engineer.

1.2 PERMITS, CERTIFICATES, AND LICENSES

A. Procure all permits, certificates and licenses required by law for his work. Comply with all Federal, State, and local laws, ordinances, or rules and regulations relating to the performance of the work.

1.3 RELATED SECTIONS

A. Section 01 35 29 Safety Requirements and Protection of Property.

PART 2 - PRODUCTS

2.1 WELL PIPING

A. PVC piping shall be Schedule 80 PVC meeting the specifications in Section 33 00 09 "PVC Plastic Pipe and Accessories."

2.2 WELL BACKFILL MATERIAL

A. General
1. Stone shall be hard, durable, granular material of uniform quality resulting from crushed rock or crushed bank run sand and gravel.
2. Loss due to sulfate soundness test shall not exceed 10 percent.
3. Loss due to abrasion test shall not exceed 40 percent.
4. Material shall not be frozen.
5. Uniformity coefficient <4.
6. Minimum hydraulic conductivity of 1 cm/sec.
7. Free of organic impurities and debris.

B. Gradation
1. 1 1/2-inch Crushed Rock

Sieve Size	% Passing by Weight
2-inch	100
1-inch	20-55
¾-inch	0-15
3/8-inch	0-5
No. 4	<2

No. 200	<2

2.3 PEA GRAVEL FILTER LAYER MATERIAL

A. General
1. Material shall be clean, sound, hard, dense, durable, field, or quarry stone which is free from seams, cracks, or other structural defects. It shall be angular material from shot rock (blasted) or crushed rock having substantially all faces which have resulted from artificial crushing.
2. Loss due to sulfate soundness test shall not exceed 10 percent.
3. Loss due to abrasion test shall not exceed 40 percent.
4. Material shall not be frozen.

B. ⅜-inch Crushed Rock Chips - ASTM D448-No. 8

Sieve Size	% Passing by Weight
½-inch	100
3/8-inch	85-100
No. 4	10-30
No. 8	0-10
No. 16	0-5

2.4 SAND SEAL LAYER MATERIAL

A. General
1. Aggregate shall be hard, strong, durable particles free from seams, cracks, and other structural defects.
2. Rounded to subangular.
3. Free from organic impurities and debris.
4. Material shall not be frozen.

B. Fine Aggregate - ASTM C33

Sieve Size	% Passing by Weight
3/8-inch	100
No. 4	95-100
No. 8	80-100
No. 16	50-85
No. 30	25-60
No. 50	10-30
No. 100	2-10

2.5 BENTONITE

A. Bentonite used for the barrier layers shall be granular bentonite, Baroid Benseal (8 mesh).

PART 3 EXECUTION

3.1 GENERAL

A. Coordinate the start of drilling with the Owner and Engineer.

B. Provide a thoroughly experienced, competent driller during all drilling operations.

C. The gas extraction well borehole shall be installed by a method which does not clog the surrounding sides of the borehole with drilling muds or fluids. The Contractor shall propose the drilling method with the Bid. Driller must have a reliable method of determining the depth of drilling to prevent damage to the landfill liner system. Contractor will be responsible for all costs relating to regulatory issues and/or damage caused by drilling beyond the design depth.

D. The bore for the well shall be straight and the well pipe shall be installed in the center of the borehole. Take all necessary precautions to maintain the well pipe vertically plumbed during the backfill operation of the bored hole to the satisfaction of the Engineer. If the pipe installed is out of plumb, as determined by the Engineer, the Contractor, at his own expense, shall correct the alignment.

E. If well construction is not completed by the end of the working day, the hole shall be covered with a plate of sufficient thickness and with a sufficient overlap to prevent access to the hole and to support expected loads. The edges of the plate shall be covered with a sufficient thickness of moistened soil to prevent the escape of gas. Barricades shall be placed around the covered hole.

F. Backfilling of the well shall commence immediately after well drilling is completed and the well piping has been installed. Backfill materials shall be placed carefully within the wells to the dimensions shown on the Construction Plans. The Engineer, on the basis of a visual examination, may reject gravel and soil backfill containing foreign material. Both well piping and backfill shall be installed with a safety grate installed over the boring as approved by the Engineer.

G. The bentonite plug shall be backfilled in 6-inch lifts and hydrated with 5 gallons of clean water per sack.

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

I. The Owner's representative shall inspect the extraction well borings 4 to 8 weeks after completion of the final well. Excessive settlement (6" or more below surrounding grade) in the boring shall be repaired by the Contractor by adding compacted fill around the well casing at no additional cost to the Owner.

3.2 SITE PREPARATION FOR PROTECTION OF SITE AND WELL

A. Construct access roads and benches as required to complete the work.

B. Protect all structures, walks, and pipelines during his/her work.

3.3 LOCATION OF WELL AND CASING ELEVATIONS

A. The proposed gas well locations and the anticipated well depths are shown on Figures 1 and 2. Field staking of the locations will be performed by the Owner prior to drilling. Owner will provide an updated table summarizing target well depths based on the existing ground elevation at time of drilling. Under no circumstances are the drilling depths from the well schedule on the Construction Plans to be exceeded unless approved by the Owner/Engineer in advance.

3.4 NOTIFICATION

A. Notify the Engineer and the Owner three (3) days prior to initiating drilling operations.

3.5 LOG OF GAS WELLS

A. Furnish the Engineer with a log of all gas wells.

3.6 DAILY REPORTS

A. Keep a continuous record of the nature of material encountered and make and keep available at the job site a daily report describing the work done during the day including the items of work accomplished, such as the depth drilled, the casing set, and other pertinent data as requested by the Engineer.

3.7 LOST TOOLS

A. The Contractor will be given a reasonable period of time to recover lost tools, not to exceed one (1) day. If not recovered within this time, the Contractor shall drill a new well at a location designated by the Engineer and abandon the first hole as specified herein, at no cost to the Owner for the construction or abandonment of the first hole.

3.8 ABANDONMENT OF WELL

A. If, in the opinion of the Engineer, the borehole has not reached a sufficient depth to function as an effective extraction well, abandon the borehole by backfilling it with cuttings removed during drilling. If cuttings are unsuitable as backfill (for example, box springs, tires, etc.) the Contractor shall use soil backfill material. Place a 2-foot thick bentonite plug in the borehole when the depth is 4 feet below the existing grade. Fill the remaining 2 feet of the borehole with soil material and compact to approximately match the elevation of the existing grade. Furnish and provide a protective grate over the well location.

3.9 TEMPORARY CAPPING

A. At all times during the progress of the work, use all reasonable precautions to prevent either tampering with the gas well or the entrance of foreign matter into it, and upon daily completion of work, if the gas well has not been completed, provide a temporary cap.

3.10 DISPOSAL OF EXCAVATED MATERIAL

A. Dispose waste materials excavated during well installation in the active landfilling area on a daily basis. Control windblown litter so that no excavated materials go beyond the limits of the landfill. Place daily cover over waste in active area if material is placed after landfill operating hours.

3.11 RESTORATION

A. Restore all areas disturbed by construction to its original conditions.

END OF SECTION

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SECTION 01 22 04
MEASUREMENT AND PAYMENT

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes:

1. Unit Cost Bid Summary
   a. Mobilization and Demobilization (Bid Item 1)
   b. Vertical Well Installation (Bid Item 2)
   c. Restoration (Bid Item 3)
   d. Additional Mobilization and Demobilization (Optional Bid Item A)

B. Unit Prices include:

1. Defined work for each Unit Price Item which will provide a functionally complete Project when combined with all Unit Price Items. If there are specific Work items which the Contractor believes are not identified in any Unit Price Item, but is required to provide a functionally complete Project, then the identified specific Work items shall be included in the appropriate Unit Price Item.
2. The method of measurement for payment.
3. The price per unit for payment.

C. Lump sum prices include:

1. All work items which will result in a functionally complete project in accordance with the Specifications and Drawings.

1.2 GENERAL WORK ITEMS

A. Include with the appropriate Bid Item the following work items which are common to the Bid Items for this Section. If there is a specific Bid Item for any of the following items, then the Work item shall be included with that specific Unit Price Item.

1. Attendance at pre-construction and progress meetings.
2. Coordination with landfill operations.
3. Maintenance, protection, replacement and/or repair of damaged facilities outside the area identified for payment in a separate Unit Price Item.
4. Site access requirements.
5. Litter control.
6. Traffic control.
7. Regulatory requirements.
8. Construction staking and other survey Work not provided by Owner’s representative.
9. Location of existing utilities and piping.
10. Protection of existing underground piping and utilities.
11. Quality assurance and quality control testing and inspections not provided by the Owner’s representative.
12. Shop Drawings and other submittals.
13. All costs for compliance with health and safety requirements.

1.3 MOBILIZATION AND DEMOBILIZATION (Bid Item 1)

A. The unit price for Item 1 includes but is not limited to:
1. General Work Items of Article 1.2.
2. All costs relating to mobilizing equipment and personnel to Site.
3. Project management costs.
4. Furnishing and installing any necessary facilities required to complete the Work.
5. Removal of all equipment and personnel from Site.

B. Measurement for payment will not be made.

C. The unit of measurement for payment is lump sum.

1.4 VERTICAL WELL INSTALLATION (BID ITEM 2)

A. The unit price for Item 2 includes:

1. General Work Items of Article 1.2.
2. Hauling, placing and compacting on-site soils to create pad for drill rig.
3. Drilling borehole.
4. Monitoring of working area for hazardous gases.
5. Quality control and depth control during drilling.
6. Furnishing and installing well pipe and all backfill/seal materials.
7. Furnishing and installing protective fabricated rebar grate.
8. Hauling, placing and compacting on-site clay to provide cap over borehole.
9. Furnishing and installing temporary cap on well pipe.
10. Removal of excess excavated waste to the active area of the landfill.
11. Hauling and placing daily cover over the active area if after hours.
12. Litter control including picking of litter created by excavation.
13. Control of liquids removed from borehole.

B. Measurement for payment will be based on the actual vertical depth of the borehole measured from the ground surface to the bottom of the borehole. All costs for piping above the ground surface must be included in the unit price.

C. The unit of measurement for payment is vertical feet. The estimated quantity is 8 well locations with a total of 1,312 vertical feet.

1.5 RESTORATION (Bid Item 3)

A. The unit price for Item 3 includes:

1. General Work Items of Article 1.2.
2. Removal of all debris and leftover materials.
3. Restoration of disturbed areas to pre-construction conditions.

B. Measurement for payment will not be made.

C. The unit of measurement for payment is lump sum.

1.6 ADDITIONAL MOBILIZATIONS AND DEMOBILIZATIONS (Optional Bid Item A)

A. The unit price for Item A includes:

1. General Work Items of Article 1.2.

2. All costs relating to mobilizing equipment and personnel to Site.
3. Project management costs.
4. Furnishing and installing any necessary facilities required to complete the Work.
5. Removal of all equipment and personnel from Site.
6. Restoration of all affected areas to conditions prior to Work.

B. Measurement for payment will be based on each additional mobilization and demobilization pre-approved by Owner.

C. The unit of measurement for payment is per each additional event.

END OF SECTION

SECTION 01 35 29
SAFETY REQUIREMENTS AND PROTECTION OF PROPERTY

PART 1 – GENERAL

1.01 HEALTH AND SAFETY CONSIDERATIONS

A. The site is a landfill and there may be potential threats to worker health associated with the landfill. The Contractor is solely and completely responsible for coordinating with the appropriate landfill personnel to identify the landfill's potential health and safety threats, then disseminating the information to their workforce.

B. Contractor is solely and completely responsible for their health and safety program. This requirement applies continuously for the duration of the Contract. Outagamie County, SCS, and their representatives are not responsible for safety.

C. Employ a person who is qualified and experienced in construction safety, whose prime responsibility will be accident prevention during construction. Such person(s) shall be at the work site and be authorized to supervise and enforce compliance with the Health and Safety Plan.

D. Provide all equipment required to implement the Health and Safety Plan.

1.02 REFERENCES

A. Code of Federal Regulations
   1. 29 CFR 1910 Occupational Safety and Health Standards
   2. 29 CFR 1926 Safety and Health Regulations for Construction

1.03 SUBMITTALS

A. Submit Site Safety and Health Plan, not for approval, but as evidence of compliance with State and Federal requirements.

1.04 HEALTH AND SAFETY PLAN

A. Develop and implement in accordance with the Contract Documents, OSHA regulations, 29 CFR 1910, 29 CFR 1926, and any other applicable federal, state or local regulations. At a minimum, the plan shall address the items

listed below as well as any additional items required by site-specific project conditions and/or local, state, and federal regulations.

1. Key Personnel and on-site Competent Person.
2. Comprehensive workplan.
3. Hazard analysis for each site task.
4. Employee training.
5. Personal protective equipment.
6. Medical surveillance.
7. Frequency and types of air monitoring, personnel monitoring and environmental sampling techniques and instrumentation to be used.
8. Site control measures.
9. Decontamination procedures.
10. Emergency response plan.
11. Spill containment program.

B. Prepare the plan specifically for the site and the anticipated activities based on available information on site conditions and hazards.

C. The plan shall be considered a living document, updated as conditions change during Project execution.

D. On-site work shall not begin until the plan has been prepared and implemented.

E. Include the following in the implementation portion of the plan:
   1. Monitoring for flammable atmospheres in the work area including excavations.
   2. Monitoring of atmosphere for toxic vapors.
   3. Monitoring for other hazards commonly associated with construction activities.

1.05 PERSONNEL ORGANIZATION, QUALIFICATIONS AND RESPONSIBILITIES

A. Designate the Safety Representative per the General Conditions, a Site Safety and Health Officer and at least one alternate.

B. The Site Safety and Health Officer shall:
   1. Implement and enforce the site health and safety plan.
   2. Provide hazard communication information.
   3. Be responsible for any safety environmental monitoring.

4. Have the authority to stop work activities if unacceptable health or safety conditions exist.
5. Coordinate and recommend corrective actions for identified health and safety deficiencies and oversee the corrective actions.

C. Training
1. As a minimum, personnel performing duties with potential for exposure to on-site contaminates shall meet the 29 CFR 1910.120 and 29 CFR 1926 training requirements.

1.06 EXCAVATION SAFETY

A. Maintain a temporary barrier around borehole at all times while open to restrict access.

1.07 SAFETY PROCEDURES IN AND AROUND THE LANDFILL

It is the Contractor's responsibility to provide for all safety functions during the term of their work on the project site.

A. All Work conducted in and around landfills shall be done in accordance with State and local requirements and OSHA Safety and Health Standards 29 CFR and shall conform to the Landfill Gas Division of the Solid Waste Association of North America (SWANA) A Compilation of Landfill Gas Field Practices and Procedures dated August, 2011.

Additionally, for construction near a known landfill area, the following steps should be taken to prevent injury:

1. A combustible gas and H_2S indicator must be utilized at all times during trenching and drilling, or when construction occurs within 10 feet of an open excavation.
2. When trenching or drilling deeper than 2 feet into any waste and in the presence of detectable concentrations of methane, the waste or other fill material is to be wetted and the operating equipment used in the presence of waste or detectable concentrations of methane shall be provided with spark-proof exhausts.
3. Foam fire extinguishers shall be provided on all equipment working in the landfill.
4. Personnel within or near an open trench or drill hole shall:
   a. be fully clothed
   b. wear shoes with non-metallic soles

c. wear a hard hat and safety goggles or glasses

5. Exhaust blowers shall be on hand to be used in cases where trenches may show a build-up of methane or lack of oxygen.
6. Smoking is not permitted in any area within 500 feet of the excavation and only in designated smoking areas or off site.
7. An attempt should be made to keep personnel away from the downwind proximity of any open trench, unless the trench is constantly monitored and declared safe.
8. The operator of trenching equipment within an area where waste or where methane is detected, should wear an organic vapor and acid gas respirator while operating the equipment in or astride any trench.
9. Before personnel are permitted to enter an open trench, the trench should be carefully monitored for methane, H_2S and oxygen sufficiency. The personnel should also be provided with a continuous methane and oxygen monitor in their work area as long as they are in the excavation.

B. For construction near (within 1,000 feet) of a known landfill area, the following safety precautions should be taken:

1. The areas under construction must be checked with a combustible gas and H_2S indicator before and during excavation to determine if methane or H_2S gas is in the area.
2. Any excavations must be monitored for methane, H_2S and oxygen deficiency if personnel are to be sent in. This must be carried out continuously, unless the presence of methane, H_2S and oxygen deficiency in the area can definitely be ruled out.
3. Should methane gas be found in the area, those precautions applicable to digging in the landfill shall also apply to this situation.

1.08 ACCIDENT REPORTS

A. Contractor shall adhere to the County's accident reporting procedures. If serious injury or damage occurs, the accident shall be reported immediately by telephone or messenger to the Engineer and to appropriate local authorities. In addition, the Contractor must promptly report in writing to the Engineer all accidents occurring in connection with the Work, giving full details, names, and statements of witnesses.

B. If a claim is made by anyone against the Contractor or any Subcontractor resulting from an accident, the Contractor shall promptly report the facts in

writing to SCS, giving full details of the claim, including investigation and restitution.

C. In addition, a summary report shall be made to the Engineer with each Payment Application which shall indicate the date, time, name of the injured, details of the accident and current status.

1.09 COMPLAINTS

A. All complaints received by the Contractor shall be reported to Owner no later than the working day following receipt thereof. Such reports shall include the name, address, date, time received, date and time of action complained about, and a brief description of the alleged damages or other circumstances upon which the complaint is predicated. Each complaint shall be assigned a separate number, and all complaints shall be numbered consecutively in order of receipt. In the event that more than one complaint is received from the same complainant, each latter complaint shall show all previous complaint numbers registered by the same complainant.

B. In addition, a summary report shall be made to the Engineer with each Payment Application which shall indicate the date, time, and name of the person investigating the complaint and the amount of damages claimed (or estimate thereof), including the amount of settlement, if any.

C. When settlement of a claim is made, Owner shall be furnished with a copy of the release of claim by the claimant. The Engineer shall be notified immediately, throughout the statutory period of liability, of any formal claims or demands made by attorneys on behalf of claimants; of the serving of notice, summons, subpoena, or other legal documents incidental to litigation; and for any out-of-court settlement or court verdicts resulting from litigation.

1.010 FIRE PREVENTION AND PROTECTION

A. Execute all Work in a fire-safe manner. Supply and maintain on the site adequate fire-fighting equipment capable of extinguishing incipient fires. Comply with applicable fire-prevention laws. Where these laws do not apply, applicable parts of the National Fire Prevention Standard for Safeguarding Building Construction Operations (NFPA No. 241) shall be followed.

1.011 SECURITY

A. If the Contractor deems it necessary to employ watchmen to safeguard the Work, equipment, or the public, employ only licensed and uniformed watchmen, physically capable of adequately patrolling the entire work area.

1.012 PROTECTION OF PROPERTY

A. Employ such means and methods as necessary to adequately protect all property against damage. In the event of damage to such property, immediately restore the property to a condition at least equal to its original condition and to the satisfaction of the Owner, at Contractor's expense.

1.013 SITE RESTORATION AND CLEANUP

A. At all times during the Work, keep the premises clean and orderly; and upon completion of the Work, repair all damage caused by equipment and leave the project free of rubbish or excess materials of any kind.

B. Stockpile excavated materials in a manner that will cause the least damage to adjacent lawns, grassed areas, shrubbery, or fences; remove all excavated materials from grassed and planted areas and leave these surfaces in a condition equivalent to their original condition.

PART 2 – PRODUCTS

Not Used

PART 3 – EXECUTION

Not Used

END OF SECTION 01 35 29

SECTION 33 00 09

POLY VINYL CHLORIDE PLASTIC PIPE AND ACCESSORIES

PART 1 - GENERAL

1.1 DESCRIPTION

A. Work under this section includes material and performance requirements for (polyvinyl chloride) PVC plastic pipe and fittings.

1.2 REFERENCE STANDARDS

A. American Society for Testing and Materials (ASTM)
1. ASTM D1784 Spec. for Rigid Poly (Vinyl Chloride) (PVC) Compounds and Chlorinated Poly (Vinyl Chloride) (CPVC) Compounds.
2. ASTM D1785 Spec. for Poly (Vinyl Chloride) (PVC) Plastic Pipe Schedules 40, 80 and 120.
3. ASTM D2467 Spec. for Socket-Type Poly (Vinyl Chloride) (PVC) Plastic Pipe Fittings, Schedule 80.
4. ASTM D2564 Standard Specification for Solvent Cements for Poly Vinyl Chloride (PVC) Plastic Pipe and Fittings.
5. ASTM D2855 Standard Practice for Making Solvent-Cemented Joints with Poly (Vinyl Chloride) (PVC) Pipe and Fittings.

1.3 QUALITY ASSURANCE

A. Pipe shall be available to Owner's representative for inspection.

B. Pipe shall be considered defective and will be rejected when:
1. Pitted or cratered.
2. Flaking.
3. Straightness varies more than 1/2 inch in 10 feet.
4. Any defect which prevents assembly according to manufacturer's recommendations.
5. Not utilized within six (6) months of date of production.

C. Material brands and/or pipe classes shall not be mixed.

1.4 PRODUCT DELIVERY

A. Pipe Marking - pipe shall be marked as follows:
1. Manufacturer's name, trademark or logo.
2. Nominal size.
3. PVC minimum cell classification.

4. Pipe stiffness designation, dimension ratio or schedule size and pressure class.
5. ASTM or AWWA designation.
6. National Sanitation Foundation approval (pipe for potable water only).
7. Production date.

B. Storage
1. Provide a protected storage area.
2. Keep pipe material safe from damage and theft.
3. Protect pipe material from direct rays of the sun.
4. Protect gaskets from sun rays, excessive heat, grease, oil, and electric motors which produce ozone.

1.5 SUBMITTALS

A. Submit following:
1. Certification of production date of all materials.
2. Manufacturer's certification that materials delivered comply with requirements of this section.

PART 2 - PRODUCTS

2.1 LANDFILL PIPING

A. Schedule 80 PVC Pipe
1. Conform with ASTM D1784 and D1785.
2. Joints and fittings shall conform with following:
a. Schedule 80: Socket-type, ASTM D2467
b. Solvent Weld Joints: ASTM D2855

PART 3 - EXECUTION

3.1 PVC INSTALLATION

A. Refer to the drawings and appropriate specification sections for installation requirements of Schedule 80 PVC pipe.

END OF SECTION