

**ADVERTISEMENT FOR BIDS,
BIDDING REQUIREMENTS,
CONTRACT DOCUMENTS AND SPECIFICATIONS**

**FOR
LANDFILL FLARE CONTROL PANEL INSTALLATION
SALEM COUNTY IMPROVEMENT AUTHORITY
Solid Waste Complex**

286 Welchville Road; PO Box 890
Alloway, New Jersey 08001

SALEM COUNTY, NEW JERSEY

September 2021



A handwritten signature in cursive script that reads "Eric Peterson".

Eric R. Peterson, P.E.
NJ License No. 24GE04330100
COA No. 24GA28124100

SCS ENGINEERS
53 South Main St., Suite A
Medford, NJ 08055
609.654.4000

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**SALEM COUNTY IMPROVEMENT AUTHORITY
NOTICE TO BIDDERS**

Notice is hereby given that sealed bids will be received by the Salem County Improvement Authority on Thursday October 7, 2021 at 2:00 PM, prevailing time at the SCIA Administrative Office, located at 286 Welchville Road, Alloway Township, NJ 08001, at which time and place bids will be publicly opened and immediately read for:

LANDFILL FLARE CONTROL PANEL INSTALLATION
Solid Waste Complex
36 McKillip Road, Alloway, NJ 08001

Drawings, specifications, instructions to bidders and proposal forms may be obtained at SCS Engineers, 53 S. Main Street, Suite A , Medford, N.J. 08055 , point of contact Eric Peterson, P.E. (609) 654-4000, on or after September 13, 2021 between the hours of 9:00 AM – 4:00 PM , Monday through Friday, except legal holidays. Those wishing specifications electronically can request from epeterson@scsengineers.com. A NON-REFUNDABLE fee of \$150.00 in the form of a check payable to SCS Engineers will be required for each hard copy set of specifications (fee includes express shipping). A full set of bid documents also will be available for review at the landfill office at 286 Welchville Road, Alloway, NJ 08001. A mandatory pre-bid conference will be held at the site at 10:00 a.m. on September 21, 2021.

Bids will be made on the proposal form provided, in the manner designated therein and required in the specifications, enclosed in an opaque sealed envelope and plainly marked on the outside with the date, time and item being bid. Each proposal must be accompanied by a Certified Check, Cashier's Check, or Bid Bond for not less than 10 percent (10%) of the total amount bid, but not in excess of \$20,000, made payable to the Salem County Improvement Authority. Successful bidder will be required to furnish a bond of a surety company, satisfactory to the Authority, in a sum equal to 100% of the total contract price.

All bidders are required to comply with the requirements of P.L. 1975, C. 127 (N.J.A.C. 17:27) (Affirmative Action), P.L. 1963, C. 150 (New Jersey Prevailing Wage Act), and Americans with Disabilities Act of 1990 (42 U.S.C. 12101, et. Seq.). All bidders are further notified that they must comply with P.L. 1977, C. 33 and submit a Disclosure Statement listing stockholders with the bid. In addition all bidders must comply with P.L. 1999, c. 238 – Public Works Contractor Registration Act and the contractor and all subcontractors must be registered in accordance with the Act.

The Owner reserves the right to reject any or all bids, to waive any informalities, deviations, or omissions in any bid or all bids, and to accept such bids and make such awards as may be in the best interest of the Owner. Furthermore, the Owner may request written clarification of any aspect of the proposal where, in the Owner's opinion, ambiguities exist. No bidder may withdraw its bid for a period of sixty (60) days after the actual date of the opening of the bids.

By the Order of
Julie Acton, Executive Director
Salem County Improvement Authority

Instructions to Bidders and Statutory Requirements

I. SUBMISSION OF BIDS

- A. Sealed bids shall be received by the contracting unit, hereinafter referred to as “Owner,” in accordance with public advertisement as required by law, with a copy of said notice being attached hereto and made a part of these specifications.
- B. Sealed bids will be received by the designated representative at the time, date and location as stated in the Notice to Bidders, and at such time and place will be publicly opened and read aloud.
- C. The bid shall be submitted in a sealed envelope: (1) addressed to the owner, (2) bearing the name and address of the bidder written on the face of the envelope, and (3) clearly marked "BID" with the contract title and/or bid # being bid.
- D. It is the bidder's responsibility that bids are presented to the owner at the time and at the place designated. Bids may be hand delivered or mailed; however, the owner disclaims any responsibility for bids forwarded by regular or overnight mail. If the bid is sent by express mail service, the designation in sub-section C, above, must also appear on the outside of the express mail envelope. Bids received after the designated time and date will be returned unopened.
- E. Sealed bids forwarded to the owner before the time of opening of bids may be withdrawn upon written application of the bidder who shall be required to produce evidence showing that the individual is or represents the principal or principals involved in the bid. Once bids have been opened, they shall remain firm for a period of sixty (60) calendar days.
- F. All prices and amounts must be written in ink or preferably machine-printed. Bids containing any conditions, omissions, unexplained erasures or alterations, items not called for in the bid proposal form, attachment of additive information not required by the specifications, or irregularities of any kind, may be rejected by the owner. Any changes, whiteouts, strikeouts, etc. in the bid must be initialed in ink by the person signing the bid.
- G. Each bid proposal form must give the full business address, business phone, fax, e-mail if available, the contact person of the bidder, and be signed by an authorized representative as follows:
- Bids by partnerships must furnish the full name of all partners and must be signed in the partnership name by one of the members of the partnership or by an authorized representative, followed by the signature and designation of the person signing.
 - Bids by corporations must be signed in the legal name of the corporation, followed by the name of the State in which incorporated and must contain the signature and designation of the president, secretary or other person authorized to bind the corporation in the matter.
 - Bids by sole-proprietorship shall be signed by the proprietor.
 - When requested, satisfactory evidence of the authority of the officer signing shall be furnished.
- H. Bidder should be aware of the following statutes that represent “Truth in Contracting” laws:
- N.J.S.A. 2C:21-34, et seq. governs false claims and representations by bidders. It is a serious crime for the bidder to knowingly submit a false claim and/or knowingly make material misrepresentation.
 - N.J.S.A. 2C:27-10 provides that a person commits a crime if said person offers a benefit to a public servant for an official act performed or to be performed by a public servant, which is a violation of official duty.

- N.J.S.A. 2C:27-11 provides that a bidder commits a crime if said person, directly or indirectly, confers or agrees to confer any benefit not allowed by law to a public servant.
- Bidder should consult the statutes or legal counsel for further information.

II. BID SECURITY AND BONDING REQUIREMENTS

The following provisions if indicated by an () , shall be applicable to this bid and be made a part of the bid documents:

A. BID GUARANTEE

Bidder shall submit with the bid a certified check, cashier's check or bid bond in the amount of ten percent (10%) of the total price bid, but not in excess of \$20,000, payable unconditionally to the owner. When submitting a Bid Bond, it shall contain Power of Attorney for full amount of Bid Bond from a surety company authorized to do business in the State of New Jersey and acceptable to the owner. The check or bond of the unsuccessful bidder(s) shall be returned pursuant to N.J.S.A. 40A:11-24a. The check or bond of the bidder to whom the contract is awarded shall be retained until a contract is executed and the required performance bond or other security is submitted. The check or bond of the successful bidder shall be forfeited if the bidder fails to enter into a contract pursuant to N.J.S.A. 40A:11-21.

Failure to submit a bid guarantee shall result in rejection of the bid.

B. CONSENT OF SURETY

Bidder shall submit with the bid a Certificate (Consent of Surety) with Power of Attorney for full amount of bid price from a Surety Company authorized to do business in the State of New Jersey and acceptable to the owner stating that it will provide said bidder with a Performance Bond in the full amount of the bid. The Surety Company must have a Best's rating of B+ or better, and a Best's Financial Size Category of VII or larger, the minimum ratings and the financial size categories are those listed for the Surety Company in the most current issues of Best's Key Rating Guide, Property-Casualty, published by the A.M. Best Company, Oldwick, New Jersey

- On multi-year contracts the Performance Bond may be resubmitted each year on the contract anniversary date for the amount remaining on the contract.
- Submission of a Performance Bond, if required for this bid, is a condition precedent to a contract award. After receipt of such a performance bond and other submissions required by the bid specifications, the bid will be accepted and a signed contract and a purchase order will be forwarded to the successful bidder.
- The Authority will not be responsible for any expenditure of monies or other expenses incurred by the Bidder, unless the Bidder has received a signed contract and a purchase order.

This certificate shall be obtained in order to confirm that the bidder to whom the contract is awarded will furnish Performance and Payment Bonds from an acceptable surety company on behalf of said bidder, any or all subcontractors or by each respective subcontractor or by any combination thereof which results in performance security equal to the total amount of the contract, pursuant to N.J.S.A. 40A:11-22.

Failure to submit a consent of surety form shall result in rejection of the bid.

C. PERFORMANCE BOND

Bidder shall simultaneously with the delivery of the executed contract, submit an executed bond in the amount of one hundred percent (100%) of the acceptable bid as security for the faithful performance of this contract.

Failure to submit this with the executed contract shall be cause for declaring the contract null and void pursuant to N.J.S.A. 40A:11-22.

D. LABOR AND MATERIAL (PAYMENT) BOND

Bidder shall with the delivery of the performance bond submit an executed payment bond to guarantee payment to laborers and suppliers for the labor and material used in the work performed under the contract.

Failure to submit a labor and material bond with the performance bond shall be cause for declaring the contract null and void.

E. MAINTENANCE BOND

Upon acceptance of the work by the owner, the contractor shall submit a maintenance bond (N.J.S.A. 40A:11-16.3) in an amount not to exceed 100% of the project costs guaranteeing against defective quality of work or materials for the period of:

- _____ 1 year
- _____ 2 years

The performance bond provided shall not be released until final acceptance of the whole work and then only if any liens or claims have been satisfied. The surety on such bond or bonds shall be a duly authorized surety company authorized to do business in the State of New Jersey pursuant to N.J.S.A. 17:31-5.

III. INTERPRETATION AND ADDENDA

- A. The bidder understands and agrees that its bid is submitted on the basis of the specifications prepared by the owner. The bidder accepts the obligation to become familiar with these specifications.
- B. Bidders are expected to examine the specifications and related bid documents with care and observe all their requirements. Ambiguities, errors or omissions noted by bidders should be promptly reported in writing to the appropriate official. Any prospective bidder who wishes to challenge a bid specification shall file such challenges in writing with the contracting agent no less than three business days prior to the opening of the bids. Challenges filed after that time shall be considered void and having no impact on the contracting unit or the award of a contract pursuant to N.J.S.A. 40A:11-13. In the event the bidder fails to notify the owner of such ambiguities, errors or omissions, the bidder shall be bound by the requirements of the specifications and the bidder's submitted bid.
- C. No oral interpretation and or clarification of the meaning of the specifications for any goods and services will be made to any bidder. Such request shall be in writing, addressed to the owner's representative stipulated in the specification. In order to be given consideration, a written request must be received at least seven (7) business days prior to the date fixed for the opening of the bid for goods and services.

All interpretations, clarifications and any supplemental instructions will be in the form of written addenda to the specifications, and will be distributed to all prospective bidders. All addenda so issued shall become part of

the specification and bid documents, and shall be acknowledged by the bidder in the bid. The owner's interpretations or corrections thereof shall be final.

All written requests for clarification or bid challenges shall be addressed to the Owner's representative: Eric Peterson, P.E. at epeterson@scsengineers.com.

When issuing addenda, the owner shall provide required notice prior to the official receipt of bids to any person who has submitted a bid or who has received a bid package pursuant to N.J.S.A. 40A:11-23c.1.

D. Discrepancies in Bids

1. If the amount shown in words and its equivalent in figures do not agree, the written words shall be binding. Ditto marks are not considered writing or printing and shall not be used.
2. In the event that there is a discrepancy between the unit prices and the extended totals, the unit prices shall prevail. In the event there is an error of the summation of the extended totals, the computation by the owner of the extended totals shall govern.

E. Pre-Bid Conference

If stated in the Notice to Bidders:

A Pre-Bid Conference is not required for this bid.

A pre-bid conference for this proposal will be held on _____.
Attendance is mandatory, but is strongly recommended. Failure to attend does not relieve the bidder of any obligations or requirements.

✓ A mandatory pre-bid conference for this proposal will be held on September 21, 2021 at 10:00 a.m..

No bidder is to assume that answers given at the site inspection or pre-bid meeting to be binding unless confirmed in writing via an addendum prior to the bid opening by the Owner.

IV. BRAND NAMES, STANDARDS OF QUALITY AND PERFORMANCE

- A. Brand names and/or descriptions used in these specifications are to acquaint bidders with the types of goods and services desired and will be used as a standard by which goods and services offered as equivalent will be evaluated.
- B. Variations between the goods and services described and the goods and services offered are to be fully identified and described by the bidder on a separate sheet and submitted with the bid proposal form. Vendor literature WILL NOT suffice in explaining exceptions to these specifications. In the absence of any exceptions by the bidder, it will be presumed and required that the goods and services as described in the bid specification be provided or performed.
- C. It is the responsibility of the bidder to document and/or demonstrate the equivalency of the goods and services offered. The owner reserves the right to evaluate the equivalency of the goods and services.
- D. In submitting its bid, the bidder certifies that the goods and services to be furnished will not infringe upon any valid patent or trademark and that the successful bidder shall, at its own expense, defend any and all actions or

suits charging such infringement, and will save the owner harmless from any damages resulting from such infringement.

E. Only manufactured and farm products of the United States, wherever available, shall be used pursuant to N.J.S.A. 40A:11-18.

F. The contractor shall guarantee any or all goods and services supplied under these specifications. Defective or inferior goods shall be replaced at the expense of the contractor. The contractor will be responsible for return freight or restocking charges.

V. INSURANCE AND INDEMNIFICATION

The insurance documents checked shall include but are not limited to the following coverage's.

A. INSURANCE REQUIREMENTS

1. Worker's Compensation Insurance

Workers Compensation insurance shall be maintained in full force during the life of the contract, covering all employees engaged in performance of the contract pursuant to N.J.S.A. 34:15-12(a) and N.J.A.C. 12:235-1.6.

2. General Liability Insurance

Commercial General Liability Insurance with limits of not less than one million dollars (\$1,000,000) Combined Single Limit per occurrence and General Aggregate of five million dollars (\$5,000,000) per project or location. The Authority and its representatives shall be listed as additional insured under the policy for "owners, lessees, or contractors." This coverage shall be primary and shall include defense of the Authority as a supplement over and above the limit of liability.

3. Automotive Liability Insurance

Automotive liability insurance covering contractor for claims arising from owned, hired and non-owned vehicles with limits of not less than \$1,000,000 any one person and \$1,000,000 any one accident for bodily injury and \$1,000,000 each accident for property damage, shall be maintained in full force during the life of the contract.

4. Other Insurance Requirements

B. CERTIFICATES OF THE REQUIRED INSURANCE

Certificates of Insurance for those policies required above shall be submitted with the contract. Such coverage shall be with an insurance company authorized to do business in the State of New Jersey and shall name the Salem County Improvement Authority as an additional insured.

Self-insured contractors shall submit an affidavit attesting to their self-insured coverage and shall name the owner as an additional insured.

C. INDEMNIFICATION

Bidder shall indemnify and hold harmless the owner from all claims, suits or actions, and damages or costs of every name and description to which the owner may be subjected or put by reason of injury to the person or property of another, or the property of the owner, resulting from negligent acts or omissions on the part of the contractor, the contractor's agents, servants or subcontractors in the delivery of goods and services, or in the performance of the work under the contract.

VI. PRICING INFORMATION FOR PREPARATION OF BIDS

- A. The owner is exempt from any local, state or federal sales, use or excise tax. In submitting a proposal, the vendor certifies that the total base proposal does not include any exempted taxes.
- B. Estimated Quantities (Open-End Contracts): The owner has attempted to identify the item(s) and the estimated amounts of each item bid to cover its requirements; however, past experience shows that the amount ordered may be different than that submitted for bidding. The right is reserved to decrease or increase the quantities specified in the specifications pursuant to N.J.A.C. 5:30-11.2 and 11.10. **NO MINIMUM PURCHASE IS IMPLIED OR GUARANTEED.**
- C. Contractor shall be responsible for obtaining any applicable permits or licenses from any government entity that has jurisdiction to require the same. All bids submitted shall have included this cost.
- D. Bidders shall insert prices for furnishing goods and services required by these specifications. Prices shall be net, including any charges for packing, crating, containers, etc. All transportation charges shall be fully prepaid by the contractor, F.O.B. destination and placement at locations specified by the owner. As specified, placement may require inside deliveries. No additional charges will be allowed for any transportation costs resulting from partial shipments made for the contractor's convenience.

VII. STATUTORY AND OTHER REQUIREMENTS

The following are mandatory requirements of this bid and contract.

A. MANDATORY AFFIRMATIVE ACTION CERTIFICATION

No firm may be issued a contract unless it complies with the affirmative action provisions of N.J.S.A. 10:5-31 et seq. and N.J.A.C. 17:27-1 et seq. The following information summarizes the full, required regulatory text, which is included as Appendix A of this bid specification.

1. Goods and Services (including professional services) Contracts

Each contractor shall submit to the public agency, after notification of award but prior to execution of a goods and services contract, one of the following three documents:

- i. A photocopy of a valid letter that the contractor is operating under an existing Federally approved or sanctioned affirmative action program (good for one year from the date of the letter); or
- ii. A photocopy of a Certificate of Employee Information Report approval, issued in accordance with N.J.A.C. 17:27-4; or

- iii. A photocopy of an Employee Information Report (Form AA 302) provided by the Division and distributed to the public agency to be completed by the contractor in accordance with N.J.A.C. 17:27-4.

For information on the requirements of the Affirmative Action Law, contact:

Division of Contract Compliance & Equal Employment Opportunity in Public Contracting
Department of the Treasury
State of New Jersey
P.O. Box 209
Trenton, NJ 08625-0209
609-292-5473
E-mail: https://nj.gov/treasury/contract_compliance/

2. Maintenance/Construction Contracts

After notification of award, but prior to signing the contract, the contractor shall submit to the public agency compliance officer and the Division of Contract Compliance and Equal Employment Opportunity in Public Contracts (Division) an initial project workforce report (Form AA201) provided to the public agency by the Division for distribution to and completion by the contractor, in accordance with N.J.A.C. 17:27-7.

The contractor shall also submit a copy of the Monthly Project Workforce Report once a month thereafter for the duration of the contract to the Division and to the public agency compliance officer. The contractor shall also cooperate with the public agency in the payment of budgeted funds, as is necessary, for on-the job and/or off-the-job programs for outreach and training of minorities and women.

B. FEDERAL OCCUPATIONAL SAFETY AND HEALTH ACT OF 1970

The vendor or contractor guarantees that all materials, supplies and equipment as listed on any bid, request for proposal, quotation, contract or purchase order, furnished or delivered to the Owner meet the requirements, specifications and standards as provided for under the Federal Occupational Safety and Health Act of 1970-, as amended from time to time and enforced as of the date hereof.

C. SAFETY STANDARDS

The bidder should be aware, if awarded the contract that they will be responsible for any and all subcontractors, as well as themselves, that they are required to comply with all applicable local, state and federal safety, health and environmental regulations, including provisions for protecting the Owner's employees and the public from construction hazards.

The Owner retains the right to have owner's safety representatives inspect any construction project taking place on the owner's property or through the owner's auspices. The Owner reserves the right to stop work if an imminent hazard exists. The costs, if any, created by a work stoppage due to unsafe conditions, will be borne by the contractor responsible for the unsafe condition.

D. AMERICANS WITH DISABILITIES ACT OF 1990

Discrimination on the basis of disability in contracting for the purchase of goods and services is prohibited. Bidders are required to read Americans with Disabilities language that is included as Appendix B of this

specification and agree that the provisions of Title II of the Act are made a part of the contract. The contractor is obligated to comply with the Act and to hold the owner harmless.

E. STOCKHOLDER DISCLOSURE

N.J.S.A. 52:25-24.2 provides that no corporation or partnership shall be awarded any contract for the performance of any work or the furnishing of any goods and services, unless, prior to the receipt of the bid or accompanying the bid of said corporation or partnership. Bidders shall submit a statement setting forth the names and addresses of all stockholders in the corporation or partnership who own ten percent or more of its stock of any class, or of all individual partners in the partnership who own a ten percent or greater interest therein. The included Statement of Ownership shall be completed and attached to the bid proposal. This requirement applies to all forms of corporations and partnerships, including, but not limited to, limited partnerships, limited liability corporations, limited liability partnerships and Subchapter S corporations. Failure to submit a stockholder disclosure document shall result in rejection of the bid.

F. PROOF OF BUSINESS REGISTRATION

N.J.S.A. 52:32-44a requires that each bidder (contractor) submit proof of a business registration with the bid proposal. Proof of registration shall be a copy of the bidder's Business Registration Certificate (BRC). A BRC is obtained from the New Jersey Division of Revenue. Information on obtaining a BRC is available on the internet at www.nj.gov/njbgs or by phone at (609) 292-1730. N.J.S.A. 52:32-44 imposes the following requirements on contractors and all subcontractors that **knowingly** provide goods or perform services for a contractor fulfilling this contract:

- 1) The contractor shall provide written notice to its listed subcontractors and suppliers to submit proof of business registration to the contractor;
- 2) Prior to receipt of final payment from a contracting agency, a contractor must submit to the contacting agency an accurate list of all subcontractors or attest that none was used;
- 3) During the term of this contract, the contractor and its affiliates shall collect and remit, and shall notify all subcontractors and their affiliates that they must collect and remit to the Director, New Jersey Division of Taxation, the use tax due pursuant to the Sales and Use Tax Act, (N.J.S.A. 54:32B-1 et seq.) on all sales of tangible personal property delivered into this State.

A contractor, subcontractor or supplier who fails to provide proof of business registration or provides false business registration information shall be liable to a penalty of \$25 for each day of violation, not to exceed \$50,000 for each business registration not properly provided or maintained under a contract with a contracting agency. Information on the law and its requirements is available by calling the New Jersey Department of the Treasury at (609) 292-9292.

If boxes of the following items are checked, they are mandatory requirements of the bid proposal and contract.

G. NEW JERSEY WORKER AND COMMUNITY RIGHT TO KNOW ACT

The manufacturer or supplier of chemical substances or mixtures shall label them in accordance with the N.J. Worker and Community Right to Know Law (N.J.S.A. 34:51 et seq., and N.J.A.C 5:89-5 et seq.). Containers that the law and rules require to be labeled shall show the Chemical Abstracts Service number of all the components and the chemical name. Further, all applicable Material Safety Data Sheets (MSDS) - hazardous substance fact sheet - must be furnished.

H. PREVAILING WAGE ACT

Pursuant to N.J.S.A. 34:11-56.25 et seq., contractors on projects for public work shall adhere to all requirements of the New Jersey Prevailing Wage Act. The contractor shall be required to submit a certified payroll record to the owner within ten (10) days of the payment of the wages. The contractor is also responsible for obtaining and submitting all subcontractors' certified payroll records within the aforementioned time period. The contractor shall submit said certified payrolls in the form set forth in N.J.A.C. 12:60-6.1(c). It is the contractor's responsibility to obtain any additional copies of the certified payroll form to be submitted by contacting the New Jersey Department of Labor and Workforce Development, Division of Workplace Standards.

I. THE PUBLIC WORKS CONTRACTOR REGISTRATION ACT

N.J.S.A. 34:11-56.48 et seq. requires that a general or prime contractor and any listed subcontractors named in the contractor's bid proposal shall possess a certificate *at the time the bid proposal is submitted*. After bid proposals are received and prior to award of contract, the successful contractor shall submit a copy of the contractor's certification along with those of all listed subcontractors. All non-listed subcontractors and lower tier sub-subcontractors shall be registered prior to starting work on the project. It is the general contractor's responsibility that all non-listed sub-contractors at any tier have their certificate prior to starting work on the job.

Under the law a "contractor" is "a person, partnership, association, joint stock company, trust, corporation or other legal business entity or successor thereof who enters into a contract" which is subject to the provisions of the New Jersey Prevailing Wage Act [N.J.S.A. 34:11-56.25, et seq.] It applies to contractors based in New Jersey or in another state.

The law defines "public works projects" as contracts for "public work" as defined in the Prevailing Wage statute [N.J.S.A. 34:11-56.26(5)]. The term means:

- "Construction, reconstruction, demolition, alteration, or repair work, or maintenance work, including painting and decorating, done under contract and paid for in whole or in part out of the funds of a public body, except work performed under a rehabilitation program.
- "Public work" shall also mean construction, reconstruction, demolition, alteration, or repair work, done on any property or premises, whether or not the work is paid for from public funds..."
- "Maintenance work" means the repair of existing facilities when the size, type or extent of such facilities is not thereby changed or increased. While "maintenance" includes painting and decorating and is covered under the law, it does not include work such as routine landscape maintenance or janitorial services.

To register, a contractor must provide the State Department of Labor with a full and accurately completed application form.

The form is available online at https://www.nj.gov/labor/wagehour/regperm/pw_cont_reg.html.

N.J.S.A. 34:11-56.55 specifically prohibits accepting applications for registration as a substitute for a certificate of registration.

J. NON-COLLUSION AFFIDAVIT

The Affidavit shall be properly executed and submitted with the bid proposal.

K. DISCLOSURE OF CONTRIBUTIONS AFFIDAVIT

All business entities are advised of their responsibility to file an annual disclosure statement of political contributions with the New Jersey Election Law Enforcement Commission (ELEC) pursuant to *N.J.S.A. 19:44A-20.27* if they receive contracts in excess of \$50,000.00 from public entities in a calendar year. Business entities are responsible for determining if filing is necessary.

Additional information on this requirement is available from ELEC at 888-313-3532 or at <http://www.elec.state.nj.us>.

The Affidavit shall be properly executed and submitted with the bid proposal.

VIII. METHOD OF CONTRACT AWARD

- A. Unless otherwise stated in the technical specifications, the length of the contract shall be one (1) year. Pursuant to requirements of N.J.A.C. 5:30-5.1 et seq., any contract resulting from this bid shall be subject to the availability and appropriation of sufficient funds annually. Please see Section X, Termination of Contract, Sub-section E, for additional information.
- B. If the award is to be made on the basis of a base bid only, it shall be made to that responsible bidder submitting the lowest base bid.
- C. If the award is to be made on the basis of a combination of a base bid with selected options, it shall be made to that responsible bidder submitting the lowest net bid.
- D. The owner may also elect to award the contract on the basis of unit prices.
- E. The form of contract shall be submitted by the owner to the successful bidder. Terms of the specifications/bid package prevail. Bidder exceptions must be formally accepted by the owner.

IX. CAUSES FOR REJECTING BIDS

Bids may be rejected for any of the following reasons:

- A. All bids pursuant to N.J.S.A. 40A:11-13.2;
- B. If more than one bid is received from an individual, firm or partnership, corporation or association under the same name;
- C. Multiple bids from an agent representing competing bidders;
- D. The bid is inappropriately unbalanced;
- E. The bidder is determined to possess, pursuant to N.J.S.A. 40A:11-4b, Prior Negative Experience; or,
- F. If the successful bidder fails to enter into a contract within twenty-one (21) days, Sundays and holidays excepted, or as otherwise agreed upon by the parties to the contract. In this case at its option, the owner may accept the bid of the next lowest responsible bidder. (N.J.S.A. 40A:11-24b)

X. TERMINATION OF CONTRACT

- A. If, through any cause, the contractor shall fail to fulfill in a timely and proper manner obligations under the contract or if the contractor shall violate any of the requirements of the contract, the owner shall there upon have the right to terminate the contract by giving written notice to the contractor of such termination and specifying the effective date of termination. Such termination shall relieve the owner of any obligation for balances to the contractor of any sum or sums set forth in the contract. Owner will pay only for goods and services accepted prior to termination.
- B. Notwithstanding the above, the contractor shall not be relieved of liability to the owner for damages sustained by the owner by virtue of any breach of the contract by the contractor and the owner may withhold any payments to the contractor for the purpose of compensation until such time as the exact amount of the damage due the owner from the contractor is determined.
- C. The contractor agrees to indemnify and hold the owner harmless from any liability to subcontractors and/or suppliers concerning payment for work performed or goods supplied arising out of the lawful termination of the contract by the owner under this provision.
- D. In case of default by the contractor, the owner may procure the goods or services from other sources and hold the contractor responsible for any excess cost.
- E. Continuation of the terms of the contract beyond the fiscal year is contingent on availability of funds in the following year's budget. In the event of unavailability of such funds, the owner reserves the right to cancel the contract.
- F. ACQUISITION, MERGER, SALE AND/OR TRANSFER OF BUSINESS, ETC.

It is understood by all parties that if, during the life of the contract, the contractor disposes of his/her business concern by acquisition, merger, sale and or/transfer or by any means convey his/her interest(s) to another party, all obligations are transferred to that new party. In this event, the new owner(s) will be required to submit all documentation/legal instruments that were required in the original bid/contract. Any change shall be approved by the Owner.

- G. The contractor will not assign any interest in the contract and shall not transfer any interest in the same without the prior written consent of the owner.
- H. The owner may terminate the contract for convenience by providing sixty (60) calendar days advanced notice to the contractor.

XI. PAYMENT

- A. No payment will be made unless duly authorized by the Owner's authorized representative and accompanied by proper documentation.
- B. Payment will be made in accordance with the SCIA's policy and procedures and in accordance with the Prompt Payment to Contractor's Act at N.J.S.A. 2A:30-1 et seq.

XII. MANDATORY CONTRACT DISPUTE PROCEDURES

The bidder agrees to Mandatory Dispute Procedures required by P.L. 2006, Chapter 96 and *N.J.S.A. 40A:11-50*, as described below:

In an effort to resolve any disputes that arise during the construction of the project or following the completion of the project, the Bidder and Owner agree that all disputes between them arising out of or relating to the performance of the work described in the contract documents shall be submitted to non-binding mediation with the Construction Industry Mediation Rules of the American Arbitration Association currently in effect. Request for mediation shall be filed in writing with the other party to the party to the Contract and with the American Arbitration Association.

The parties shall share the mediator's fee and any filing fees equally. The mediation shall be held in the place where the Project is located, unless another location is mutually agreed upon. Agreements reached in mediation shall be enforceable as settlement agreements in any court having jurisdiction thereof.

The Bidder further agrees to include a similar mediation provision in all agreements with independent contractors and consultants retained for the project and to require all independent contractors and consultants also to include a similar mediation provision in all agreements with subcontractors, sub-consultants, suppliers or fabricators so retained, thereby providing for mediation as the primary method for dispute resolution between the parties to those agreements.

Nothing in this section shall prevent the Owner from seeking injunctive or declaratory relief in court or at any time. The alternative dispute resolution practices required by this section shall not apply to disputes concerning the bid solicitation or award process, or the formation of contracts or subcontracts to be entered into pursuant to P.L. 1971, c.198 (C:40A:11-1, *et seq.*).

SECTION 00300

BID DOCUMENT SUBMISSION CHECKLIST

To: Salem County Improvement Authority

Re: Landfill Flare Control Panel Installation

A. Failure to submit the following documents may be cause for bid to be rejected.

Required With
Submission of Bid
(Owner's checkmarks)

Initial Each Item
Submitted With Bid
(Bidder's Initials)

√	Bid Bond as required by <u>N.J.S.A. 40A:11-21</u> (Section 00420)	
√	Consent of Surety, pursuant to <u>N.J.S.A. 40A:11-22</u> (Section 00310-1)	
√	Statement of Ownership, pursuant to <u>N.J.S.A. 52:25-24.2</u> (Section 00680)	
√	Subcontractor Identification Form, pursuant to these specifications & <u>N.J.S.A. 40A:11-16</u> (Section 00650)	
√	Bidder's acknowledgement of any additions on the Authority's website, www.scianj.com , of revisions or addenda to an advertisement, specifications or bid documents (Section 00660)	
√	Proposal Bidder Information Sheet (Section 00410)	
√	Submission of Non-Collusion Affidavit (this form must be Notarized) <u>N.J.S.A. 52:34-15</u> (Section 00630)	
	Equipment Certification as provided in <u>N.J.S.A. 40A:11-20</u> (Section 00650-4)	
√	Bidder Corporate Resolution (this form must be notarized) (Section 00680-3)	
√	Bidder's and all Listed (or Named) Subcontractor's Certificate(s) of Business Registration, pursuant to <u>N.J.S.A. 52:32-44</u> (Section 00200-11)	
√	Affirmative Action Employee Information Report (Section 00200-16)	
√	Certification of Public Works Contractor Registration (Section 00650-2)	

B. SIGNATURE: The undersigned hereby acknowledge and has submitted the above listed requirements.

Name of Bidder: _____

By Authorized Representative:

Signature: _____

Printed Name and Title: _____

Date: _____

SECTION 310

CONSENT OF SURETY

The _____

(Name and address of surety)

a corporation organized under the laws of the State of _____ and authorized to do business in New Jersey, hereby certify that application has been made to us by

(Name and address of Bidder)

and satisfactory arrangements have been completed by which we have and do now agree to furnish a Performance Bond equal to 100% of the CONTRACT amount to ensure the faithful performance on the part of the Bidder of the terms and conditions of the Bidding Documents, advertisement, the accompanying Bid dated _____, 20__ and the terms and conditions of the CONTRACT and the payment of all lawful claims according to the Bidding Documents and the CONTRACT.

Surety Company

By _____
Attorney-in-fact

Date _____

SECTION 00400

BIDDER INFORMATION SHEET

Please fill in the following information and submit with your proposal:

BIDDER: _____

REPRESENTATIVE: _____

ADDRESS: _____

PHONE NUMBER: _____

FAX NUMBER: _____

FEDERAL TAX I.D.NO.: _____

PERSON PREPARING BID: _____

PROPOSED PROJECT MANAGER/ POINT OF CONTACT

BIDDER'S NAME: _____

ADDRESS: _____

OFFICE PHONE NUMBER: _____

CELL PHONE NUMBER: _____

PAGER NUMBER: _____

FAX NUMBER: _____

PROPOSED PROJECT MANAGER: _____

EMAIL ADDRESS: _____

Attach a corporate report, curriculum vitae/resume and any other pertinent/relevant information about the company and the people proposed to staff the Project under the Bid Proposal.

SECTION 00410

BID FORM

BID PROPOSAL

TO: SALEM COUNTY IMPROVEMENT AUTHORITY

The undersigned hereby agrees that if named the CONTRACTOR, he or she will complete all work detailed in the CONTRACT and the Technical Specifications and Drawings listed below from the date of Notice to begin work, which will be forwarded to the CONTRACTOR by the OWNER or the ENGINEER. He further agrees that the OWNER may, without recourse or other legal action, retain from the monies that are or may become due to amount stipulated below for each and every calendar day (Sundays and legal holidays expected) that the completion of the work may be delayed beyond the time stipulated in the CONTRACT. Such amount is hereby mutually agreed, not as a penalty, but as liquidated damages accruing to the OWNER due to such delay for extra costs due to engineering or other expenses as stated in the Bidding Documents.

SIGNATURES:

Therefore, in accordance with NJ law and by signature on this Bid Form for the Landfill Gas Collection and Control System Improvements Project at the Salem County Improvement Authority Solid Waste Facility, I hereby submit this Bid Proposal.

By: _____

Signature

Name: _____ Title: _____

Bidder Name: _____

(Affix Corporate Seal)

Date: _____

(continued)

SECTION 00410

BID FORM

This Bid is submitted by:

If Bidder is:

An Individual

Name (typed or printed): _____

By: _____

(Individual's signature)

Doing business as: _____

A Partnership

Partnership Name: _____

By: _____

(Signature of general partner—attach evidence of authority to sign)

Name (typed of printed): _____

A Corporation or LLC

Corporation/LLC Name: _____ (SEAL)

State of Formation: _____

Type (General Business, Professional, Service, Limited Liability Company): _____

By: _____

(Signature—attach evidence of authority to sign)

Name (typed or printed): _____

Title: _____

(CORPORATE SEAL)

Attest _____

Date of Qualification to do business in New Jersey is ____/____/____.

(continued)

SECTION 00410

BID FORM

A Joint Venture

Name of Joint Venture: _____

First Joint Venturer Name: _____

(SEAL)

By: _____

(Signature of first joint venture partner--attach evidence of authority to sign)

Name (typed or printed): _____

Title: _____

Second Joint Venture Name: _____ (SEAL)

By: _____

(Signature of second joint venture partner--attach evidence of authority to sign)

Name (typed or printed): _____

Title: _____

(Each joint venturer must sign. The manner of signing for each individual, partnership, and corporation that is a party to the joint venture should be in the manner indicated above.)

Bidder's Business Address _____

Phone No. _____ Fax No. _____

Email _____

SUBMITTED on _____, 20__.

State Contractor License No. _____.

SECTION 00410

SALEM COUNTY IMPROVEMENT AUTHORITY

BID FORM

PROJECT NAME/DESCRIPTION: _____

Total bid amount from **Price Schedule A** (next page), in numeric form:

In written form: _____ DOLLARS

Bidders must submit with their bid, the latest printed specifications and advertising literature on the services they propose to furnish.

All Exceptions and/or Deviations must be fully explained (note page and section number). Use additional paper if necessary:

Please attach any information on maintenance contracts available, i.e. price, what is covered, etc.

Term of project: Substantial Completion 30 calendar days; Final Completion 40 days. Liquidated damages apply to successful bidder at \$750.00 per day for each day past final completion deadline.

Company Name _____

Address: _____

Prepared by: _____
(printed/typed name)

Signature: _____
(Signature of Authorized agent)

Date: _____

Contract Contact Person: _____

Telephone Number: _____

Fax Number: _____

E-Mail Address: _____

PRICE SCHEDULE A

PAY ITEMS (See Section 01025)

Item No.	Description	Unit	Unit Price	Total Price
1	Mobilization	LS		
2	Flare Control Panel & Motor Starter Control Panel	LS		
3	Flare Auxiliary Panels	LS		
4	Condensate Sump & Knockout Pot Upgrades	LS		
5	Air Compressor Building Controls	LS		
6	Startup and Training	LS		
7	Rental Flare	LS		
8	Shade Fence	LS		

TOTAL AMOUNT OF BID = \$ _____

NOTES:

1. LS means lump sum.

DOCUMENT 00420

BID BOND

KNOW ALL MEN BY THESE PRESENTS, that we, the undersigned:

_____ as
Principal and

_____ as
Surety, are hereby held and firmly bound unto Salem County Improvement Authority (OWNER) in the penal sum of (10% total amount of Bid, not to exceed \$20,000) for the payment of which, well and truly to be made, we hereby jointly and severely bind ourselves, heirs, executors, administrators, successors and assigns to OWNER. Signed, this

_____ day of _____ 20__ . Bond No. _____

The condition of the above obligation is such that whereas the Principal has submitted to the OWNER a certain BID, attached hereto and hereby made a part hereof to enter into a contract in writing for the Landfill Flare Control Panel Installation.

NOW THEREFORE; (a.) If said BID shall be rejected, or; (b.) If said BID shall be accepted and the Principal shall execute and deliver a contract in the Form of Contract (properly completed in accordance with said BID) and shall furnish a BOND for his faithful performance of said contract, and for the payment of all persons performing labor or furnishing materials in connection therewith, and shall in all other respects perform the agreement created by the acceptance of said BID,

Then this obligation shall be void, otherwise the same shall remain in force and effect; it being expressly understood and agreed that the liability or the Surety for any and all claims hereunder shall, in no event, exceed the penal amount of this obligation as herein stated.

The Surety, for value received, hereby stipulates and agrees that the obligations of said Surety and its BOND shall be in no way impaired or affected by any extension of the time within which the OWNER may accept such a BID; and said Surety does hereby waive notice of any such extension.

IN WITNESS HEREOF, the Principal and the Surety have hereunto set their hands and seals, and such of them as are corporations have caused their corporate seals to be hereto affixed and these presents to be signed by their proper officers, the day and year first set forth above.

_____ (L.S.) _____
Surety

_____ By: _____

DOCUMENT 00420

BID BOND

IMPORTANT: Surety Companies executing bonds shall be authorized to conduct business in the State of New Jersey by the New Jersey Department of Banking and Insurance, satisfying the standards set forth in N.J.S.A. 2A:44-143 and 2A:44-144, listed by the New Jersey Department of Banking and Insurance and by the United States Treasury Department in its latest Circular 570 list of qualified Surety Companies, and acceptable to the OWNER for the full term and amount of the bid, as accepted by the OWNER; and (b) shall pay all premiums due thereon during the term of the Contract. The Surety must have an AM Best Rating of A or Better.

(Affix Seal)

SECTION 00470

FORM OF AGREEMENT

THIS AGREEMENT is made on the ____ day of _____ 2021 by and between _____, (hereinafter called the "Contractor"), and Salem County Improvement Authority, (hereinafter "Owner" or "SCIA"). The parties agree to the First Amendment to the Contract Documents, attached hereto, and as follows:

ARTICLE I: Scope of Work

The Contractor shall furnish all labor, material, tools, machinery and appurtenances and perform all work, services and obligations under this Contract and as indicated in contract drawings, Bidding Documents and the Specifications ("the Contract Documents") for the Landfill Flare Control Panel Installation at the Salem County Improvement Authority Solid Waste Facility (hereinafter the "Project") as set forth herein to the reasonable satisfaction of the Owner, in its sole discretion.

ARTICLE II: Time of Completion

Contractor shall establish a start date for the "Project" with Owner within five (5) days upon issuance of the Notice to Proceed. Contractor is responsible for scheduling the construction start date such that work can be substantially completed no later than 30 calendar days from the issuance of the Notice to Proceed by the Owner. The Contractor agrees that Final Completion of the work in its entirety, including all punch list items but not limited to any and all contractual requirements, shall be achieved no later than 10 calendar days from the date of Substantial Completion.

The Contractor hereby acknowledges and agrees that TIME IS OF THE ESSENCE to the Owner. The Contractor agrees to complete the Project strictly within the time specified.

LIQUIDATED AND SPECIAL DAMAGES

Liquidated Damages: Owner and Contractor recognize that TIME IS OF THE ESSENCE as to final Completion of the Project and all specified associated work, and that Owner will suffer financial loss and claims which will be difficult to measure if the Work is not completed within the time specified. Owner and Contractor also recognize the delays, expense and difficulties involved in proving in a legal proceeding the actual loss suffered by Owner if the Work is not completed on time. Accordingly, in an effort to estimate such loss and damage in advance, the Owner may assess against the Contractor Liquidated Damages, independently and cumulatively, in the amount of \$750 for each consecutive calendar day the Work, as outlined in these Specifications and Contract Documents, is not completed by the time set forth in Article II above. Such Liquidated Damages represent a good faith effort by the Owner and the Contractor to estimate the Owner's anticipated damages and loss by reason of the Contractor's failure to complete the Work in accordance with the schedule set forth herein.

Special Damages: In addition to the amount provided for liquidated damages, the Contractor shall pay the Owner the actual costs reasonably incurred by the Owner as a result of the Contractor's failure to meet its obligations set forth in this Contract, including the contract

drawings, Bidding Documents, Specifications and Contract Documents, in the time and in the manner described herein, which actual costs shall include, but not be limited to, engineering and inspection forces employed on the Work, regulatory imposed fines and fees incurred by Owner or others arising there from, and costs of court and reasonable attorneys' fees, until the Work is substantially completed in accordance herewith.

The Owner may deduct the amount of liquidated damages and special damages from monies due to the Contractor under this Contract.

ARTICLE III: The Contract Sum

The Owner shall pay to the Contractor for satisfactory performance of the Contract an amount equal to the sum of the established unit price for each separately identified item of unit price work times the actual quantity of that item installed and approved by Owner, in accordance with the unit prices stated in the Contractor's bid, attached hereto as Exhibit C.

All bills submitted to SCIA for approval and payment pursuant to N.J.S.A. 2A:30 A-1 et seq. must comply with the following provisions: The "billing" date shall be the date that the Contractor signs the certification on the voucher/purchase order that the work has been performed.

Bills that are required to be approved by the Project Engineer (prior to submission to the SCIA for approval) for purposes of confirmation of successful completion of construction work shall be approved or disapproved within 20 days of submission of same to the Engineer. If bills are disapproved or monies withheld from payment, notice of reason for disapproval or monies withheld shall be given within the same 20 days to the Contractor.

SCIA must approve payment of all bills. For SCIA to consider a bill for approval, it must be submitted to the SCIA Administrator at least two weeks prior to a scheduled or re-scheduled SCIA meeting date. If SCIA or any agent or appropriate office of SCIA determines that the bill is not approved, notice of the disapproval shall be sent to the Contractor within 5 days of the SCIA meeting on which the bill was listed for approval.

If the bill is approved by SCIA, payment shall be made to the Contractor within 14 days of the SCIA meeting as the "payment cycle."

ARTICLE IV: Payment of the Contract Sum

The Contractor shall be paid the prices stipulated in the Bid as full compensation for everything furnished and performed by the Contractor including all work required, but not specifically mentioned, and all loss or damage arising out of the nature of the aforesaid work, the action of the elements, any unforeseen obstruction or difficulty encountered in the prosecution of the work, all risks of every description connected with the Work, all expenses incurred by or in consequence of the suspension or discontinuance of the Work as herein specified and for well and faithfully completing the Work and the whole thereof, as provided herein.

ARTICLE V: Contract Documents and Other Terms

The Contract shall include the Contract Documents (as defined in Article 1 of the Standard General Conditions of the Construction Contract); the schedule; the Bidding Documents, including, without limitation, forms and Instructions to Bidders; the proposal for the work as submitted by the Contractor; the Contractor's bonds and insurance certificates; this Agreement, the Owner's Purchase Order Terms and Conditions attached hereto, and all written amendments, addenda and additions thereto all of which are incorporated herein by reference.

ARTICLE VI: Subcontractors

The Contractor agrees to bind every subcontractor by the terms of the Contract Documents and shall provide each subcontractor with a copy of same for every related construction contract before the contract is executed. The Contract Documents shall not be construed as creating any contractual relationship between any subcontractor and the Owner.

ARTICLE VII: Waivers

Neither the inspection by the Owner or by the Owner's agents nor any orders or measurement or certificate by the Engineer, nor any order by the Owner for the payment of the money, nor payment for or acceptance of the whole or any part of the Work by the Owner, nor any extension of time or any possession taken by the Owner of its employees, shall operate as a waiver of any provision of this Contract, any power herein reserved to the Owner, or any right to damages herein provided. No waiver by the Owners of any breach by the Contractor of this Contract shall be held to be a waiver of any other subsequent breach. Any remedy provided in the Contract shall be taken and construed as cumulative; that is, in addition to each and every other remedy herein provided and in addition to all other suits, actions or legal proceedings. The Owner shall also be entitled as of right to a writ of injunction against any breach of any of the provisions of this Contract.

ARTICLE VIII: Owner and Responsibility of the Engineer

All work shall be done under the observation of the Engineer or other authorized representative of the Owner. The Engineer shall decide any and all questions which may arise regarding the quality and acceptability of materials furnished, Work performed, rate of progress of the Work, interpretation of the Contract Documents, and all questions concerning the satisfactory performance of the Contract by the Contractor.

The Engineer's services during the construction of the Project are intended to assure the Owner that the completed work of Contractor will conform in general to the Contract Documents. The Engineer, by visiting the Project site while the work is in progress, shall not be deemed to supervise, direct or have control over the Contractor's work, or the means, methods, techniques, sequences or procedures of construction selected by the Contractor, or for any failure by the Contractor to comply with laws, rules, regulations, ordinances, codes, or orders applicable to Contractor's work.

ARTICLE IX: Contract Wage Requirements

The minimum wage to be paid all labor employed on this contract shall be in accordance with the “prevailing Wage Rate Determination” as ascertained and determined by the New Jersey Department of Labor and Workforce Development applicable to Sussex County Public Improvements. The Contractor shall be bound by the list effective at the date of the signing of this Contract. Contractors and subcontractors shall keep full and accurate payroll records covering all disbursement of wages to their employees to whom they are required to pay not less than the prevailing rate or rates or wages. Such payroll records shall not be destroyed or removed from the State for the period of one (1) year following the completion of this improvement, final payment and guarantee period. Certified payrolls must be submitted on a monthly basis to the Owner with any and all pay requests.

ARTICLE X: Indemnification and Insurance Coverage

The Contractor shall indemnify, save, hold harmless and defend (with legal counsel selected by Owner) the Salem County Improvement Authority, its officials, employees, representatives and professionals for any loss, damage, or injury from or in consequence of any act or omission of the Contractor, its employees or agents, whether intentional or unintentional, and from the negligent acts of anyone for whom the Contractor is liable except for such loss, damage or injury resulting solely from the SCIA’s negligence.

The Contractor agrees to maintain insurance coverage as set forth in the Contractor Documents, including the Notice to Bidders, for, inter alia, Workmen’s Compensation insurance as required by law, covering all employees and all such coverage as required by Article II of the General and Supplementary Conditions of the Contract for Construction. All such insurance shall be evidenced by Certificate(s) of Insurance executed by the Contractor’s insurance carrier(s) and filed with the Owner, specifically providing that the Contractor’s Public Liability insurance includes contractual coverage as provided in the Contract Documents, and further, that said insurance will not be cancelled or changed until at least thirty (30) days written notice has been given to the Owner.

ARTICLE XI: Contractor’s Status and Responsibilities

- a. The Contractor status shall be that of an independent contractor, and not an agent or employee of the Owner,
- b. The Contractor is responsible for providing competent, qualified personnel to perform the work.
- c. The Contractor shall be responsible for proceeding with the work and adhering to the work schedule despite any disputes, disagreements or claims made against the Owner. No work shall be delayed or postponed pending resolution of any dispute, disagreement or claim.

- d. The Owner shall have the right to deduct the full amount of all expenses, losses and damages from monies due the Contractor under this Contract for any defective work of the Contractor in order to pay for the repairs of said defective work, as determined by the Engineer.

ARTICLE XII: Guarantee and Correction of Defective Work

- a. The Contractor warrants and guarantees to the owner that all Work will be performed in accordance with the Contract Documents and all applicable, laws, rules and regulations and that the work will not be defective.
- b. If after the acceptance date, the Work is found to be defective, the Contractor shall promptly correct the defective work as directed by the Owner, and shall do so at no additional cost to the Owner.

ARTICLE XIII: Termination

- a. The owner may, upon seven (7) days written notice to the Contractor, and at any time after the execution of this Contract, terminate or reduce the services of the Contractor furnished hereunder for any reason, including, but not limited to, the abandonment of the Project, or the unavailability of monies to complete the work.
- b. In the event of such termination, the Contractor shall be compensated for its authorized services rendered hereunder up to that date, and for all reasonable shutdown costs as agreed to by both parties less any costs or changes that may be related to a breach or other early termination of this Contract.

ARTICLE XIV: Mandatory Dispute Resolution Procedures

Any claim arising out of or related to the Contract shall be subject to non-binding mediation as a condition precedent to the institution of legal or equitable proceedings by either party.

The parties shall endeavor to resolve their claims by mediation. The mediation shall be held where the Project is located before a mediator who is mutually acceptable to the parties. The parties shall share the mediator's fees equally.

Nothing shall prevent the Owner from seeking injunctive or declaratory relief in court at any time. The alternative dispute resolution practices required by this section shall not apply to disputes concerning the bid solicitation process, or to the formation of contracts to be entered into pursuant to P.L. 1971, c. 198 (N.J.S.A. 40A:11-1 et seq.).

The Bidder further agrees to include a similar provision in all agreements with independent contractors and consultants retained for the project and to require all independent contractors to include a similar mediation provision in all agreements with subcontractor, suppliers or fabricators so retained, thereby providing for mediation as the primary method for dispute

resolution between the parties to those agreements. The arbitration of claims is expressly excluded under this Contract.

ARTICLE XV: Agreement Binding

This Contract shall bind the heirs, executors, administrators, successors and assigns of the respective parties hereto.

ARTICLE XVI: Controlling Law

This Agreement, its interpretation and performance, shall be controlled by the Laws of the State of New Jersey.

ARTICLE XVII: Venue

All proceedings on the Contract and any and all disputes between the Parties shall be brought before and venued in the Superior Court of New Jersey, Salem County.

ARTICLE XVIII: Integrated Agreement

This Agreement represents the entire and integrated agreement between the Parties hereto and supersedes all prior agreements, either written or oral.

ARTICLE XIX: Reconciliation of Conflicts

Any and all inconsistencies or conflicts in the Contract Documents and the Provisions of the Local Public Contracts Law at N.J.S.A. 40A:11-1 et. seq. shall be resolved in favor of the Local Public Contracts Law.

IN WITNESS WHEREOF, and intending to be legally bound, the parties have caused this Agreement to be executed by their duly authorized Officer and Director, respectively, attested by their duly authorized Secretary and Clerk/Administrator, respectively, and their respective corporate seals to be hereto affixed the day and year written above. We have read and are in agreement with the above.

ATTEST:

(Witness)

(Contractor)

(Signature)

(Title / Date)

SALEM COUNTY IMPROVEMENT
AUTHORITY

ACKNOWLEDGEMENT OF PRINCIPAL, IF A CORPORATION

STATE OF _____)
) SS:
COUNTY OF _____)

BE IT REMEMBERED, that on this _____ day of _____ in the year _____, AND Before me, the subscriber, a Notary Public of the State of _____ personally appeared who, being by me duly sworn on h_____ oath, doth depose and make proof to my satisfactory that he is the Secretary or Assistance Secretary of _____, the Corporation named III the within Instrument; that _____ is the President of said Corporation; that the execution as well as the making of this Instrument has been duly authorized by a proper resolution of the Board of Directors of said Corporation; that deponent well knows the corporation seal of said Corporation; and the seal affixed to said Instrument is such Corporation seal and was thereto affixed and said Instrument signed and delivered by said President, as and for h voluntary act and deed and as and for the voluntary act and deed of said Corporation; in presence of deponent, who thereupon subscribed h_____ name thereto as witness.

A Notary Public

Signature of Secretary or
Signature of Assistant Secretary

My Commission Expires: _____

(seal)

ACKNOWLEDGEMENT OF PRINCIPAL, IF A PARTNERSHIP

STATE OF _____)
) SS:
COUNTY OF _____)

Sworn to and subscribed before me, a Notary Public in the State of _____

On this _____ day of _____, 20____, before me personally came
_____ and known to me to be one of the members of the firm of
_____ described in and who executed the foregoing instrument, and he
acknowledged to me that he executed the same as for the act and deed of said firm.

Signature

A Notary Public

My Commission Expires: _____

(seal)

ACKNOWLEDGEMENT OF PRINCIPAL, IF AN INDIVIDUAL

STATE OF _____)
) SS:
COUNTY OF _____)

Sworn to and subscribed before me, a Notary Public in the State of _____

On this _____ day of _____, 20____, before me personally came
_____ and known to me to be the person described in and
who executed the foregoing instrument, and he acknowledged to me that he executed the same as for the
act and deed of said firm.

Signature

A Notary Public

My Commission Expires: _____

(seal)

(Witness)

(Date)

SALEM COUNTY IMPROVEMENT AUTHORITY Purchase Order Terms and Conditions

1. **Offer and Contract.** The following terms, together with such terms as are set forth on the face of the purchase order, with such plans, specifications, or other documents as are incorporated by reference on the face of the order, and which such additional terms as are approved in writing by Buyer in a Change Notice issued by it to this Order, constitutes the offer of Buyer to Seller, and shall, when accepted, constitute the entire order between Buyer and Seller. Buyer hereby gives notice of its objections to any different or additional terms. Such Order shall be deemed to have been accepted upon Buyer's receipt of an initialed copy of the Order duly executed by Seller, upon Seller's shipment of the products identified herein, or (if such products are to be specially manufactured for Buyer) upon Seller's commencement of manufacture of such products.
2. **Price and Payment.** The prices herein specified, unless otherwise expressly stated, shall exclude all taxes and duties or any kind which either party is required to pay with respect to the sale of goods covered by this order, but shall include all charges and expenses in connection with the packing of the goods and their carriage to the place of delivery to Buyer unless specifically excluded. Seller shall be paid, except as otherwise stated in this Order, upon submission or proper invoices, the price stipulated herein for supplies delivered and accepted or services rendered and accepted; however, payment may be withheld or portions thereof may be deducted if, in Buyer's reasonable opinion, Seller is not performing work in accordance with the provisions of this Order or if proper setoffs in favor of Buyer in other transactions are asserted.

Payment terms are net thirty (30) days subject to any limitations as provided elsewhere in this Order. Invoices shall be mailed at the time of shipment and any cash discount period offered by Seller shall be computed from the date the goods or the invoice is received, whichever is later, and provided that the required certification documents are received by Buyer. Drafts or facsimiles will not be honored. The foregoing payment and cash discount periods shall be extended by the period of any delay caused by an error in the invoices requiring correction.

Those provisions of this Order that by their very nature survive final acceptance under this Order shall remain in full force and effect after such acceptance and payment.
3. **Compliance with Laws.** Seller's performance of work hereunder and all products to be delivered hereunder shall be in accordance with any and all applicable executive orders, Federal, state, municipal, and local laws and ordinances, and rules, orders, requirements, and regulations thereunder. Such Federal laws shall include, but not be limited to, the Fair Labor Standards Acts of 1938, as amended.
4. **Title and Risk of Loss.** Except as otherwise provided herein, all goods furnished by Seller hereunder shall become the property of Buyer upon payment therefore or upon delivery, whichever occurs earlier. Notwithstanding the foregoing, Seller shall be responsible for shall bear any and all risk of loss or damage to the goods until delivery thereof in accordance with the delivery provisions in the Order. Upon such delivery, risk or loss or damage shall pass to Buyer, provided however, that any loss or damage, whenever occurring, which results from Seller's nonconforming packaging or crafting shall be borne by Seller.
5. **Delivery; Delays.** The time or times of delivery specified in this Order are of the essence of this order. Any delay will excused only if (I) such delay is due to strike, fire, windstorm, riot, act of God, act of the public enemy or other unforeseeable cause beyond the control and without the fault or negligence of Seller and if (II) Seller shall have notified Buyer in writing of the existence of such cause within five (5) days after the commencement of the delay, giving all pertinent

information concerning such cause. Within seven days of the cessation of the event causing the delay, Seller shall provide Buyer with written notice of the actual delay incurred, upon receipt of which the date of promised delivery shall be extended for the time actually lost by reason of the excusable delay. Unless otherwise provided in this Order, no delivery required hereunder shall be made more than fifteen (15) days prior to the applicable delivery date and Buyer shall have the right to return earlier deliveries at Seller's risk and expense or to charge to Seller any additional costs sustained because of the same.

6. **Termination; Cancellation.** Buyer shall have the right to terminate this order in whole or in part by written or telegraphic notice whenever it deems such action will be in its best interest. In the event of any termination other than a cancellation for default of Seller and only in such event, if Seller, at the time of such termination shall have in stock or on firm order any raw, semi-processed, or completed materials for use in fulfilling this Order (I) in the case of completed materials Buyer may, at its option, either require delivery of all or part of the completed materials and make payment therefore at the contract price or (without taking delivery thereof) pay Seller the excess, if any, of the contract price over the market price at the time of termination, and (II) in the case of raw or semi-processed materials, Buyer may, at its option, either require Seller to complete and deliver all or part of such materials at the contract price, or (without taking delivery thereof) pay Seller with respect to such raw or semi-processed materials which are properly allocable to this order a proportion of the Order price based on the stage of completion of such materials and reduced by the value of such materials at such stage of completion, and (III) in the case of materials which Seller has on firm order hereunder, Buyer may, at its option, either take an assignment of Seller's rights under such order or pay the costs, if any, of settling or discharging Seller's obligations under such order. The preceding paragraph shall not limit any legal rights of Buyer to cancel this order by reason of any default by Seller, and Buyer further reserves the right to cancel this order without further liability for articles not accepted by Buyer in the event Seller commits an act of bankruptcy, files or has filed against it a petition under the federal Bankruptcy Code, suffers any receivership or other similar petition to be filed for or against it, or make a general assignment for the benefit of the creditors.
7. **Warranty.** Seller warrants that the goods shall be free from liens and defects in design, material, workmanship, and title, and shall conform in all respects to the terms of the Order and to the applicable drawings issued for manufacture, and shall be new and of the best quality if no quality is specified. Unless the warranty period is otherwise extended, the conditions of which are provided elsewhere in this Order, the following warranty shall apply: if, any time prior to eighteen (18) months from the date of delivery, it appears that the goods, or any part thereof, do not conform to these warranties or to the specifications, and Buyer so notifies Seller within a reasonable time after its discovery. Seller shall promptly correct such nonconformity to the satisfaction of Buyer, at Seller's sole expense, failing which Buyer may reject or revoke acceptance and cover by making any reasonable purchase of goods in substitution for those rejected and the Seller will be liable to the Buyer for any excess costs for such similar goods or services; or Buyer may proceed to correct Seller's nonconforming work by the most expeditious means available, the cost of which shall be for Seller's account, or Buyer may retain the nonconforming goods and equitable adjustment reducing the order price to reflect the diminished value of such nonconforming goods will be made by written revision Seller's liability hereunder shall extend to all damages approximately caused by the breach of any of the foregoing warranties, including incidental damages, such as removal, inspection, replacement, costs of return or warehousing.

8. **Non-Waiver.** Failure by Buyer to insist upon strict performance of any of the terms and conditions hereof, or failure or delay to exercise any rights or remedies provided herein or by law or to properly notify Seller in the event of a breach, or the acceptance of or payment for any goods hereunder, or review of design, shall not release Seller from any of the warranties or obligations of this Order and shall not be deemed a waiver of any right of Buyer to insist upon strict performance hereof or any of its rights or remedies as to any such goods, regardless of when shipped, received or accepted, or as to any prior or subsequent default hereunder, nor shall any termination of this Order by Buyer operate as a waiver of any of the terms hereof.
9. **Liens.** Seller shall deliver the products which are the subject matter of this Order to Buyer free and clear of all liens, claims, and encumbrances.
10. **Patents.** Seller shall, at its own expense, hold harmless and defend Buyer under this Order against any claim, suit or processing brought against Buyer which is based upon a claim, whether rightful or otherwise, that any equipment, process or material, or any part thereof, furnished by Seller under this Order, constitutes and infringement of any patent and Seller shall pay all damages and costs awarded against buyer resulting therefrom.

The preceding paragraph shall not apply to any equipment, or any part thereof, manufactured to Buyer's detailed design. As to such equipment or part, Seller assumes no liability whatsoever for patent infringement. This indemnity is given upon the condition that Buyer shall promptly notify Seller of any claim or suit or proceeding involving Buyer in which such infringement is alleged, and Buyer shall permit Seller to control completely the defense or compromise of any such allegation of infringement, and Buyer shall render such reasonable assistance at Seller's cost in the defense thereof as Seller may require.

Notwithstanding any proprietary legends or copyright notices to the contrary, Buyer may copy or reproduce documents and information furnished by Seller in connection with Seller's proposal and with this Order and distribute such copies and reproductions to others for the limited purposes of designing, constructing, operating, maintaining, or licensing Buyer's project. Seller is responsible for obtaining necessary permission and releases from any third parties placing proprietary rights or copyrights on such documents or information and shall, at its own expense, hold harmless and defend Buyer against any and all claims, suits or proceedings based upon a claim whether rightful or otherwise that a proprietary right or copyright has been infringed by copying, reproduction, distribution or use by Buyer.

Unless otherwise agreed in writing and except as provided below in this Article 11, Seller shall assume the defense of any suit for infringement of patents brought against Buyer or its vendees, mediate or immediate, based upon the products purchased hereunder constituting a patent infringement.

11. **Availability of Information.** All financial statements, reports, billings, and other documents shall properly reflect the facts about all activities and transactions handled for the accounts of Buyer. Buyer's duly authorized representatives shall have, during the term of this agreement and for two years thereafter, access at all reasonable times to all of the Seller's and his Subcontractor's personnel, accounts and records that may be needed to verify and audit all charges to Buyer (except those charged solely on a lump-sum basis).
12. **Applicable Law Definitions.** The definition of terms used, the interpretation of this Order and rights of the parties hereunder shall be construed under and governed by the laws of the state wherein Buyer's office is located, as first indicated in this Order, unless otherwise specified herein. Buyer means the SCMUA, whether acting on behalf of or as agent for the successor in

interest of the goods or on its own behalf. Seller means the person, firm, or corporate to which this Order is addressed. Goods means those articles, materials, supplies, drawings, data and other property and/or all services specified or required hereunder.

13. **Indemnity.** Seller hereby releases and shall indemnify, defend and hold harmless Buyer and its officers, agents, employees, successors, and assigns and authorized representatives of all the foregoing from and against any and all suits, actions, legal or administrative proceedings, claims, demands, damages, liabilities, interest, reasonable attorney's fees, costs and expenses of whatsoever kind or nature, including those arising out of injury to or death of Seller's employees, whether arising before or after completion of the Work hereunder and in any manner directly or indirectly caused, occasioned, or contributed to in whole or in part, or claimed to be caused, occasioned or contributed to in whole or in part, by reason of any act, omission, fault or negligence whether active or passive of Seller, its subcontractors or of anyone acting under its direction or control or on its behalf in connection with or hold harmless obligations, or portions or applications thereof, shall apply even in the event of the fault or negligence, whether active or passive, or strict liability of the parties released, indemnified, or held harmless to the fullest extent permitted by law, but in no event shall they apply to liability caused by the willful misconduct or sole negligence of the party released, indemnified or held harmless.
14. **Business Ethics.** Seller or its employees shall not offer substantial gifts, entertainment, payments, loans or other considerations to Buyer's employees, their families, vendors, subcontractors and other third parties for the purpose of influencing such persons to act contrary to Buyer's interest. Seller shall immediately notify Buyer of all violations of this provision upon becoming aware of such violation.
15. **Compliance with Site Rules.** Seller is to comply with all Contractor, federal, state and local Safety Rules of the site for delivery, inspection, replacement, repair or other services. These Safety Rules include, but are not limited to: insurance requirements, evidence of training, documentation of safety meetings, and documentation of job safety analysis, lock-out tag-out (LOTO) procedures, confined space procedures, fall protection usage and compliance with other local safety rules to the satisfaction of site management. Non-compliance with Safety Rules is grounds for cancellation of this Order without prejudice and/or removal of specific individuals, subcontractors or Seller from the site.
16. **General.** Unless the contrary is specifically stated, all rights and remedies provided herein shall be in addition to, and not in place of, those provided by applicable law.

SECTION 00610
PERFORMANCE BOND

KNOW ALL MEN BY THESE PRESENTS:

That we, the undersigned _____

as Principal and _____,

as Surety, are held and firmly bound unto the Salem County Improvement Authority, in the penal sum of

_____ Dollars
(Written Amount)

(\$ _____).
(Figures)

for payment of which well and truly to be made, we hereby jointly and severally bind ourselves, our heirs, executors, administrators, successors and assigns.

Signed this _____ day of _____, 20__.

The CONDITION of the above obligation is such that whereas the Principal did on the _____ day of _____, 20__, enter into a CONTRACT with the Salem County Improvement Authority which said CONTRACT is made part of this Bond, the same as though set forth herein:

NOW, if the said _____ shall well and faithfully do and perform the things agreed by _____ to be done and faithfully performed according to the terms of said CONTRACT, then this obligation shall be void, otherwise the same shall remain in effect. It is understood and agreed that the liability of the surety for any and all claims hereunder shall not exceed the penal amount of this Bond as herein stated.

The said Surety stipulates and agrees that no modifications to the terms and conditions of said CONTRACT shall in any way affect the obligations of said Surety on its bond.

This Bond is given in compliance with the requirements of the statutes of the State of New Jersey in its respect to bonds of contractors on public works.

SIGNED, SEALED AND DATED THIS _____ DAY OF _____
_____, 20__.

Signed by the Principal
In the presence of

(SEAL)

(Principal)

Signed by the Surety
In the presence of

(SEAL)

(Surety)

BY _____
(Attorney-in-fact)

SECTION 00630

NON-COLLUSION AFFIDAVIT

State of New Jersey
County of _____

ss:

I, _____ residing in _____
(name of affiant) (name of municipality)

in the County of _____ and State of _____ of
full age, being duly sworn according to law on my oath depose and say that:

I am _____ of the firm of _____
(title or position) (name of firm)

_____ the bidder making this Proposal for the bid

entitled _____, and that I executed the said proposal
(title or bid proposal)

with full authority to do so that said bidder has not, directly or indirectly entered into any agreement, participated in any collusion, or otherwise taken any action in restraint of free, competitive bidding in connection with the above named project; and that all statements contained in said proposal and in this affidavit are true and correct, and made with full knowledge that the Salem County Improvement Authority relies upon the truth of the statements contained in said Proposal and in the statements contained in this affidavit in awarding the contract for the said project.

I further warrant that no person or selling agency has been employed or retained to solicit or secure such contract upon an agreement or understanding for a commission, percentage, brokerage, or contingent fee, except bona fide employees or bona fide established commercial or selling agencies maintained by _____.

Subscribed and sworn to

Signature

before me this day _____ of
_____, 20__

(Type or print name of affiant under signature)

Notary Public
My Commission expires: _____
(seal)

SECTION 640

**BIDDER'S CERTIFICATION REGARDING
DEBARMENT/DISQUALIFICATION/SUSPENSION**

I am _____, the Bidder; or Officer of Bidder; or

Partner of the Bidder (Select One), of the Firm of _____
(Name of Bidder)

at _____
(State the Address of Bidder)

(CHOOSE ONE OF THE FOLLOWING)

A. I hereby certify on behalf of _____
(Name of Bidder)

that, on the date and time of the bid, neither it nor its principals is included on the State Treasurer's or the Federal Government's List of Debarred, Suspended or Disqualified Bidders as a result of action taken by any State or Federal Agency. If awarded the contract, the Bidder acknowledges and agrees to insert into all its contracts with all Subcontractors and Subconsultants a clause stating that the Contracted Party, its Subcontractors or Subconsultants is prohibited from working on this Project if the entity's name appears on the List of Debarred, Suspended or Disqualified Bidders of the State Treasurer or the Federal Government.

Certify that it shall immediately notify the Owner, in writing, in the event that the Bidder, or any Subcontractors and Subconsultant shall come to appear on the Treasury's or the Federal Government's List of Debarred, Suspended or Disqualified Bidders.

B. I am unable to certify to any of the statements set forth in this Certification. I have attached an explanation to this form.

(Signature)

(Typed Name and Title)

(Date)

Sworn and subscribed before me this
_____ day of _____, 20__.

NOTARY PUBLIC _____
(Signature)

(Print Name)

SEAL

Notary Public - State of _____
My Commission Expires _____

CERTIFICATE OF PUBLIC WORKS CONTRACTOR REGISTRATION
(P.L. 1999, c. 238)

To: Salem County Improvement Authority

Re: Landfill Flare Control Panel Installation

1. All Bidders are required to be registered pursuant to P.L. 1999, c. 238 (N.J.S.A. 34:11•56-48) by the New Jersey Department of Labor at the time of the submission of a bid for this project pursuant to the Public Works Contractor Registration Act.
2. Each Contractor shall submit the Certificate of Registration for the contractor and all subcontractors listed in the Bid Proposal at the time of the bid, but, in any event, prior to the award of the contract.

**EQUIPMENT CERTIFICATION OF BIDDER SHOWING ABILITY TO PERFORM
THE CONTRACT (N.J.S.A.40A:11-16)**

To: Salem County Improvement Authority

Re: Landfill Flare Control Panel Installation

"There may be required to perform any bidder submitting a bid on public work to any contracting unit duly advertised for in accordance with Law, a certificate showing that he owns, leases, or controls all the necessary equipment required by the plans specifications and advertisements under which bids are asked for and if the bidder is not the actual owner or lessee of any such equipment, this article shall state the source from which the equipment would be obtained and shall be accompanied by a certificate from the owner or person in control of the equipment definitely granting to the bidder the control of the equipment required during such time as may be necessary for the completion of that portion of the contract of which is necessary."

If the bidder owns, leases or controls all the necessary equipment required of the completion of the Project, the bidders shall complete and sign Part 1.

PART 1:

I, _____, hereby certify that I own, lease, or control all the necessary equipment (Complete Name of Bidder) necessary to complete the work shown and described on the Contract Documents

Title: _____

Date: _____

PART 2

IF the Bidder does not own, lease or control all of the equipment necessary to complete the Project, the Bidder shall complete and sign Part 2.

I, _____, hereby certify that I own or control the equipment
(Complete Name of Equipment Supplier)
required to complete the Project, the subject of this Bid, and definitely grant _____
(Complete Name of Bidder)

the control of such equipment for such time as may be required for the portion of the work described in the Contract Documents, for which said equipment is necessary.

Date: _____

By: _____
(Signature)

Name: _____
(print)

Title: _____

Company Name: _____

Address: _____

Bidder is required to list all equipment that bidder intends to use on this Project

(Attach additional sheets if necessary)

SECTION 00660

ACKNOWLEDGEMENT OF ADDENDA

The undersigned Bidder hereby acknowledges the addition on the Authority's website, www.scianj.com, of the following Addenda:

<u>Addendum Number</u>	<u>Dated</u>	<u>Acknowledge Receipt</u> (initial)
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

No addenda were added:

Acknowledged for: _____
(Name of Bidder/company)

By: _____
(Signature of Authorized Representative)

Name: _____
(Print or Type)

Title: _____

Date: _____

SECTION 00680

STATEMENT OF OWNERSHIP

The following statement is a list of all stockholders in this corporation or partners in this partnership or owners of this entity with 10% or greater interest therein, as the case may be.

Project: Landfill Flare Control Panel Installation

Salem County Improvement Authority Solid Waste Facility

NAME OF CORPORATION, LIMITED PARTNERSHIP OR OTHER LEGAL

ENTITY: _____

Type of Entity (check one)

CORPORATION PARTNERSHIP

LIMITED PARTNERSHIP LIMITED LIABILITY COMPANY

OTHER (Describe) _____

BIDDER NAME _____

ADDRESS _____

PERCENTAGE OF STOCK, PARTNERSHIP OR OTHER OWNERSHIP INTEREST
IN BIDDER

NAME	ADDRESS	TYPE AND PERCENTAGE OF OWNERSHIP
------	---------	-------------------------------------

_____	_____	_____
_____	_____	_____
_____	_____	_____

(Supplement with attachment, if needed)

The undersigned Bidder certifies that the within document is a true and accurate statement of all persons or entities owning 10% or more of the outstanding stock, partnership or other interests in the Bidder and in each of the persons or entities having ownership interests in the Bidder.

Bidder Name (printed): _____

By: _____

Name:

Title:

Sworn and subscribed to before me,
this ____ day of _____, 20__

Notary Public

BID CORPORATE RESOLUTION TO BIND BIDDER TO THE CONTRACT WITH SCIA

To: Salem County Improvement Authority

Re: Landfill Flare Control Panel Installation

I hereby certify that the Officers and Partners of the Bidder are authorized to submit the bid and execute the contract of the Bidder, and fulfill the obligations of the Bidder under the Contract upon the acceptance of the bid by the Salem County Improvement Authority.

I hereby certify that the above was authorized by a resolution passed by the Officers or Board of Directors at a meeting held on the _____ day of _____, 20__.

Signature of bidder's authorized Representative _____

Print Name _____

Title _____

Date _____

**SECTION 00800
SUPPLEMENTARY CONDITIONS**

These Supplementary Conditions contain changes and additions to the "Standard General Conditions of the Construction Contract." Notwithstanding the changes and additions made by the Supplementary Conditions herein, the remaining provisions of the Standard General Conditions of the Construction Contract shall be in full force and effect.

PART 1-AMENDMENTS TO GENERAL CONDITIONS

ARTICLE 1 – DEFINITIONS AND TERMINOLOGY

ENGINEER The **ENGINEER** referred to shall be:

SCS Engineers
53 South Main Street
Suite A
Medford, NJ 08055
Contact: Eric Peterson
Telephone: (609) 654-4000
Fax: (703) 471-6676

OWNER The **OWNER** referred to shall be:

The Salem County Improvement Authority
Administrative Offices
286 Welchville Road; PO Box 890
Alloway, New Jersey 08001

FINAL COMPLETION **Final Completion** is the point at which the CONTRACTOR has removed his materials and equipment from the site and has returned the work areas to a clean and orderly state to the satisfaction of the ENGINEER and OWNER. The CONTRACTOR must participate in a site inspection with the ENGINEER and OWNER to determine that all Work has been completed to the satisfaction of the ENGINEER and OWNER.

ARTICLE 3 – CONTRACT DOCUMENTS: INTENT, AMENDING, REUSE

3.03A(3) Delete 3.03A(3) in its entirety and replace it with the following:

"Contractor shall be liable to the Owner for failure to report any conflict, error, ambiguity or discrepancy in the Contract Documents before submitting its bid for the work as is required by the Local Public Contracts Law at N.J.S.A. 40A:11-13."

ARTICLE 4 – AVAILABILITY OF LANDS; SUBSURFACE AND PHYSICAL CONDITIONS; HAZARDOUS ENVIRONMENTAL CONDITIONS; REFERENCE POINTS

4.02B Delete the first paragraph only and replace with the following:

No Reliance by Contractor on information provided by the Owner.
Information regarding the Landfill Site is available from the OWNER. However, in transmitting information regarding the surface or subsurface conditions to be encountered, the OWNER does not guarantee the accuracy or completeness of the data given, and it assumes no responsibility thereof. The Contractor shall draw his own conclusions from whatever information is available, through the OWNER or otherwise. Contractor may not rely upon or make any claim against OWNER or ENGINEER, or any of their officer, directors, employees or consultants with respect to:

Delete 4.03 in its entirety:

Delete 4.04 B and replace with the following:

Underground Facilities

It is understood and agreed that the Contractor will be working on a Municipal Solid Waste Landfill Site and digging in Landfill Waste and, as a result, the OWNER cannot guarantee surface conditions, subsurface conditions or the precise location of any of the Underground Facilities that may be shown on the Plans. Contractor has considered in its bid all the Underground Facilities shown on the plans or through his site investigation and assumes the risk of uncovering or discovering other Underground Facilities or any latent conditions not shown in the Contract Documents in

performing the Work in connection therewith. Contractor has made allowance in his bid for the fact that no additional compensation will be allowed for any delays, inconvenience, loss of efficiency, or damages that are caused by the location of Underground Facilities, or any conditions on the Site, whether known or unknown, that interfere with the proper execution of this work.

Delete 4.06A, B, C, D, E, F, G and I and replace with the following:

Hazardous Environmental Conditions.

It is mutually agreed that the Contractor accepts the Site in its present condition, and without any representation, statements, or warranties, express or implied, in respect thereto, or in respect of its condition as a Municipal Solid Waste Site and the Owner shall not be liable for any damage or injury sustained by the Contractor, its employees or third parties for whom the Contractor is liable if the Contractor encounters a hazardous environmental condition at the Site. Furthermore, the Contractor assumes all responsibility for the safety and protection of its workers and third parties for whom the

Contractor is liable if Contractor encounters a hazardous condition at the Site.

ARTICLE 5 – BONDS AND INSURANCE

- 5.01D** Add:
A One (1) Year Maintenance Bond will be required in the amount of fifteen (15) percent of the Contract after Notice of Substantial Completion and prior to Final-Payment which cost shall be confirmed by the Owner's Engineer prior to the release of the performance bond by the Owner. The Maintenance Bond shall remain in effect for one (1) year beyond the date of the final inspection and acceptance by the Owner. The surety or letter of credit must be issued by a firm authorized to do business in the State of New Jersey and acceptable to the Owner.
- 5.11** All references to "named insureds" in the Contract Documents shall be replaced with "additional insureds."

ARTICLE 6 – CONTRACTOR’S RESPONSIBILITIES

- 6.07B** Paragraph 6.07B shall be deleted in its entirety.

ARTICLE 11 – COST OF THE WORK; ALLOWANCES; UNIT PRICE WORK

- 11.01** Delete 11.01 in its entirety.

ARTICLE 12 – CHANGE OF CONTRACT PRICE; CHANGE OF CONTRACT TIME

- 12.01** Add the new subparagraph 12.01D follows:

“The unit price of an individual contract line item may be reconsidered in the event of a change in the unit quantity of more than 25 percent. The Owner may request a reduction in the unit price equivalent to the Contractor’s overhead for the additional contract quantity. In the event the contract quantity decreases by 25 percent, the Contractor may request unit price adjustment to account for contractor’s overhead for the quantity reduced. Unit price adjustment may not exceed 15 % of the original Bid Price:

12.03 Paragraph 12.03 B and C shall be deleted in its entirety and replaced with:

TIME IS OF THE ESSENCE. Effects of inclement weather on working conditions must be taken into account in the scheduling and planning process. Contractor's sole remedy for delays caused by weather events is an extension of time subject to the Owner's sole discretion.

The OWNER shall be held harmless for any damages due to delays beyond its control. Such delays can consist of strikes, acts of war, acts of terrorism, protests, riots, natural disaster, pandemic, or other causes not the fault of the OWNER, the CONTRACTOR or its subcontractors. In the event of such a delay, the Contract Time shall be automatically extended and all contract prices held firm until such time as the delay has ceased to exist, or for a period of one year, whichever is least.

ARTICLE 14 – PAYMENTS TO CONTRACTOR AND COMPLETION

14.02 Paragraph 14.02, Progress Payments is hereby amended to the extent of any conflict therein with P.L. 1991, c. 133, the New Jersey Prompt Payment of Contractor's Law at N.J.S.A. 2A:30A-1 et. seq.

ARTICLE 15 – SUSPENSION OF WORK AND TERMINATION

15.02 Paragraph 15.02 shall not prejudice the OWNER's right to proceed against the Contractor's Surety for completion of any work or claim.

15.04 Eliminate the reference to "an order of court or other public authority."

ARTICLE 16 – DISPUTE RESOLUTION

Delete this Article in its entirety.

Article 16, Dispute Resolution, is hereby deleted in favor of the Dispute Resolution provisions of Section 00470, Form of Agreement.

ARTICLE 20 – LIQUIDATED DAMAGES

TIME IS OF THE ESSENCE in the execution and completion of this Contract.

20.1 The actual damages for any delay in completion of the work which the CONTRACTOR is required to perform under this Contract are impossible to accurately determine. Therefore, the CONTRACTOR and his Sureties shall be liable for and shall pay to the OWNER, liquidated damages as required by Article II of the Agreement Between OWNER and CONTRACTOR.

This document has important legal consequences; consultation with an attorney is encouraged with respect to its use or modification. This document should be adapted to the particular circumstances of the contemplated Project and the controlling Laws and Regulations.

STANDARD GENERAL CONDITIONS OF THE CONSTRUCTION CONTRACT

Prepared by

ENGINEERS JOINT CONTRACT DOCUMENTS COMMITTEE

and

Issued and Published Jointly by



AMERICAN COUNCIL OF ENGINEERING COMPANIES

ASSOCIATED GENERAL CONTRACTORS OF AMERICA

AMERICAN SOCIETY OF CIVIL ENGINEERS

PROFESSIONAL ENGINEERS IN PRIVATE PRACTICE
A Practice Division of the
NATIONAL SOCIETY OF PROFESSIONAL ENGINEERS

Endorsed by



CONSTRUCTION SPECIFICATIONS INSTITUTE

These General Conditions have been prepared for use with the Suggested Forms of Agreement Between Owner and Contractor (EJCDC C-520 or C-525, 2007 Editions). Their provisions are interrelated and a change in one may necessitate a change in the other. Comments concerning their usage are contained in the Narrative Guide to the EJCDC Construction Documents (EJCDC C-001, 2007 Edition). For guidance in the preparation of Supplementary Conditions, see Guide to the Preparation of Supplementary Conditions (EJCDC C-800, 2007 Edition).

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**STANDARD GENERAL CONDITIONS OF THE
CONSTRUCTION CONTRACT**

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ARTICLE 1 – DEFINITIONS AND TERMINOLOGY

1.01 *Defined Terms*

- A. Wherever used in the Bidding Requirements or Contract Documents and printed with initial capital letters, the terms listed below will have the meanings indicated which are applicable to both the singular and plural thereof. In addition to terms specifically defined, terms with initial capital letters in the Contract Documents include references to identified articles and paragraphs, and the titles of other documents or forms.
1. *Addenda*—Written or graphic instruments issued prior to the opening of Bids which clarify, correct, or change the Bidding Requirements or the proposed Contract Documents.
 2. *Agreement*—The written instrument which is evidence of the agreement between Owner and Contractor covering the Work.
 3. *Application for Payment*—The form acceptable to Engineer which is to be used by Contractor during the course of the Work in requesting progress or final payments and which is to be accompanied by such supporting documentation as is required by the Contract Documents.
 4. *Asbestos*—Any material that contains more than one percent asbestos and is friable or is releasing asbestos fibers into the air above current action levels established by the United States Occupational Safety and Health Administration.
 5. *Bid*—The offer or proposal of a Bidder submitted on the prescribed form setting forth the prices for the Work to be performed.
 6. *Bidder*—The individual or entity who submits a Bid directly to Owner.
 7. *Bidding Documents*—The Bidding Requirements and the proposed Contract Documents (including all Addenda).
 8. *Bidding Requirements*—The advertisement or invitation to bid, Instructions to Bidders, Bid security of acceptable form, if any, and the Bid Form with any supplements.
 9. *Change Order*—A document recommended by Engineer which is signed by Contractor and Owner and authorizes an addition, deletion, or revision in the Work or an adjustment in the Contract Price or the Contract Times, issued on or after the Effective Date of the Agreement.
 10. *Claim*—A demand or assertion by Owner or Contractor seeking an adjustment of Contract Price or Contract Times, or both, or other relief with respect to the terms of the Contract. A demand for money or services by a third party is not a Claim.
 11. *Contract*—The entire and integrated written agreement between the Owner and Contractor concerning the Work. The Contract supersedes prior negotiations, representations, or agreements, whether written or oral.

12. *Contract Documents*—Those items so designated in the Agreement. Only printed or hard copies of the items listed in the Agreement are Contract Documents. Approved Shop Drawings, other Contractor submittals, and the reports and drawings of subsurface and physical conditions are not Contract Documents.
13. *Contract Price*—The moneys payable by Owner to Contractor for completion of the Work in accordance with the Contract Documents as stated in the Agreement (subject to the provisions of Paragraph 11.03 in the case of Unit Price Work).
14. *Contract Times*—The number of days or the dates stated in the Agreement to: (i) achieve Milestones, if any; (ii) achieve Substantial Completion; and (iii) complete the Work so that it is ready for final payment as evidenced by Engineer's written recommendation of final payment.
15. *Contractor*—The individual or entity with whom Owner has entered into the Agreement.
16. *Cost of the Work*—See Paragraph 11.01 for definition.
17. *Drawings*—That part of the Contract Documents prepared or approved by Engineer which graphically shows the scope, extent, and character of the Work to be performed by Contractor. Shop Drawings and other Contractor submittals are not Drawings as so defined.
18. *Effective Date of the Agreement*—The date indicated in the Agreement on which it becomes effective, but if no such date is indicated, it means the date on which the Agreement is signed and delivered by the last of the two parties to sign and deliver.
19. *Engineer*—The individual or entity named as such in the Agreement.
20. *Field Order*—A written order issued by Engineer which requires minor changes in the Work but which does not involve a change in the Contract Price or the Contract Times.
21. *General Requirements*—Sections of Division 1 of the Specifications.
22. *Hazardous Environmental Condition*—The presence at the Site of Asbestos, PCBs, Petroleum, Hazardous Waste, or Radioactive Material in such quantities or circumstances that may present a substantial danger to persons or property exposed thereto.
23. *Hazardous Waste*—The term Hazardous Waste shall have the meaning provided in Section 1004 of the Solid Waste Disposal Act (42 USC Section 6903) as amended from time to time.
24. *Laws and Regulations; Laws or Regulations*—Any and all applicable laws, rules, regulations, ordinances, codes, and orders of any and all governmental bodies, agencies, authorities, and courts having jurisdiction.
25. *Liens*—Charges, security interests, or encumbrances upon Project funds, real property, or personal property.
26. *Milestone*—A principal event specified in the Contract Documents relating to an intermediate completion date or time prior to Substantial Completion of all the Work.

27. *Notice of Award*—The written notice by Owner to the Successful Bidder stating that upon timely compliance by the Successful Bidder with the conditions precedent listed therein, Owner will sign and deliver the Agreement.
28. *Notice to Proceed*—A written notice given by Owner to Contractor fixing the date on which the Contract Times will commence to run and on which Contractor shall start to perform the Work under the Contract Documents.
29. *Owner*—The individual or entity with whom Contractor has entered into the Agreement and for whom the Work is to be performed.
30. *PCBs*—Polychlorinated biphenyls.
31. *Petroleum*—Petroleum, including crude oil or any fraction thereof which is liquid at standard conditions of temperature and pressure (60 degrees Fahrenheit and 14.7 pounds per square inch absolute), such as oil, petroleum, fuel oil, oil sludge, oil refuse, gasoline, kerosene, and oil mixed with other non-Hazardous Waste and crude oils.
32. *Progress Schedule*—A schedule, prepared and maintained by Contractor, describing the sequence and duration of the activities comprising the Contractor's plan to accomplish the Work within the Contract Times.
33. *Project*—The total construction of which the Work to be performed under the Contract Documents may be the whole, or a part.
34. *Project Manual*—The bound documentary information prepared for bidding and constructing the Work. A listing of the contents of the Project Manual, which may be bound in one or more volumes, is contained in the table(s) of contents.
35. *Radioactive Material*—Source, special nuclear, or byproduct material as defined by the Atomic Energy Act of 1954 (42 USC Section 2011 et seq.) as amended from time to time.
36. *Resident Project Representative*—The authorized representative of Engineer who may be assigned to the Site or any part thereof.
37. *Samples*—Physical examples of materials, equipment, or workmanship that are representative of some portion of the Work and which establish the standards by which such portion of the Work will be judged.
38. *Schedule of Submittals*—A schedule, prepared and maintained by Contractor, of required submittals and the time requirements to support scheduled performance of related construction activities.
39. *Schedule of Values*—A schedule, prepared and maintained by Contractor, allocating portions of the Contract Price to various portions of the Work and used as the basis for reviewing Contractor's Applications for Payment.

40. *Shop Drawings*—All drawings, diagrams, illustrations, schedules, and other data or information which are specifically prepared or assembled by or for Contractor and submitted by Contractor to illustrate some portion of the Work.
41. *Site*—Lands or areas indicated in the Contract Documents as being furnished by Owner upon which the Work is to be performed, including rights-of-way and easements for access thereto, and such other lands furnished by Owner which are designated for the use of Contractor.
42. *Specifications*—That part of the Contract Documents consisting of written requirements for materials, equipment, systems, standards and workmanship as applied to the Work, and certain administrative requirements and procedural matters applicable thereto.
43. *Subcontractor*—An individual or entity having a direct contract with Contractor or with any other Subcontractor for the performance of a part of the Work at the Site.
44. *Substantial Completion*—The time at which the Work (or a specified part thereof) has progressed to the point where, in the opinion of Engineer, the Work (or a specified part thereof) is sufficiently complete, in accordance with the Contract Documents, so that the Work (or a specified part thereof) can be utilized for the purposes for which it is intended. The terms “substantially complete” and “substantially completed” as applied to all or part of the Work refer to Substantial Completion thereof.
45. *Successful Bidder*—The Bidder submitting a responsive Bid to whom Owner makes an award.
46. *Supplementary Conditions*—That part of the Contract Documents which amends or supplements these General Conditions.
47. *Supplier*—A manufacturer, fabricator, supplier, distributor, materialman, or vendor having a direct contract with Contractor or with any Subcontractor to furnish materials or equipment to be incorporated in the Work by Contractor or Subcontractor.
48. *Underground Facilities*—All underground pipelines, conduits, ducts, cables, wires, manholes, vaults, tanks, tunnels, or other such facilities or attachments, and any encasements containing such facilities, including those that convey electricity, gases, steam, liquid petroleum products, telephone or other communications, cable television, water, wastewater, storm water, other liquids or chemicals, or traffic or other control systems.
49. *Unit Price Work*—Work to be paid for on the basis of unit prices.
50. *Work*—The entire construction or the various separately identifiable parts thereof required to be provided under the Contract Documents. Work includes and is the result of performing or providing all labor, services, and documentation necessary to produce such construction, and furnishing, installing, and incorporating all materials and equipment into such construction, all as required by the Contract Documents.
51. *Work Change Directive*—A written statement to Contractor issued on or after the Effective Date of the Agreement and signed by Owner and recommended by Engineer ordering an

addition, deletion, or revision in the Work, or responding to differing or unforeseen subsurface or physical conditions under which the Work is to be performed or to emergencies. A Work Change Directive will not change the Contract Price or the Contract Times but is evidence that the parties expect that the change ordered or documented by a Work Change Directive will be incorporated in a subsequently issued Change Order following negotiations by the parties as to its effect, if any, on the Contract Price or Contract Times.

1.02 Terminology

A. The words and terms discussed in Paragraph 1.02.B through F are not defined but, when used in the Bidding Requirements or Contract Documents, have the indicated meaning.

B. *Intent of Certain Terms or Adjectives:*

1. The Contract Documents include the terms “as allowed,” “as approved,” “as ordered,” “as directed” or terms of like effect or import to authorize an exercise of professional judgment by Engineer. In addition, the adjectives “reasonable,” “suitable,” “acceptable,” “proper,” “satisfactory,” or adjectives of like effect or import are used to describe an action or determination of Engineer as to the Work. It is intended that such exercise of professional judgment, action, or determination will be solely to evaluate, in general, the Work for compliance with the information in the Contract Documents and with the design concept of the Project as a functioning whole as shown or indicated in the Contract Documents (unless there is a specific statement indicating otherwise). The use of any such term or adjective is not intended to and shall not be effective to assign to Engineer any duty or authority to supervise or direct the performance of the Work, or any duty or authority to undertake responsibility contrary to the provisions of Paragraph 9.09 or any other provision of the Contract Documents.

C. *Day:*

1. The word “day” means a calendar day of 24 hours measured from midnight to the next midnight.

D. *Defective:*

1. The word “defective,” when modifying the word “Work,” refers to Work that is unsatisfactory, faulty, or deficient in that it:
 - a. does not conform to the Contract Documents; or
 - b. does not meet the requirements of any applicable inspection, reference standard, test, or approval referred to in the Contract Documents; or
 - c. has been damaged prior to Engineer’s recommendation of final payment (unless responsibility for the protection thereof has been assumed by Owner at Substantial Completion in accordance with Paragraph 14.04 or 14.05).

E. Furnish, Install, Perform, Provide:

1. The word “furnish,” when used in connection with services, materials, or equipment, shall mean to supply and deliver said services, materials, or equipment to the Site (or some other specified location) ready for use or installation and in usable or operable condition.
 2. The word “install,” when used in connection with services, materials, or equipment, shall mean to put into use or place in final position said services, materials, or equipment complete and ready for intended use.
 3. The words “perform” or “provide,” when used in connection with services, materials, or equipment, shall mean to furnish and install said services, materials, or equipment complete and ready for intended use.
 4. When “furnish,” “install,” “perform,” or “provide” is not used in connection with services, materials, or equipment in a context clearly requiring an obligation of Contractor, “provide” is implied.
- F. Unless stated otherwise in the Contract Documents, words or phrases that have a well-known technical or construction industry or trade meaning are used in the Contract Documents in accordance with such recognized meaning.

ARTICLE 2 – PRELIMINARY MATTERS

2.01 Delivery of Bonds and Evidence of Insurance

- A. When Contractor delivers the executed counterparts of the Agreement to Owner, Contractor shall also deliver to Owner such bonds as Contractor may be required to furnish.
- B. *Evidence of Insurance:* Before any Work at the Site is started, Contractor and Owner shall each deliver to the other, with copies to each additional insured identified in the Supplementary Conditions, certificates of insurance (and other evidence of insurance which either of them or any additional insured may reasonably request) which Contractor and Owner respectively are required to purchase and maintain in accordance with Article 5.

2.02 Copies of Documents

- A. Owner shall furnish to Contractor up to ten printed or hard copies of the Drawings and Project Manual. Additional copies will be furnished upon request at the cost of reproduction.

2.03 Commencement of Contract Times; Notice to Proceed

- A. The Contract Times will commence to run on the thirtieth day after the Effective Date of the Agreement or, if a Notice to Proceed is given, on the day indicated in the Notice to Proceed. A Notice to Proceed may be given at any time within 30 days after the Effective Date of the Agreement. In no event will the Contract Times commence to run later than the sixtieth day after the day of Bid opening or the thirtieth day after the Effective Date of the Agreement, whichever date is earlier.

2.04 *Starting the Work*

- A. Contractor shall start to perform the Work on the date when the Contract Times commence to run. No Work shall be done at the Site prior to the date on which the Contract Times commence to run.

2.05 *Before Starting Construction*

- A. *Preliminary Schedules:* Within 10 days after the Effective Date of the Agreement (unless otherwise specified in the General Requirements), Contractor shall submit to Engineer for timely review:
 - 1. a preliminary Progress Schedule indicating the times (numbers of days or dates) for starting and completing the various stages of the Work, including any Milestones specified in the Contract Documents;
 - 2. a preliminary Schedule of Submittals; and
 - 3. a preliminary Schedule of Values for all of the Work which includes quantities and prices of items which when added together equal the Contract Price and subdivides the Work into component parts in sufficient detail to serve as the basis for progress payments during performance of the Work. Such prices will include an appropriate amount of overhead and profit applicable to each item of Work.

2.06 *Preconstruction Conference; Designation of Authorized Representatives*

- A. Before any Work at the Site is started, a conference attended by Owner, Contractor, Engineer, and others as appropriate will be held to establish a working understanding among the parties as to the Work and to discuss the schedules referred to in Paragraph 2.05.A, procedures for handling Shop Drawings and other submittals, processing Applications for Payment, and maintaining required records.
- B. At this conference Owner and Contractor each shall designate, in writing, a specific individual to act as its authorized representative with respect to the services and responsibilities under the Contract. Such individuals shall have the authority to transmit instructions, receive information, render decisions relative to the Contract, and otherwise act on behalf of each respective party.

2.07 *Initial Acceptance of Schedules*

- A. At least 10 days before submission of the first Application for Payment a conference attended by Contractor, Engineer, and others as appropriate will be held to review for acceptability to Engineer as provided below the schedules submitted in accordance with Paragraph 2.05.A. Contractor shall have an additional 10 days to make corrections and adjustments and to complete and resubmit the schedules. No progress payment shall be made to Contractor until acceptable schedules are submitted to Engineer.
 - 1. The Progress Schedule will be acceptable to Engineer if it provides an orderly progression of the Work to completion within the Contract Times. Such acceptance will not impose on

Engineer responsibility for the Progress Schedule, for sequencing, scheduling, or progress of the Work, nor interfere with or relieve Contractor from Contractor's full responsibility therefor.

2. Contractor's Schedule of Submittals will be acceptable to Engineer if it provides a workable arrangement for reviewing and processing the required submittals.
3. Contractor's Schedule of Values will be acceptable to Engineer as to form and substance if it provides a reasonable allocation of the Contract Price to component parts of the Work.

ARTICLE 3 – CONTRACT DOCUMENTS: INTENT, AMENDING, REUSE

3.01 Intent

- A. The Contract Documents are complementary; what is required by one is as binding as if required by all.
- B. It is the intent of the Contract Documents to describe a functionally complete project (or part thereof) to be constructed in accordance with the Contract Documents. Any labor, documentation, services, materials, or equipment that reasonably may be inferred from the Contract Documents or from prevailing custom or trade usage as being required to produce the indicated result will be provided whether or not specifically called for, at no additional cost to Owner.
- C. Clarifications and interpretations of the Contract Documents shall be issued by Engineer as provided in Article 9.

3.02 Reference Standards

- A. Standards, Specifications, Codes, Laws, and Regulations
 1. Reference to standards, specifications, manuals, or codes of any technical society, organization, or association, or to Laws or Regulations, whether such reference be specific or by implication, shall mean the standard, specification, manual, code, or Laws or Regulations in effect at the time of opening of Bids (or on the Effective Date of the Agreement if there were no Bids), except as may be otherwise specifically stated in the Contract Documents.
 2. No provision of any such standard, specification, manual, or code, or any instruction of a Supplier, shall be effective to change the duties or responsibilities of Owner, Contractor, or Engineer, or any of their subcontractors, consultants, agents, or employees, from those set forth in the Contract Documents. No such provision or instruction shall be effective to assign to Owner, Engineer, or any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors, any duty or authority to supervise or direct the performance of the Work or any duty or authority to undertake responsibility inconsistent with the provisions of the Contract Documents.

3.03 *Reporting and Resolving Discrepancies*

A. *Reporting Discrepancies:*

1. *Contractor's Review of Contract Documents Before Starting Work:* Before undertaking each part of the Work, Contractor shall carefully study and compare the Contract Documents and check and verify pertinent figures therein and all applicable field measurements. Contractor shall promptly report in writing to Engineer any conflict, error, ambiguity, or discrepancy which Contractor discovers, or has actual knowledge of, and shall obtain a written interpretation or clarification from Engineer before proceeding with any Work affected thereby.
2. *Contractor's Review of Contract Documents During Performance of Work:* If, during the performance of the Work, Contractor discovers any conflict, error, ambiguity, or discrepancy within the Contract Documents, or between the Contract Documents and (a) any applicable Law or Regulation, (b) any standard, specification, manual, or code, or (c) any instruction of any Supplier, then Contractor shall promptly report it to Engineer in writing. Contractor shall not proceed with the Work affected thereby (except in an emergency as required by Paragraph 6.16.A) until an amendment or supplement to the Contract Documents has been issued by one of the methods indicated in Paragraph 3.04.
3. Contractor shall not be liable to Owner or Engineer for failure to report any conflict, error, ambiguity, or discrepancy in the Contract Documents unless Contractor had actual knowledge thereof.

B. *Resolving Discrepancies:*

1. Except as may be otherwise specifically stated in the Contract Documents, the provisions of the Contract Documents shall take precedence in resolving any conflict, error, ambiguity, or discrepancy between the provisions of the Contract Documents and:
 - a. the provisions of any standard, specification, manual, or code, or the instruction of any Supplier (whether or not specifically incorporated by reference in the Contract Documents); or
 - b. the provisions of any Laws or Regulations applicable to the performance of the Work (unless such an interpretation of the provisions of the Contract Documents would result in violation of such Law or Regulation).

3.04 *Amending and Supplementing Contract Documents*

- A. The Contract Documents may be amended to provide for additions, deletions, and revisions in the Work or to modify the terms and conditions thereof by either a Change Order or a Work Change Directive.
- B. The requirements of the Contract Documents may be supplemented, and minor variations and deviations in the Work may be authorized, by one or more of the following ways:

1. A Field Order;
2. Engineer's approval of a Shop Drawing or Sample (subject to the provisions of Paragraph 6.17.D.3); or
3. Engineer's written interpretation or clarification.

3.05 *Reuse of Documents*

- A. Contractor and any Subcontractor or Supplier shall not:
1. have or acquire any title to or ownership rights in any of the Drawings, Specifications, or other documents (or copies of any thereof) prepared by or bearing the seal of Engineer or its consultants, including electronic media editions; or
 2. reuse any such Drawings, Specifications, other documents, or copies thereof on extensions of the Project or any other project without written consent of Owner and Engineer and specific written verification or adaptation by Engineer.
- B. The prohibitions of this Paragraph 3.05 will survive final payment, or termination of the Contract. Nothing herein shall preclude Contractor from retaining copies of the Contract Documents for record purposes.

3.06 *Electronic Data*

- A. Unless otherwise stated in the Supplementary Conditions, the data furnished by Owner or Engineer to Contractor, or by Contractor to Owner or Engineer, that may be relied upon are limited to the printed copies (also known as hard copies). Files in electronic media format of text, data, graphics, or other types are furnished only for the convenience of the receiving party. Any conclusion or information obtained or derived from such electronic files will be at the user's sole risk. If there is a discrepancy between the electronic files and the hard copies, the hard copies govern.
- B. Because data stored in electronic media format can deteriorate or be modified inadvertently or otherwise without authorization of the data's creator, the party receiving electronic files agrees that it will perform acceptance tests or procedures within 60 days, after which the receiving party shall be deemed to have accepted the data thus transferred. Any errors detected within the 60-day acceptance period will be corrected by the transferring party.
- C. When transferring documents in electronic media format, the transferring party makes no representations as to long term compatibility, usability, or readability of documents resulting from the use of software application packages, operating systems, or computer hardware differing from those used by the data's creator.

ARTICLE 4 – AVAILABILITY OF LANDS; SUBSURFACE AND PHYSICAL CONDITIONS; HAZARDOUS ENVIRONMENTAL CONDITIONS; REFERENCE POINTS

4.01 Availability of Lands

- A. Owner shall furnish the Site. Owner shall notify Contractor of any encumbrances or restrictions not of general application but specifically related to use of the Site with which Contractor must comply in performing the Work. Owner will obtain in a timely manner and pay for easements for permanent structures or permanent changes in existing facilities. If Contractor and Owner are unable to agree on entitlement to or on the amount or extent, if any, of any adjustment in the Contract Price or Contract Times, or both, as a result of any delay in Owner’s furnishing the Site or a part thereof, Contractor may make a Claim therefor as provided in Paragraph 10.05.
- B. Upon reasonable written request, Owner shall furnish Contractor with a current statement of record legal title and legal description of the lands upon which the Work is to be performed and Owner’s interest therein as necessary for giving notice of or filing a mechanic’s or construction lien against such lands in accordance with applicable Laws and Regulations.
- C. Contractor shall provide for all additional lands and access thereto that may be required for temporary construction facilities or storage of materials and equipment.

4.02 Subsurface and Physical Conditions

A. Reports and Drawings: The Supplementary Conditions identify:

- 1. those reports known to Owner of explorations and tests of subsurface conditions at or contiguous to the Site; and
- 2. those drawings known to Owner of physical conditions relating to existing surface or subsurface structures at the Site (except Underground Facilities).

B. Limited Reliance by Contractor on Technical Data Authorized: Contractor may rely upon the accuracy of the “technical data” contained in such reports and drawings, but such reports and drawings are not Contract Documents. Such “technical data” is identified in the Supplementary Conditions. Except for such reliance on such “technical data,” Contractor may not rely upon or make any claim against Owner or Engineer, or any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors with respect to:

- 1. the completeness of such reports and drawings for Contractor’s purposes, including, but not limited to, any aspects of the means, methods, techniques, sequences, and procedures of construction to be employed by Contractor, and safety precautions and programs incident thereto; or
- 2. other data, interpretations, opinions, and information contained in such reports or shown or indicated in such drawings; or
- 3. any Contractor interpretation of or conclusion drawn from any “technical data” or any such other data, interpretations, opinions, or information.

4.03 *Differing Subsurface or Physical Conditions*

- A. *Notice:* If Contractor believes that any subsurface or physical condition that is uncovered or revealed either:
1. is of such a nature as to establish that any “technical data” on which Contractor is entitled to rely as provided in Paragraph 4.02 is materially inaccurate; or
 2. is of such a nature as to require a change in the Contract Documents; or
 3. differs materially from that shown or indicated in the Contract Documents; or
 4. is of an unusual nature, and differs materially from conditions ordinarily encountered and generally recognized as inherent in work of the character provided for in the Contract Documents;

then Contractor shall, promptly after becoming aware thereof and before further disturbing the subsurface or physical conditions or performing any Work in connection therewith (except in an emergency as required by Paragraph 6.16.A), notify Owner and Engineer in writing about such condition. Contractor shall not further disturb such condition or perform any Work in connection therewith (except as aforesaid) until receipt of written order to do so.

- B. *Engineer’s Review:* After receipt of written notice as required by Paragraph 4.03.A, Engineer will promptly review the pertinent condition, determine the necessity of Owner’s obtaining additional exploration or tests with respect thereto, and advise Owner in writing (with a copy to Contractor) of Engineer’s findings and conclusions.

C. *Possible Price and Times Adjustments:*

1. The Contract Price or the Contract Times, or both, will be equitably adjusted to the extent that the existence of such differing subsurface or physical condition causes an increase or decrease in Contractor’s cost of, or time required for, performance of the Work; subject, however, to the following:
 - a. such condition must meet any one or more of the categories described in Paragraph 4.03.A; and
 - b. with respect to Work that is paid for on a unit price basis, any adjustment in Contract Price will be subject to the provisions of Paragraphs 9.07 and 11.03.
2. Contractor shall not be entitled to any adjustment in the Contract Price or Contract Times if:
 - a. Contractor knew of the existence of such conditions at the time Contractor made a final commitment to Owner with respect to Contract Price and Contract Times by the submission of a Bid or becoming bound under a negotiated contract; or
 - b. the existence of such condition could reasonably have been discovered or revealed as a result of any examination, investigation, exploration, test, or study of the Site and

contiguous areas required by the Bidding Requirements or Contract Documents to be conducted by or for Contractor prior to Contractor's making such final commitment; or

- c. Contractor failed to give the written notice as required by Paragraph 4.03.A.
3. If Owner and Contractor are unable to agree on entitlement to or on the amount or extent, if any, of any adjustment in the Contract Price or Contract Times, or both, a Claim may be made therefor as provided in Paragraph 10.05. However, neither Owner or Engineer, or any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors shall be liable to Contractor for any claims, costs, losses, or damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) sustained by Contractor on or in connection with any other project or anticipated project.

4.04 *Underground Facilities*

A. *Shown or Indicated:* The information and data shown or indicated in the Contract Documents with respect to existing Underground Facilities at or contiguous to the Site is based on information and data furnished to Owner or Engineer by the owners of such Underground Facilities, including Owner, or by others. Unless it is otherwise expressly provided in the Supplementary Conditions:

1. Owner and Engineer shall not be responsible for the accuracy or completeness of any such information or data provided by others; and
2. the cost of all of the following will be included in the Contract Price, and Contractor shall have full responsibility for:
 - a. reviewing and checking all such information and data;
 - b. locating all Underground Facilities shown or indicated in the Contract Documents;
 - c. coordination of the Work with the owners of such Underground Facilities, including Owner, during construction; and
 - d. the safety and protection of all such Underground Facilities and repairing any damage thereto resulting from the Work.

B. *Not Shown or Indicated:*

1. If an Underground Facility is uncovered or revealed at or contiguous to the Site which was not shown or indicated, or not shown or indicated with reasonable accuracy in the Contract Documents, Contractor shall, promptly after becoming aware thereof and before further disturbing conditions affected thereby or performing any Work in connection therewith (except in an emergency as required by Paragraph 6.16.A), identify the owner of such Underground Facility and give written notice to that owner and to Owner and Engineer. Engineer will promptly review the Underground Facility and determine the extent, if any, to which a change is required in the Contract Documents to reflect and document the

consequences of the existence or location of the Underground Facility. During such time, Contractor shall be responsible for the safety and protection of such Underground Facility.

2. If Engineer concludes that a change in the Contract Documents is required, a Work Change Directive or a Change Order will be issued to reflect and document such consequences. An equitable adjustment shall be made in the Contract Price or Contract Times, or both, to the extent that they are attributable to the existence or location of any Underground Facility that was not shown or indicated or not shown or indicated with reasonable accuracy in the Contract Documents and that Contractor did not know of and could not reasonably have been expected to be aware of or to have anticipated. If Owner and Contractor are unable to agree on entitlement to or on the amount or extent, if any, of any such adjustment in Contract Price or Contract Times, Owner or Contractor may make a Claim therefor as provided in Paragraph 10.05.

4.05 *Reference Points*

- A. Owner shall provide engineering surveys to establish reference points for construction which in Engineer's judgment are necessary to enable Contractor to proceed with the Work. Contractor shall be responsible for laying out the Work, shall protect and preserve the established reference points and property monuments, and shall make no changes or relocations without the prior written approval of Owner. Contractor shall report to Engineer whenever any reference point or property monument is lost or destroyed or requires relocation because of necessary changes in grades or locations, and shall be responsible for the accurate replacement or relocation of such reference points or property monuments by professionally qualified personnel.

4.06 *Hazardous Environmental Condition at Site*

- A. *Reports and Drawings:* The Supplementary Conditions identify those reports and drawings known to Owner relating to Hazardous Environmental Conditions that have been identified at the Site.
- B. *Limited Reliance by Contractor on Technical Data Authorized:* Contractor may rely upon the accuracy of the "technical data" contained in such reports and drawings, but such reports and drawings are not Contract Documents. Such "technical data" is identified in the Supplementary Conditions. Except for such reliance on such "technical data," Contractor may not rely upon or make any claim against Owner or Engineer, or any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors with respect to:
 1. the completeness of such reports and drawings for Contractor's purposes, including, but not limited to, any aspects of the means, methods, techniques, sequences and procedures of construction to be employed by Contractor and safety precautions and programs incident thereto; or
 2. other data, interpretations, opinions and information contained in such reports or shown or indicated in such drawings; or
 3. any Contractor interpretation of or conclusion drawn from any "technical data" or any such other data, interpretations, opinions or information.

- C. Contractor shall not be responsible for any Hazardous Environmental Condition uncovered or revealed at the Site which was not shown or indicated in Drawings or Specifications or identified in the Contract Documents to be within the scope of the Work. Contractor shall be responsible for a Hazardous Environmental Condition created with any materials brought to the Site by Contractor, Subcontractors, Suppliers, or anyone else for whom Contractor is responsible.
- D. If Contractor encounters a Hazardous Environmental Condition or if Contractor or anyone for whom Contractor is responsible creates a Hazardous Environmental Condition, Contractor shall immediately: (i) secure or otherwise isolate such condition; (ii) stop all Work in connection with such condition and in any area affected thereby (except in an emergency as required by Paragraph 6.16.A); and (iii) notify Owner and Engineer (and promptly thereafter confirm such notice in writing). Owner shall promptly consult with Engineer concerning the necessity for Owner to retain a qualified expert to evaluate such condition or take corrective action, if any. Promptly after consulting with Engineer, Owner shall take such actions as are necessary to permit Owner to timely obtain required permits and provide Contractor the written notice required by Paragraph 4.06.E.
- E. Contractor shall not be required to resume Work in connection with such condition or in any affected area until after Owner has obtained any required permits related thereto and delivered written notice to Contractor: (i) specifying that such condition and any affected area is or has been rendered safe for the resumption of Work; or (ii) specifying any special conditions under which such Work may be resumed safely. If Owner and Contractor cannot agree as to entitlement to or on the amount or extent, if any, of any adjustment in Contract Price or Contract Times, or both, as a result of such Work stoppage or such special conditions under which Work is agreed to be resumed by Contractor, either party may make a Claim therefor as provided in Paragraph 10.05.
- F. If after receipt of such written notice Contractor does not agree to resume such Work based on a reasonable belief it is unsafe, or does not agree to resume such Work under such special conditions, then Owner may order the portion of the Work that is in the area affected by such condition to be deleted from the Work. If Owner and Contractor cannot agree as to entitlement to or on the amount or extent, if any, of an adjustment in Contract Price or Contract Times as a result of deleting such portion of the Work, then either party may make a Claim therefor as provided in Paragraph 10.05. Owner may have such deleted portion of the Work performed by Owner's own forces or others in accordance with Article 7.
- G. To the fullest extent permitted by Laws and Regulations, Owner shall indemnify and hold harmless Contractor, Subcontractors, and Engineer, and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to a Hazardous Environmental Condition, provided that such Hazardous Environmental Condition: (i) was not shown or indicated in the Drawings or Specifications or identified in the Contract Documents to be included within the scope of the Work, and (ii) was not created by Contractor or by anyone for whom Contractor is responsible. Nothing in this Paragraph 4.06.G shall obligate Owner to indemnify any individual or entity from and against the consequences of that individual's or entity's own negligence.

- H. To the fullest extent permitted by Laws and Regulations, Contractor shall indemnify and hold harmless Owner and Engineer, and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to a Hazardous Environmental Condition created by Contractor or by anyone for whom Contractor is responsible. Nothing in this Paragraph 4.06.H shall obligate Contractor to indemnify any individual or entity from and against the consequences of that individual's or entity's own negligence.
- I. The provisions of Paragraphs 4.02, 4.03, and 4.04 do not apply to a Hazardous Environmental Condition uncovered or revealed at the Site.

ARTICLE 5 – BONDS AND INSURANCE

5.01 Performance, Payment, and Other Bonds

- A. Contractor shall furnish performance and payment bonds, each in an amount at least equal to the Contract Price as security for the faithful performance and payment of all of Contractor's obligations under the Contract Documents. These bonds shall remain in effect until one year after the date when final payment becomes due or until completion of the correction period specified in Paragraph 13.07, whichever is later, except as provided otherwise by Laws or Regulations or by the Contract Documents. Contractor shall also furnish such other bonds as are required by the Contract Documents.
- B. All bonds shall be in the form prescribed by the Contract Documents except as provided otherwise by Laws or Regulations, and shall be executed by such sureties as are named in the list of "Companies Holding Certificates of Authority as Acceptable Sureties on Federal Bonds and as Acceptable Reinsuring Companies" as published in Circular 570 (amended) by the Financial Management Service, Surety Bond Branch, U.S. Department of the Treasury. All bonds signed by an agent or attorney-in-fact must be accompanied by a certified copy of that individual's authority to bind the surety. The evidence of authority shall show that it is effective on the date the agent or attorney-in-fact signed each bond.
- C. If the surety on any bond furnished by Contractor is declared bankrupt or becomes insolvent or its right to do business is terminated in any state where any part of the Project is located or it ceases to meet the requirements of Paragraph 5.01.B, Contractor shall promptly notify Owner and Engineer and shall, within 20 days after the event giving rise to such notification, provide another bond and surety, both of which shall comply with the requirements of Paragraphs 5.01.B and 5.02.

5.02 Licensed Sureties and Insurers

- A. All bonds and insurance required by the Contract Documents to be purchased and maintained by Owner or Contractor shall be obtained from surety or insurance companies that are duly licensed or authorized in the jurisdiction in which the Project is located to issue bonds or insurance policies for the limits and coverages so required. Such surety and insurance companies shall also

meet such additional requirements and qualifications as may be provided in the Supplementary Conditions.

5.03 *Certificates of Insurance*

- A. Contractor shall deliver to Owner, with copies to each additional insured and loss payee identified in the Supplementary Conditions, certificates of insurance (and other evidence of insurance requested by Owner or any other additional insured) which Contractor is required to purchase and maintain.
- B. Owner shall deliver to Contractor, with copies to each additional insured and loss payee identified in the Supplementary Conditions, certificates of insurance (and other evidence of insurance requested by Contractor or any other additional insured) which Owner is required to purchase and maintain.
- C. Failure of Owner to demand such certificates or other evidence of Contractor's full compliance with these insurance requirements or failure of Owner to identify a deficiency in compliance from the evidence provided shall not be construed as a waiver of Contractor's obligation to maintain such insurance.
- D. Owner does not represent that insurance coverage and limits established in this Contract necessarily will be adequate to protect Contractor.
- E. The insurance and insurance limits required herein shall not be deemed as a limitation on Contractor's liability under the indemnities granted to Owner in the Contract Documents.

5.04 *Contractor's Insurance*

- A. Contractor shall purchase and maintain such insurance as is appropriate for the Work being performed and as will provide protection from claims set forth below which may arise out of or result from Contractor's performance of the Work and Contractor's other obligations under the Contract Documents, whether it is to be performed by Contractor, any Subcontractor or Supplier, or by anyone directly or indirectly employed by any of them to perform any of the Work, or by anyone for whose acts any of them may be liable:
 - 1. claims under workers' compensation, disability benefits, and other similar employee benefit acts;
 - 2. claims for damages because of bodily injury, occupational sickness or disease, or death of Contractor's employees;
 - 3. claims for damages because of bodily injury, sickness or disease, or death of any person other than Contractor's employees;
 - 4. claims for damages insured by reasonably available personal injury liability coverage which are sustained:

- a. by any person as a result of an offense directly or indirectly related to the employment of such person by Contractor, or
 - b. by any other person for any other reason;
5. claims for damages, other than to the Work itself, because of injury to or destruction of tangible property wherever located, including loss of user resulting therefrom; and
 6. claims for damages because of bodily injury or death of any person or property damage arising out of the ownership, maintenance or use of any motor vehicle.
- B. The policies of insurance required by this Paragraph 5.04 shall:
1. with respect to insurance required by Paragraphs 5.04.A.3 through 5.04.A.6 inclusive, be written on an occurrence basis, include as additional insureds (subject to any customary exclusion regarding professional liability) Owner and Engineer, and any other individuals or entities identified in the Supplementary Conditions, all of whom shall be listed as additional insureds, and include coverage for the respective officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of all such additional insureds, and the insurance afforded to these additional insureds shall provide primary coverage for all claims covered thereby;
 2. include at least the specific coverages and be written for not less than the limits of liability provided in the Supplementary Conditions or required by Laws or Regulations, whichever is greater;
 3. include contractual liability insurance covering Contractor's indemnity obligations under Paragraphs 6.11 and 6.20;
 4. contain a provision or endorsement that the coverage afforded will not be canceled, materially changed or renewal refused until at least 30 days prior written notice has been given to Owner and Contractor and to each other additional insured identified in the Supplementary Conditions to whom a certificate of insurance has been issued (and the certificates of insurance furnished by the Contractor pursuant to Paragraph 5.03 will so provide);
 5. remain in effect at least until final payment and at all times thereafter when Contractor may be correcting, removing, or replacing defective Work in accordance with Paragraph 13.07; and
 6. include completed operations coverage:
 - a. Such insurance shall remain in effect for two years after final payment.
 - b. Contractor shall furnish Owner and each other additional insured identified in the Supplementary Conditions, to whom a certificate of insurance has been issued, evidence satisfactory to Owner and any such additional insured of continuation of such insurance at final payment and one year thereafter.

5.05 *Owner's Liability Insurance*

- A. In addition to the insurance required to be provided by Contractor under Paragraph 5.04, Owner, at Owner's option, may purchase and maintain at Owner's expense Owner's own liability insurance as will protect Owner against claims which may arise from operations under the Contract Documents.

5.06 *Property Insurance*

- A. Unless otherwise provided in the Supplementary Conditions, Owner shall purchase and maintain property insurance upon the Work at the Site in the amount of the full replacement cost thereof (subject to such deductible amounts as may be provided in the Supplementary Conditions or required by Laws and Regulations). This insurance shall:
1. include the interests of Owner, Contractor, Subcontractors, and Engineer, and any other individuals or entities identified in the Supplementary Conditions, and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them, each of whom is deemed to have an insurable interest and shall be listed as a loss payee;
 2. be written on a Builder's Risk "all-risk" policy form that shall at least include insurance for physical loss or damage to the Work, temporary buildings, falsework, and materials and equipment in transit, and shall insure against at least the following perils or causes of loss: fire, lightning, extended coverage, theft, vandalism and malicious mischief, earthquake, collapse, debris removal, demolition occasioned by enforcement of Laws and Regulations, water damage (other than that caused by flood), and such other perils or causes of loss as may be specifically required by the Supplementary Conditions.
 3. include expenses incurred in the repair or replacement of any insured property (including but not limited to fees and charges of engineers and architects);
 4. cover materials and equipment stored at the Site or at another location that was agreed to in writing by Owner prior to being incorporated in the Work, provided that such materials and equipment have been included in an Application for Payment recommended by Engineer;
 5. allow for partial utilization of the Work by Owner;
 6. include testing and startup; and
 7. be maintained in effect until final payment is made unless otherwise agreed to in writing by Owner, Contractor, and Engineer with 30 days written notice to each other loss payee to whom a certificate of insurance has been issued.
- B. Owner shall purchase and maintain such equipment breakdown insurance or additional property insurance as may be required by the Supplementary Conditions or Laws and Regulations which will include the interests of Owner, Contractor, Subcontractors, and Engineer, and any other individuals or entities identified in the Supplementary Conditions, and the officers, directors,

members, partners, employees, agents, consultants and subcontractors of each and any of them, each of whom is deemed to have an insurable interest and shall be listed as a loss payee.

- C. All the policies of insurance (and the certificates or other evidence thereof) required to be purchased and maintained in accordance with this Paragraph 5.06 will contain a provision or endorsement that the coverage afforded will not be canceled or materially changed or renewal refused until at least 30 days prior written notice has been given to Owner and Contractor and to each other loss payee to whom a certificate of insurance has been issued and will contain waiver provisions in accordance with Paragraph 5.07.
- D. Owner shall not be responsible for purchasing and maintaining any property insurance specified in this Paragraph 5.06 to protect the interests of Contractor, Subcontractors, or others in the Work to the extent of any deductible amounts that are identified in the Supplementary Conditions. The risk of loss within such identified deductible amount will be borne by Contractor, Subcontractors, or others suffering any such loss, and if any of them wishes property insurance coverage within the limits of such amounts, each may purchase and maintain it at the purchaser's own expense.
- E. If Contractor requests in writing that other special insurance be included in the property insurance policies provided under this Paragraph 5.06, Owner shall, if possible, include such insurance, and the cost thereof will be charged to Contractor by appropriate Change Order. Prior to commencement of the Work at the Site, Owner shall in writing advise Contractor whether or not such other insurance has been procured by Owner.

5.07 *Waiver of Rights*

- A. Owner and Contractor intend that all policies purchased in accordance with Paragraph 5.06 will protect Owner, Contractor, Subcontractors, and Engineer, and all other individuals or entities identified in the Supplementary Conditions as loss payees (and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them) in such policies and will provide primary coverage for all losses and damages caused by the perils or causes of loss covered thereby. All such policies shall contain provisions to the effect that in the event of payment of any loss or damage the insurers will have no rights of recovery against any of the insureds or loss payees thereunder. Owner and Contractor waive all rights against each other and their respective officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them for all losses and damages caused by, arising out of or resulting from any of the perils or causes of loss covered by such policies and any other property insurance applicable to the Work; and, in addition, waive all such rights against Subcontractors and Engineer, and all other individuals or entities identified in the Supplementary Conditions as loss payees (and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them) under such policies for losses and damages so caused. None of the above waivers shall extend to the rights that any party making such waiver may have to the proceeds of insurance held by Owner as trustee or otherwise payable under any policy so issued.
- B. Owner waives all rights against Contractor, Subcontractors, and Engineer, and the officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them for:

1. loss due to business interruption, loss of use, or other consequential loss extending beyond direct physical loss or damage to Owner's property or the Work caused by, arising out of, or resulting from fire or other perils whether or not insured by Owner; and
 2. loss or damage to the completed Project or part thereof caused by, arising out of, or resulting from fire or other insured peril or cause of loss covered by any property insurance maintained on the completed Project or part thereof by Owner during partial utilization pursuant to Paragraph 14.05, after Substantial Completion pursuant to Paragraph 14.04, or after final payment pursuant to Paragraph 14.07.
- C. Any insurance policy maintained by Owner covering any loss, damage or consequential loss referred to in Paragraph 5.07.B shall contain provisions to the effect that in the event of payment of any such loss, damage, or consequential loss, the insurers will have no rights of recovery against Contractor, Subcontractors, or Engineer, and the officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them.

5.08 Receipt and Application of Insurance Proceeds

- A. Any insured loss under the policies of insurance required by Paragraph 5.06 will be adjusted with Owner and made payable to Owner as fiduciary for the loss payees, as their interests may appear, subject to the requirements of any applicable mortgage clause and of Paragraph 5.08.B. Owner shall deposit in a separate account any money so received and shall distribute it in accordance with such agreement as the parties in interest may reach. If no other special agreement is reached, the damaged Work shall be repaired or replaced, the moneys so received applied on account thereof, and the Work and the cost thereof covered by an appropriate Change Order.
- B. Owner as fiduciary shall have power to adjust and settle any loss with the insurers unless one of the parties in interest shall object in writing within 15 days after the occurrence of loss to Owner's exercise of this power. If such objection be made, Owner as fiduciary shall make settlement with the insurers in accordance with such agreement as the parties in interest may reach. If no such agreement among the parties in interest is reached, Owner as fiduciary shall adjust and settle the loss with the insurers and, if required in writing by any party in interest, Owner as fiduciary shall give bond for the proper performance of such duties.

5.09 Acceptance of Bonds and Insurance; Option to Replace

- A. If either Owner or Contractor has any objection to the coverage afforded by or other provisions of the bonds or insurance required to be purchased and maintained by the other party in accordance with Article 5 on the basis of non-conformance with the Contract Documents, the objecting party shall so notify the other party in writing within 10 days after receipt of the certificates (or other evidence requested) required by Paragraph 2.01.B. Owner and Contractor shall each provide to the other such additional information in respect of insurance provided as the other may reasonably request. If either party does not purchase or maintain all of the bonds and insurance required of such party by the Contract Documents, such party shall notify the other party in writing of such failure to purchase prior to the start of the Work, or of such failure to maintain prior to any change in the required coverage. Without prejudice to any other right or remedy, the other party may elect to obtain equivalent bonds or insurance to protect such other party's

interests at the expense of the party who was required to provide such coverage, and a Change Order shall be issued to adjust the Contract Price accordingly.

5.10 *Partial Utilization, Acknowledgment of Property Insurer*

- A. If Owner finds it necessary to occupy or use a portion or portions of the Work prior to Substantial Completion of all the Work as provided in Paragraph 14.05, no such use or occupancy shall commence before the insurers providing the property insurance pursuant to Paragraph 5.06 have acknowledged notice thereof and in writing effected any changes in coverage necessitated thereby. The insurers providing the property insurance shall consent by endorsement on the policy or policies, but the property insurance shall not be canceled or permitted to lapse on account of any such partial use or occupancy.

ARTICLE 6 – CONTRACTOR’S RESPONSIBILITIES

6.01 *Supervision and Superintendence*

- A. Contractor shall supervise, inspect, and direct the Work competently and efficiently, devoting such attention thereto and applying such skills and expertise as may be necessary to perform the Work in accordance with the Contract Documents. Contractor shall be solely responsible for the means, methods, techniques, sequences, and procedures of construction. Contractor shall not be responsible for the negligence of Owner or Engineer in the design or specification of a specific means, method, technique, sequence, or procedure of construction which is shown or indicated in and expressly required by the Contract Documents.
- B. At all times during the progress of the Work, Contractor shall assign a competent resident superintendent who shall not be replaced without written notice to Owner and Engineer except under extraordinary circumstances.

6.02 *Labor; Working Hours*

- A. Contractor shall provide competent, suitably qualified personnel to survey and lay out the Work and perform construction as required by the Contract Documents. Contractor shall at all times maintain good discipline and order at the Site.
- B. Except as otherwise required for the safety or protection of persons or the Work or property at the Site or adjacent thereto, and except as otherwise stated in the Contract Documents, all Work at the Site shall be performed during regular working hours. Contractor will not permit the performance of Work on a Saturday, Sunday, or any legal holiday without Owner’s written consent (which will not be unreasonably withheld) given after prior written notice to Engineer.

6.03 *Services, Materials, and Equipment*

- A. Unless otherwise specified in the Contract Documents, Contractor shall provide and assume full responsibility for all services, materials, equipment, labor, transportation, construction equipment and machinery, tools, appliances, fuel, power, light, heat, telephone, water, sanitary facilities, temporary facilities, and all other facilities and incidentals necessary for the performance, testing, start-up, and completion of the Work.

- B. All materials and equipment incorporated into the Work shall be as specified or, if not specified, shall be of good quality and new, except as otherwise provided in the Contract Documents. All special warranties and guarantees required by the Specifications shall expressly run to the benefit of Owner. If required by Engineer, Contractor shall furnish satisfactory evidence (including reports of required tests) as to the source, kind, and quality of materials and equipment.
- C. All materials and equipment shall be stored, applied, installed, connected, erected, protected, used, cleaned, and conditioned in accordance with instructions of the applicable Supplier, except as otherwise may be provided in the Contract Documents.

6.04 *Progress Schedule*

- A. Contractor shall adhere to the Progress Schedule established in accordance with Paragraph 2.07 as it may be adjusted from time to time as provided below.
 - 1. Contractor shall submit to Engineer for acceptance (to the extent indicated in Paragraph 2.07) proposed adjustments in the Progress Schedule that will not result in changing the Contract Times. Such adjustments will comply with any provisions of the General Requirements applicable thereto.
 - 2. Proposed adjustments in the Progress Schedule that will change the Contract Times shall be submitted in accordance with the requirements of Article 12. Adjustments in Contract Times may only be made by a Change Order.

6.05 *Substitutes and "Or-Equals"*

- A. Whenever an item of material or equipment is specified or described in the Contract Documents by using the name of a proprietary item or the name of a particular Supplier, the specification or description is intended to establish the type, function, appearance, and quality required. Unless the specification or description contains or is followed by words reading that no like, equivalent, or "or-equal" item or no substitution is permitted, other items of material or equipment or material or equipment of other Suppliers may be submitted to Engineer for review under the circumstances described below.
 - 1. *"Or-Equal" Items:* If in Engineer's sole discretion an item of material or equipment proposed by Contractor is functionally equal to that named and sufficiently similar so that no change in related Work will be required, it may be considered by Engineer as an "or-equal" item, in which case review and approval of the proposed item may, in Engineer's sole discretion, be accomplished without compliance with some or all of the requirements for approval of proposed substitute items. For the purposes of this Paragraph 6.05.A.1, a proposed item of material or equipment will be considered functionally equal to an item so named if:
 - a. in the exercise of reasonable judgment Engineer determines that:
 - 1) it is at least equal in materials of construction, quality, durability, appearance, strength, and design characteristics;

- 2) it will reliably perform at least equally well the function and achieve the results imposed by the design concept of the completed Project as a functioning whole; and
 - 3) it has a proven record of performance and availability of responsive service.
- b. Contractor certifies that, if approved and incorporated into the Work:
- 1) there will be no increase in cost to the Owner or increase in Contract Times; and
 - 2) it will conform substantially to the detailed requirements of the item named in the Contract Documents.

2. *Substitute Items:*

- a. If in Engineer's sole discretion an item of material or equipment proposed by Contractor does not qualify as an "or-equal" item under Paragraph 6.05.A.1, it will be considered a proposed substitute item.
- b. Contractor shall submit sufficient information as provided below to allow Engineer to determine if the item of material or equipment proposed is essentially equivalent to that named and an acceptable substitute therefor. Requests for review of proposed substitute items of material or equipment will not be accepted by Engineer from anyone other than Contractor.
- c. The requirements for review by Engineer will be as set forth in Paragraph 6.05.A.2.d, as supplemented by the General Requirements, and as Engineer may decide is appropriate under the circumstances.
- d. Contractor shall make written application to Engineer for review of a proposed substitute item of material or equipment that Contractor seeks to furnish or use. The application:
 - 1) shall certify that the proposed substitute item will:
 - a) perform adequately the functions and achieve the results called for by the general design,
 - b) be similar in substance to that specified, and
 - c) be suited to the same use as that specified;
 - 2) will state:
 - a) the extent, if any, to which the use of the proposed substitute item will prejudice Contractor's achievement of Substantial Completion on time,
 - b) whether use of the proposed substitute item in the Work will require a change in any of the Contract Documents (or in the provisions of any other direct contract with Owner for other work on the Project) to adapt the design to the proposed substitute item, and

- c) whether incorporation or use of the proposed substitute item in connection with the Work is subject to payment of any license fee or royalty;
 - 3) will identify:
 - a) all variations of the proposed substitute item from that specified, and
 - b) available engineering, sales, maintenance, repair, and replacement services; and
 - 4) shall contain an itemized estimate of all costs or credits that will result directly or indirectly from use of such substitute item, including costs of redesign and claims of other contractors affected by any resulting change.
- B. *Substitute Construction Methods or Procedures:* If a specific means, method, technique, sequence, or procedure of construction is expressly required by the Contract Documents, Contractor may furnish or utilize a substitute means, method, technique, sequence, or procedure of construction approved by Engineer. Contractor shall submit sufficient information to allow Engineer, in Engineer's sole discretion, to determine that the substitute proposed is equivalent to that expressly called for by the Contract Documents. The requirements for review by Engineer will be similar to those provided in Paragraph 6.05.A.2.
- C. *Engineer's Evaluation:* Engineer will be allowed a reasonable time within which to evaluate each proposal or submittal made pursuant to Paragraphs 6.05.A and 6.05.B. Engineer may require Contractor to furnish additional data about the proposed substitute item. Engineer will be the sole judge of acceptability. No "or equal" or substitute will be ordered, installed or utilized until Engineer's review is complete, which will be evidenced by a Change Order in the case of a substitute and an approved Shop Drawing for an "or equal." Engineer will advise Contractor in writing of any negative determination.
- D. *Special Guarantee:* Owner may require Contractor to furnish at Contractor's expense a special performance guarantee or other surety with respect to any substitute.
- E. *Engineer's Cost Reimbursement:* Engineer will record Engineer's costs in evaluating a substitute proposed or submitted by Contractor pursuant to Paragraphs 6.05.A.2 and 6.05.B. Whether or not Engineer approves a substitute so proposed or submitted by Contractor, Contractor shall reimburse Owner for the reasonable charges of Engineer for evaluating each such proposed substitute. Contractor shall also reimburse Owner for the reasonable charges of Engineer for making changes in the Contract Documents (or in the provisions of any other direct contract with Owner) resulting from the acceptance of each proposed substitute.
- F. *Contractor's Expense:* Contractor shall provide all data in support of any proposed substitute or "or-equal" at Contractor's expense.

6.06 *Concerning Subcontractors, Suppliers, and Others*

- A. Contractor shall not employ any Subcontractor, Supplier, or other individual or entity (including those acceptable to Owner as indicated in Paragraph 6.06.B), whether initially or as a replacement, against whom Owner may have reasonable objection. Contractor shall not be

required to employ any Subcontractor, Supplier, or other individual or entity to furnish or perform any of the Work against whom Contractor has reasonable objection.

- B. If the Supplementary Conditions require the identity of certain Subcontractors, Suppliers, or other individuals or entities to be submitted to Owner in advance for acceptance by Owner by a specified date prior to the Effective Date of the Agreement, and if Contractor has submitted a list thereof in accordance with the Supplementary Conditions, Owner's acceptance (either in writing or by failing to make written objection thereto by the date indicated for acceptance or objection in the Bidding Documents or the Contract Documents) of any such Subcontractor, Supplier, or other individual or entity so identified may be revoked on the basis of reasonable objection after due investigation. Contractor shall submit an acceptable replacement for the rejected Subcontractor, Supplier, or other individual or entity, and the Contract Price will be adjusted by the difference in the cost occasioned by such replacement, and an appropriate Change Order will be issued. No acceptance by Owner of any such Subcontractor, Supplier, or other individual or entity, whether initially or as a replacement, shall constitute a waiver of any right of Owner or Engineer to reject defective Work.
- C. Contractor shall be fully responsible to Owner and Engineer for all acts and omissions of the Subcontractors, Suppliers, and other individuals or entities performing or furnishing any of the Work just as Contractor is responsible for Contractor's own acts and omissions. Nothing in the Contract Documents:
 - 1. shall create for the benefit of any such Subcontractor, Supplier, or other individual or entity any contractual relationship between Owner or Engineer and any such Subcontractor, Supplier or other individual or entity; nor
 - 2. shall create any obligation on the part of Owner or Engineer to pay or to see to the payment of any moneys due any such Subcontractor, Supplier, or other individual or entity except as may otherwise be required by Laws and Regulations.
- D. Contractor shall be solely responsible for scheduling and coordinating the Work of Subcontractors, Suppliers, and other individuals or entities performing or furnishing any of the Work under a direct or indirect contract with Contractor.
- E. Contractor shall require all Subcontractors, Suppliers, and such other individuals or entities performing or furnishing any of the Work to communicate with Engineer through Contractor.
- F. The divisions and sections of the Specifications and the identifications of any Drawings shall not control Contractor in dividing the Work among Subcontractors or Suppliers or delineating the Work to be performed by any specific trade.
- G. All Work performed for Contractor by a Subcontractor or Supplier will be pursuant to an appropriate agreement between Contractor and the Subcontractor or Supplier which specifically binds the Subcontractor or Supplier to the applicable terms and conditions of the Contract Documents for the benefit of Owner and Engineer. Whenever any such agreement is with a Subcontractor or Supplier who is listed as a loss payee on the property insurance provided in Paragraph 5.06, the agreement between the Contractor and the Subcontractor or Supplier will contain provisions whereby the Subcontractor or Supplier waives all rights against Owner,

Contractor, Engineer, and all other individuals or entities identified in the Supplementary Conditions to be listed as insureds or loss payees (and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them) for all losses and damages caused by, arising out of, relating to, or resulting from any of the perils or causes of loss covered by such policies and any other property insurance applicable to the Work. If the insurers on any such policies require separate waiver forms to be signed by any Subcontractor or Supplier, Contractor will obtain the same.

6.07 *Patent Fees and Royalties*

- A. Contractor shall pay all license fees and royalties and assume all costs incident to the use in the performance of the Work or the incorporation in the Work of any invention, design, process, product, or device which is the subject of patent rights or copyrights held by others. If a particular invention, design, process, product, or device is specified in the Contract Documents for use in the performance of the Work and if, to the actual knowledge of Owner or Engineer, its use is subject to patent rights or copyrights calling for the payment of any license fee or royalty to others, the existence of such rights shall be disclosed by Owner in the Contract Documents.
- B. To the fullest extent permitted by Laws and Regulations, Owner shall indemnify and hold harmless Contractor, and its officers, directors, members, partners, employees, agents, consultants, and subcontractors from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals, and all court or arbitration or other dispute resolution costs) arising out of or relating to any infringement of patent rights or copyrights incident to the use in the performance of the Work or resulting from the incorporation in the Work of any invention, design, process, product, or device specified in the Contract Documents, but not identified as being subject to payment of any license fee or royalty to others required by patent rights or copyrights.
- C. To the fullest extent permitted by Laws and Regulations, Contractor shall indemnify and hold harmless Owner and Engineer, and the officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to any infringement of patent rights or copyrights incident to the use in the performance of the Work or resulting from the incorporation in the Work of any invention, design, process, product, or device not specified in the Contract Documents.

6.08 *Permits*

- A. Unless otherwise provided in the Supplementary Conditions, Contractor shall obtain and pay for all construction permits and licenses. Owner shall assist Contractor, when necessary, in obtaining such permits and licenses. Contractor shall pay all governmental charges and inspection fees necessary for the prosecution of the Work which are applicable at the time of opening of Bids, or, if there are no Bids, on the Effective Date of the Agreement. Owner shall pay all charges of utility owners for connections for providing permanent service to the Work.

6.09 *Laws and Regulations*

- A. Contractor shall give all notices required by and shall comply with all Laws and Regulations applicable to the performance of the Work. Except where otherwise expressly required by applicable Laws and Regulations, neither Owner nor Engineer shall be responsible for monitoring Contractor's compliance with any Laws or Regulations.
- B. If Contractor performs any Work knowing or having reason to know that it is contrary to Laws or Regulations, Contractor shall bear all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to such Work. However, it shall not be Contractor's responsibility to make certain that the Specifications and Drawings are in accordance with Laws and Regulations, but this shall not relieve Contractor of Contractor's obligations under Paragraph 3.03.
- C. Changes in Laws or Regulations not known at the time of opening of Bids (or, on the Effective Date of the Agreement if there were no Bids) having an effect on the cost or time of performance of the Work shall be the subject of an adjustment in Contract Price or Contract Times. If Owner and Contractor are unable to agree on entitlement to or on the amount or extent, if any, of any such adjustment, a Claim may be made therefor as provided in Paragraph 10.05.

6.10 *Taxes*

- A. Contractor shall pay all sales, consumer, use, and other similar taxes required to be paid by Contractor in accordance with the Laws and Regulations of the place of the Project which are applicable during the performance of the Work.

6.11 *Use of Site and Other Areas*

A. *Limitation on Use of Site and Other Areas:*

- 1. Contractor shall confine construction equipment, the storage of materials and equipment, and the operations of workers to the Site and other areas permitted by Laws and Regulations, and shall not unreasonably encumber the Site and other areas with construction equipment or other materials or equipment. Contractor shall assume full responsibility for any damage to any such land or area, or to the owner or occupant thereof, or of any adjacent land or areas resulting from the performance of the Work.
- 2. Should any claim be made by any such owner or occupant because of the performance of the Work, Contractor shall promptly settle with such other party by negotiation or otherwise resolve the claim by arbitration or other dispute resolution proceeding or at law.
- 3. To the fullest extent permitted by Laws and Regulations, Contractor shall indemnify and hold harmless Owner and Engineer, and the officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to any claim or action, legal or equitable, brought

by any such owner or occupant against Owner, Engineer, or any other party indemnified hereunder to the extent caused by or based upon Contractor's performance of the Work.

- B. *Removal of Debris During Performance of the Work:* During the progress of the Work Contractor shall keep the Site and other areas free from accumulations of waste materials, rubbish, and other debris. Removal and disposal of such waste materials, rubbish, and other debris shall conform to applicable Laws and Regulations.
- C. *Cleaning:* Prior to Substantial Completion of the Work Contractor shall clean the Site and the Work and make it ready for utilization by Owner. At the completion of the Work Contractor shall remove from the Site all tools, appliances, construction equipment and machinery, and surplus materials and shall restore to original condition all property not designated for alteration by the Contract Documents.
- D. *Loading Structures:* Contractor shall not load nor permit any part of any structure to be loaded in any manner that will endanger the structure, nor shall Contractor subject any part of the Work or adjacent property to stresses or pressures that will endanger it.

6.12 *Record Documents*

- A. Contractor shall maintain in a safe place at the Site one record copy of all Drawings, Specifications, Addenda, Change Orders, Work Change Directives, Field Orders, and written interpretations and clarifications in good order and annotated to show changes made during construction. These record documents together with all approved Samples and a counterpart of all approved Shop Drawings will be available to Engineer for reference. Upon completion of the Work, these record documents, Samples, and Shop Drawings will be delivered to Engineer for Owner.

6.13 *Safety and Protection*

- A. Contractor shall be solely responsible for initiating, maintaining and supervising all safety precautions and programs in connection with the Work. Such responsibility does not relieve Subcontractors of their responsibility for the safety of persons or property in the performance of their work, nor for compliance with applicable safety Laws and Regulations. Contractor shall take all necessary precautions for the safety of, and shall provide the necessary protection to prevent damage, injury or loss to:
 - 1. all persons on the Site or who may be affected by the Work;
 - 2. all the Work and materials and equipment to be incorporated therein, whether in storage on or off the Site; and
 - 3. other property at the Site or adjacent thereto, including trees, shrubs, lawns, walks, pavements, roadways, structures, utilities, and Underground Facilities not designated for removal, relocation, or replacement in the course of construction.
- B. Contractor shall comply with all applicable Laws and Regulations relating to the safety of persons or property, or to the protection of persons or property from damage, injury, or loss; and

shall erect and maintain all necessary safeguards for such safety and protection. Contractor shall notify owners of adjacent property and of Underground Facilities and other utility owners when prosecution of the Work may affect them, and shall cooperate with them in the protection, removal, relocation, and replacement of their property.

- C. Contractor shall comply with the applicable requirements of Owner's safety programs, if any. The Supplementary Conditions identify any Owner's safety programs that are applicable to the Work.
- D. Contractor shall inform Owner and Engineer of the specific requirements of Contractor's safety program with which Owner's and Engineer's employees and representatives must comply while at the Site.
- E. All damage, injury, or loss to any property referred to in Paragraph 6.13.A.2 or 6.13.A.3 caused, directly or indirectly, in whole or in part, by Contractor, any Subcontractor, Supplier, or any other individual or entity directly or indirectly employed by any of them to perform any of the Work, or anyone for whose acts any of them may be liable, shall be remedied by Contractor (except damage or loss attributable to the fault of Drawings or Specifications or to the acts or omissions of Owner or Engineer or anyone employed by any of them, or anyone for whose acts any of them may be liable, and not attributable, directly or indirectly, in whole or in part, to the fault or negligence of Contractor or any Subcontractor, Supplier, or other individual or entity directly or indirectly employed by any of them).
- F. Contractor's duties and responsibilities for safety and for protection of the Work shall continue until such time as all the Work is completed and Engineer has issued a notice to Owner and Contractor in accordance with Paragraph 14.07.B that the Work is acceptable (except as otherwise expressly provided in connection with Substantial Completion).

6.14 *Safety Representative*

- A. Contractor shall designate a qualified and experienced safety representative at the Site whose duties and responsibilities shall be the prevention of accidents and the maintaining and supervising of safety precautions and programs.

6.15 *Hazard Communication Programs*

- A. Contractor shall be responsible for coordinating any exchange of material safety data sheets or other hazard communication information required to be made available to or exchanged between or among employers at the Site in accordance with Laws or Regulations.

6.16 *Emergencies*

- A. In emergencies affecting the safety or protection of persons or the Work or property at the Site or adjacent thereto, Contractor is obligated to act to prevent threatened damage, injury, or loss. Contractor shall give Engineer prompt written notice if Contractor believes that any significant changes in the Work or variations from the Contract Documents have been caused thereby or are required as a result thereof. If Engineer determines that a change in the Contract Documents is

required because of the action taken by Contractor in response to such an emergency, a Work Change Directive or Change Order will be issued.

6.17 *Shop Drawings and Samples*

A. Contractor shall submit Shop Drawings and Samples to Engineer for review and approval in accordance with the accepted Schedule of Submittals (as required by Paragraph 2.07). Each submittal will be identified as Engineer may require.

1. *Shop Drawings:*

- a. Submit number of copies specified in the General Requirements.
- b. Data shown on the Shop Drawings will be complete with respect to quantities, dimensions, specified performance and design criteria, materials, and similar data to show Engineer the services, materials, and equipment Contractor proposes to provide and to enable Engineer to review the information for the limited purposes required by Paragraph 6.17.D.

2. *Samples:*

- a. Submit number of Samples specified in the Specifications.
- b. Clearly identify each Sample as to material, Supplier, pertinent data such as catalog numbers, the use for which intended and other data as Engineer may require to enable Engineer to review the submittal for the limited purposes required by Paragraph 6.17.D.

B. Where a Shop Drawing or Sample is required by the Contract Documents or the Schedule of Submittals, any related Work performed prior to Engineer's review and approval of the pertinent submittal will be at the sole expense and responsibility of Contractor.

C. *Submittal Procedures:*

1. Before submitting each Shop Drawing or Sample, Contractor shall have:

- a. reviewed and coordinated each Shop Drawing or Sample with other Shop Drawings and Samples and with the requirements of the Work and the Contract Documents;
- b. determined and verified all field measurements, quantities, dimensions, specified performance and design criteria, installation requirements, materials, catalog numbers, and similar information with respect thereto;
- c. determined and verified the suitability of all materials offered with respect to the indicated application, fabrication, shipping, handling, storage, assembly, and installation pertaining to the performance of the Work; and
- d. determined and verified all information relative to Contractor's responsibilities for means, methods, techniques, sequences, and procedures of construction, and safety precautions and programs incident thereto.

2. Each submittal shall bear a stamp or specific written certification that Contractor has satisfied Contractor's obligations under the Contract Documents with respect to Contractor's review and approval of that submittal.
3. With each submittal, Contractor shall give Engineer specific written notice of any variations that the Shop Drawing or Sample may have from the requirements of the Contract Documents. This notice shall be both a written communication separate from the Shop Drawings or Sample submittal; and, in addition, by a specific notation made on each Shop Drawing or Sample submitted to Engineer for review and approval of each such variation.

D. Engineer's Review:

1. Engineer will provide timely review of Shop Drawings and Samples in accordance with the Schedule of Submittals acceptable to Engineer. Engineer's review and approval will be only to determine if the items covered by the submittals will, after installation or incorporation in the Work, conform to the information given in the Contract Documents and be compatible with the design concept of the completed Project as a functioning whole as indicated by the Contract Documents.
2. Engineer's review and approval will not extend to means, methods, techniques, sequences, or procedures of construction (except where a particular means, method, technique, sequence, or procedure of construction is specifically and expressly called for by the Contract Documents) or to safety precautions or programs incident thereto. The review and approval of a separate item as such will not indicate approval of the assembly in which the item functions.
3. Engineer's review and approval shall not relieve Contractor from responsibility for any variation from the requirements of the Contract Documents unless Contractor has complied with the requirements of Paragraph 6.17.C.3 and Engineer has given written approval of each such variation by specific written notation thereof incorporated in or accompanying the Shop Drawing or Sample. Engineer's review and approval shall not relieve Contractor from responsibility for complying with the requirements of Paragraph 6.17.C.1.

E. Resubmittal Procedures:

1. Contractor shall make corrections required by Engineer and shall return the required number of corrected copies of Shop Drawings and submit, as required, new Samples for review and approval. Contractor shall direct specific attention in writing to revisions other than the corrections called for by Engineer on previous submittals.

6.18 Continuing the Work

- A. Contractor shall carry on the Work and adhere to the Progress Schedule during all disputes or disagreements with Owner. No Work shall be delayed or postponed pending resolution of any disputes or disagreements, except as permitted by Paragraph 15.04 or as Owner and Contractor may otherwise agree in writing.

6.19 *Contractor's General Warranty and Guarantee*

- A. Contractor warrants and guarantees to Owner that all Work will be in accordance with the Contract Documents and will not be defective. Engineer and its officers, directors, members, partners, employees, agents, consultants, and subcontractors shall be entitled to rely on representation of Contractor's warranty and guarantee.
- B. Contractor's warranty and guarantee hereunder excludes defects or damage caused by:
 - 1. abuse, modification, or improper maintenance or operation by persons other than Contractor, Subcontractors, Suppliers, or any other individual or entity for whom Contractor is responsible; or
 - 2. normal wear and tear under normal usage.
- C. Contractor's obligation to perform and complete the Work in accordance with the Contract Documents shall be absolute. None of the following will constitute an acceptance of Work that is not in accordance with the Contract Documents or a release of Contractor's obligation to perform the Work in accordance with the Contract Documents:
 - 1. observations by Engineer;
 - 2. recommendation by Engineer or payment by Owner of any progress or final payment;
 - 3. the issuance of a certificate of Substantial Completion by Engineer or any payment related thereto by Owner;
 - 4. use or occupancy of the Work or any part thereof by Owner;
 - 5. any review and approval of a Shop Drawing or Sample submittal or the issuance of a notice of acceptability by Engineer;
 - 6. any inspection, test, or approval by others; or
 - 7. any correction of defective Work by Owner.

6.20 *Indemnification*

- A. To the fullest extent permitted by Laws and Regulations, Contractor shall indemnify and hold harmless Owner and Engineer, and the officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to the performance of the Work, provided that any such claim, cost, loss, or damage is attributable to bodily injury, sickness, disease, or death, or to injury to or destruction of tangible property (other than the Work itself), including the loss of use resulting therefrom but only to the extent caused by any negligent act or omission of Contractor, any Subcontractor, any Supplier, or any individual or entity directly or indirectly employed by any of them to perform any of the Work or anyone for whose acts any of them may be liable .

- B. In any and all claims against Owner or Engineer or any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors by any employee (or the survivor or personal representative of such employee) of Contractor, any Subcontractor, any Supplier, or any individual or entity directly or indirectly employed by any of them to perform any of the Work, or anyone for whose acts any of them may be liable, the indemnification obligation under Paragraph 6.20.A shall not be limited in any way by any limitation on the amount or type of damages, compensation, or benefits payable by or for Contractor or any such Subcontractor, Supplier, or other individual or entity under workers' compensation acts, disability benefit acts, or other employee benefit acts.
- C. The indemnification obligations of Contractor under Paragraph 6.20.A shall not extend to the liability of Engineer and Engineer's officers, directors, members, partners, employees, agents, consultants and subcontractors arising out of:
 - 1. the preparation or approval of, or the failure to prepare or approve maps, Drawings, opinions, reports, surveys, Change Orders, designs, or Specifications; or
 - 2. giving directions or instructions, or failing to give them, if that is the primary cause of the injury or damage.

6.21 *Delegation of Professional Design Services*

- A. Contractor will not be required to provide professional design services unless such services are specifically required by the Contract Documents for a portion of the Work or unless such services are required to carry out Contractor's responsibilities for construction means, methods, techniques, sequences and procedures. Contractor shall not be required to provide professional services in violation of applicable law.
- B. If professional design services or certifications by a design professional related to systems, materials or equipment are specifically required of Contractor by the Contract Documents, Owner and Engineer will specify all performance and design criteria that such services must satisfy. Contractor shall cause such services or certifications to be provided by a properly licensed professional, whose signature and seal shall appear on all drawings, calculations, specifications, certifications, Shop Drawings and other submittals prepared by such professional. Shop Drawings and other submittals related to the Work designed or certified by such professional, if prepared by others, shall bear such professional's written approval when submitted to Engineer.
- C. Owner and Engineer shall be entitled to rely upon the adequacy, accuracy and completeness of the services, certifications or approvals performed by such design professionals, provided Owner and Engineer have specified to Contractor all performance and design criteria that such services must satisfy.
- D. Pursuant to this Paragraph 6.21, Engineer's review and approval of design calculations and design drawings will be only for the limited purpose of checking for conformance with performance and design criteria given and the design concept expressed in the Contract Documents. Engineer's review and approval of Shop Drawings and other submittals (except design calculations and design drawings) will be only for the purpose stated in Paragraph 6.17.D.1.

- E. Contractor shall not be responsible for the adequacy of the performance or design criteria required by the Contract Documents.

ARTICLE 7 – OTHER WORK AT THE SITE

7.01 Related Work at Site

- A. Owner may perform other work related to the Project at the Site with Owner’s employees, or through other direct contracts therefor, or have other work performed by utility owners. If such other work is not noted in the Contract Documents, then:
 - 1. written notice thereof will be given to Contractor prior to starting any such other work; and
 - 2. if Owner and Contractor are unable to agree on entitlement to or on the amount or extent, if any, of any adjustment in the Contract Price or Contract Times that should be allowed as a result of such other work, a Claim may be made therefor as provided in Paragraph 10.05.
- B. Contractor shall afford each other contractor who is a party to such a direct contract, each utility owner, and Owner, if Owner is performing other work with Owner’s employees, proper and safe access to the Site, provide a reasonable opportunity for the introduction and storage of materials and equipment and the execution of such other work, and properly coordinate the Work with theirs. Contractor shall do all cutting, fitting, and patching of the Work that may be required to properly connect or otherwise make its several parts come together and properly integrate with such other work. Contractor shall not endanger any work of others by cutting, excavating, or otherwise altering such work; provided, however, that Contractor may cut or alter others' work with the written consent of Engineer and the others whose work will be affected. The duties and responsibilities of Contractor under this Paragraph are for the benefit of such utility owners and other contractors to the extent that there are comparable provisions for the benefit of Contractor in said direct contracts between Owner and such utility owners and other contractors.
- C. If the proper execution or results of any part of Contractor’s Work depends upon work performed by others under this Article 7, Contractor shall inspect such other work and promptly report to Engineer in writing any delays, defects, or deficiencies in such other work that render it unavailable or unsuitable for the proper execution and results of Contractor’s Work. Contractor’s failure to so report will constitute an acceptance of such other work as fit and proper for integration with Contractor’s Work except for latent defects and deficiencies in such other work.

7.02 Coordination

- A. If Owner intends to contract with others for the performance of other work on the Project at the Site, the following will be set forth in Supplementary Conditions:
 - 1. the individual or entity who will have authority and responsibility for coordination of the activities among the various contractors will be identified;
 - 2. the specific matters to be covered by such authority and responsibility will be itemized; and
 - 3. the extent of such authority and responsibilities will be provided.

- B. Unless otherwise provided in the Supplementary Conditions, Owner shall have sole authority and responsibility for such coordination.

7.03 *Legal Relationships*

- A. Paragraphs 7.01.A and 7.02 are not applicable for utilities not under the control of Owner.
- B. Each other direct contract of Owner under Paragraph 7.01.A shall provide that the other contractor is liable to Owner and Contractor for the reasonable direct delay and disruption costs incurred by Contractor as a result of the other contractor's wrongful actions or inactions.
- C. Contractor shall be liable to Owner and any other contractor under direct contract to Owner for the reasonable direct delay and disruption costs incurred by such other contractor as a result of Contractor's wrongful action or inactions.

ARTICLE 8 – OWNER'S RESPONSIBILITIES

8.01 *Communications to Contractor*

- A. Except as otherwise provided in these General Conditions, Owner shall issue all communications to Contractor through Engineer.

8.02 *Replacement of Engineer*

- A. In case of termination of the employment of Engineer, Owner shall appoint an engineer to whom Contractor makes no reasonable objection, whose status under the Contract Documents shall be that of the former Engineer.

8.03 *Furnish Data*

- A. Owner shall promptly furnish the data required of Owner under the Contract Documents.

8.04 *Pay When Due*

- A. Owner shall make payments to Contractor when they are due as provided in Paragraphs 14.02.C and 14.07.C.

8.05 *Lands and Easements; Reports and Tests*

- A. Owner's duties with respect to providing lands and easements and providing engineering surveys to establish reference points are set forth in Paragraphs 4.01 and 4.05. Paragraph 4.02 refers to Owner's identifying and making available to Contractor copies of reports of explorations and tests of subsurface conditions and drawings of physical conditions relating to existing surface or subsurface structures at the Site.

8.06 *Insurance*

- A. Owner's responsibilities, if any, with respect to purchasing and maintaining liability and property insurance are set forth in Article 5.

8.07 *Change Orders*

A. Owner is obligated to execute Change Orders as indicated in Paragraph 10.03.

8.08 *Inspections, Tests, and Approvals*

A. Owner's responsibility with respect to certain inspections, tests, and approvals is set forth in Paragraph 13.03.B.

8.09 *Limitations on Owner's Responsibilities*

A. The Owner shall not supervise, direct, or have control or authority over, nor be responsible for, Contractor's means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or for any failure of Contractor to comply with Laws and Regulations applicable to the performance of the Work. Owner will not be responsible for Contractor's failure to perform the Work in accordance with the Contract Documents.

8.10 *Undisclosed Hazardous Environmental Condition*

A. Owner's responsibility in respect to an undisclosed Hazardous Environmental Condition is set forth in Paragraph 4.06.

8.11 *Evidence of Financial Arrangements*

A. Upon request of Contractor, Owner shall furnish Contractor reasonable evidence that financial arrangements have been made to satisfy Owner's obligations under the Contract Documents.

8.12 *Compliance with Safety Program*

A. While at the Site, Owner's employees and representatives shall comply with the specific applicable requirements of Contractor's safety programs of which Owner has been informed pursuant to Paragraph 6.13.D.

ARTICLE 9 – ENGINEER'S STATUS DURING CONSTRUCTION

9.01 *Owner's Representative*

A. Engineer will be Owner's representative during the construction period. The duties and responsibilities and the limitations of authority of Engineer as Owner's representative during construction are set forth in the Contract Documents.

9.02 *Visits to Site*

A. Engineer will make visits to the Site at intervals appropriate to the various stages of construction as Engineer deems necessary in order to observe as an experienced and qualified design professional the progress that has been made and the quality of the various aspects of Contractor's executed Work. Based on information obtained during such visits and observations, Engineer, for the benefit of Owner, will determine, in general, if the Work is proceeding in accordance with the Contract Documents. Engineer will not be required to make exhaustive or

continuous inspections on the Site to check the quality or quantity of the Work. Engineer's efforts will be directed toward providing for Owner a greater degree of confidence that the completed Work will conform generally to the Contract Documents. On the basis of such visits and observations, Engineer will keep Owner informed of the progress of the Work and will endeavor to guard Owner against defective Work.

- B. Engineer's visits and observations are subject to all the limitations on Engineer's authority and responsibility set forth in Paragraph 9.09. Particularly, but without limitation, during or as a result of Engineer's visits or observations of Contractor's Work, Engineer will not supervise, direct, control, or have authority over or be responsible for Contractor's means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or for any failure of Contractor to comply with Laws and Regulations applicable to the performance of the Work.

9.03 *Project Representative*

- A. If Owner and Engineer agree, Engineer will furnish a Resident Project Representative to assist Engineer in providing more extensive observation of the Work. The authority and responsibilities of any such Resident Project Representative and assistants will be as provided in the Supplementary Conditions, and limitations on the responsibilities thereof will be as provided in Paragraph 9.09. If Owner designates another representative or agent to represent Owner at the Site who is not Engineer's consultant, agent or employee, the responsibilities and authority and limitations thereon of such other individual or entity will be as provided in the Supplementary Conditions.

9.04 *Authorized Variations in Work*

- A. Engineer may authorize minor variations in the Work from the requirements of the Contract Documents which do not involve an adjustment in the Contract Price or the Contract Times and are compatible with the design concept of the completed Project as a functioning whole as indicated by the Contract Documents. These may be accomplished by a Field Order and will be binding on Owner and also on Contractor, who shall perform the Work involved promptly. If Owner or Contractor believes that a Field Order justifies an adjustment in the Contract Price or Contract Times, or both, and the parties are unable to agree on entitlement to or on the amount or extent, if any, of any such adjustment, a Claim may be made therefor as provided in Paragraph 10.05.

9.05 *Rejecting Defective Work*

- A. Engineer will have authority to reject Work which Engineer believes to be defective, or that Engineer believes will not produce a completed Project that conforms to the Contract Documents or that will prejudice the integrity of the design concept of the completed Project as a functioning whole as indicated by the Contract Documents. Engineer will also have authority to require special inspection or testing of the Work as provided in Paragraph 13.04, whether or not the Work is fabricated, installed, or completed.

9.06 *Shop Drawings, Change Orders and Payments*

- A. In connection with Engineer's authority, and limitations thereof, as to Shop Drawings and Samples, see Paragraph 6.17.
- B. In connection with Engineer's authority, and limitations thereof, as to design calculations and design drawings submitted in response to a delegation of professional design services, if any, see Paragraph 6.21.
- C. In connection with Engineer's authority as to Change Orders, see Articles 10, 11, and 12.
- D. In connection with Engineer's authority as to Applications for Payment, see Article 14.

9.07 *Determinations for Unit Price Work*

- A. Engineer will determine the actual quantities and classifications of Unit Price Work performed by Contractor. Engineer will review with Contractor the Engineer's preliminary determinations on such matters before rendering a written decision thereon (by recommendation of an Application for Payment or otherwise). Engineer's written decision thereon will be final and binding (except as modified by Engineer to reflect changed factual conditions or more accurate data) upon Owner and Contractor, subject to the provisions of Paragraph 10.05.

9.08 *Decisions on Requirements of Contract Documents and Acceptability of Work*

- A. Engineer will be the initial interpreter of the requirements of the Contract Documents and judge of the acceptability of the Work thereunder. All matters in question and other matters between Owner and Contractor arising prior to the date final payment is due relating to the acceptability of the Work, and the interpretation of the requirements of the Contract Documents pertaining to the performance of the Work, will be referred initially to Engineer in writing within 30 days of the event giving rise to the question.
- B. Engineer will, with reasonable promptness, render a written decision on the issue referred. If Owner or Contractor believes that any such decision entitles them to an adjustment in the Contract Price or Contract Times or both, a Claim may be made under Paragraph 10.05. The date of Engineer's decision shall be the date of the event giving rise to the issues referenced for the purposes of Paragraph 10.05.B.
- C. Engineer's written decision on the issue referred will be final and binding on Owner and Contractor, subject to the provisions of Paragraph 10.05.
- D. When functioning as interpreter and judge under this Paragraph 9.08, Engineer will not show partiality to Owner or Contractor and will not be liable in connection with any interpretation or decision rendered in good faith in such capacity.

9.09 *Limitations on Engineer's Authority and Responsibilities*

- A. Neither Engineer's authority or responsibility under this Article 9 or under any other provision of the Contract Documents nor any decision made by Engineer in good faith either to exercise or not

exercise such authority or responsibility or the undertaking, exercise, or performance of any authority or responsibility by Engineer shall create, impose, or give rise to any duty in contract, tort, or otherwise owed by Engineer to Contractor, any Subcontractor, any Supplier, any other individual or entity, or to any surety for or employee or agent of any of them.

- B. Engineer will not supervise, direct, control, or have authority over or be responsible for Contractor's means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or for any failure of Contractor to comply with Laws and Regulations applicable to the performance of the Work. Engineer will not be responsible for Contractor's failure to perform the Work in accordance with the Contract Documents.
- C. Engineer will not be responsible for the acts or omissions of Contractor or of any Subcontractor, any Supplier, or of any other individual or entity performing any of the Work.
- D. Engineer's review of the final Application for Payment and accompanying documentation and all maintenance and operating instructions, schedules, guarantees, bonds, certificates of inspection, tests and approvals, and other documentation required to be delivered by Paragraph 14.07.A will only be to determine generally that their content complies with the requirements of, and in the case of certificates of inspections, tests, and approvals that the results certified indicate compliance with, the Contract Documents.
- E. The limitations upon authority and responsibility set forth in this Paragraph 9.09 shall also apply to the Resident Project Representative, if any, and assistants, if any.

9.10 *Compliance with Safety Program*

- A. While at the Site, Engineer's employees and representatives shall comply with the specific applicable requirements of Contractor's safety programs of which Engineer has been informed pursuant to Paragraph 6.13.D.

ARTICLE 10 – CHANGES IN THE WORK; CLAIMS

10.01 Authorized Changes in the Work

- A. Without invalidating the Contract and without notice to any surety, Owner may, at any time or from time to time, order additions, deletions, or revisions in the Work by a Change Order, or a Work Change Directive. Upon receipt of any such document, Contractor shall promptly proceed with the Work involved which will be performed under the applicable conditions of the Contract Documents (except as otherwise specifically provided).
- B. If Owner and Contractor are unable to agree on entitlement to, or on the amount or extent, if any, of an adjustment in the Contract Price or Contract Times, or both, that should be allowed as a result of a Work Change Directive, a Claim may be made therefor as provided in Paragraph 10.05.

10.02 *Unauthorized Changes in the Work*

- A. Contractor shall not be entitled to an increase in the Contract Price or an extension of the Contract Times with respect to any work performed that is not required by the Contract Documents as amended, modified, or supplemented as provided in Paragraph 3.04, except in the case of an emergency as provided in Paragraph 6.16 or in the case of uncovering Work as provided in Paragraph 13.04.D.

10.03 *Execution of Change Orders*

- A. Owner and Contractor shall execute appropriate Change Orders recommended by Engineer covering:
 - 1. changes in the Work which are: (i) ordered by Owner pursuant to Paragraph 10.01.A, (ii) required because of acceptance of defective Work under Paragraph 13.08.A or Owner's correction of defective Work under Paragraph 13.09, or (iii) agreed to by the parties;
 - 2. changes in the Contract Price or Contract Times which are agreed to by the parties, including any undisputed sum or amount of time for Work actually performed in accordance with a Work Change Directive; and
 - 3. changes in the Contract Price or Contract Times which embody the substance of any written decision rendered by Engineer pursuant to Paragraph 10.05; provided that, in lieu of executing any such Change Order, an appeal may be taken from any such decision in accordance with the provisions of the Contract Documents and applicable Laws and Regulations, but during any such appeal, Contractor shall carry on the Work and adhere to the Progress Schedule as provided in Paragraph 6.18.A.

10.04 *Notification to Surety*

- A. If the provisions of any bond require notice to be given to a surety of any change affecting the general scope of the Work or the provisions of the Contract Documents (including, but not limited to, Contract Price or Contract Times), the giving of any such notice will be Contractor's responsibility. The amount of each applicable bond will be adjusted to reflect the effect of any such change.

10.05 *Claims*

- A. *Engineer's Decision Required:* All Claims, except those waived pursuant to Paragraph 14.09, shall be referred to the Engineer for decision. A decision by Engineer shall be required as a condition precedent to any exercise by Owner or Contractor of any rights or remedies either may otherwise have under the Contract Documents or by Laws and Regulations in respect of such Claims.
- B. *Notice:* Written notice stating the general nature of each Claim shall be delivered by the claimant to Engineer and the other party to the Contract promptly (but in no event later than 30 days) after the start of the event giving rise thereto. The responsibility to substantiate a Claim shall rest with the party making the Claim. Notice of the amount or extent of the Claim, with supporting data

shall be delivered to the Engineer and the other party to the Contract within 60 days after the start of such event (unless Engineer allows additional time for claimant to submit additional or more accurate data in support of such Claim). A Claim for an adjustment in Contract Price shall be prepared in accordance with the provisions of Paragraph 12.01.B. A Claim for an adjustment in Contract Times shall be prepared in accordance with the provisions of Paragraph 12.02.B. Each Claim shall be accompanied by claimant's written statement that the adjustment claimed is the entire adjustment to which the claimant believes it is entitled as a result of said event. The opposing party shall submit any response to Engineer and the claimant within 30 days after receipt of the claimant's last submittal (unless Engineer allows additional time).

- C. *Engineer's Action:* Engineer will review each Claim and, within 30 days after receipt of the last submittal of the claimant or the last submittal of the opposing party, if any, take one of the following actions in writing:
1. deny the Claim in whole or in part;
 2. approve the Claim; or
 3. notify the parties that the Engineer is unable to resolve the Claim if, in the Engineer's sole discretion, it would be inappropriate for the Engineer to do so. For purposes of further resolution of the Claim, such notice shall be deemed a denial.
- D. In the event that Engineer does not take action on a Claim within said 30 days, the Claim shall be deemed denied.
- E. Engineer's written action under Paragraph 10.05.C or denial pursuant to Paragraphs 10.05.C.3 or 10.05.D will be final and binding upon Owner and Contractor, unless Owner or Contractor invoke the dispute resolution procedure set forth in Article 16 within 30 days of such action or denial.
- F. No Claim for an adjustment in Contract Price or Contract Times will be valid if not submitted in accordance with this Paragraph 10.05.

ARTICLE 11 – COST OF THE WORK; ALLOWANCES; UNIT PRICE WORK

11.01 Cost of the Work

- A. *Costs Included:* The term Cost of the Work means the sum of all costs, except those excluded in Paragraph 11.01.B, necessarily incurred and paid by Contractor in the proper performance of the Work. When the value of any Work covered by a Change Order or when a Claim for an adjustment in Contract Price is determined on the basis of Cost of the Work, the costs to be reimbursed to Contractor will be only those additional or incremental costs required because of the change in the Work or because of the event giving rise to the Claim. Except as otherwise may be agreed to in writing by Owner, such costs shall be in amounts no higher than those prevailing in the locality of the Project, shall not include any of the costs itemized in Paragraph 11.01.B, and shall include only the following items:

1. Payroll costs for employees in the direct employ of Contractor in the performance of the Work under schedules of job classifications agreed upon by Owner and Contractor. Such employees shall include, without limitation, superintendents, foremen, and other personnel employed full time on the Work. Payroll costs for employees not employed full time on the Work shall be apportioned on the basis of their time spent on the Work. Payroll costs shall include, but not be limited to, salaries and wages plus the cost of fringe benefits, which shall include social security contributions, unemployment, excise, and payroll taxes, workers' compensation, health and retirement benefits, bonuses, sick leave, vacation and holiday pay applicable thereto. The expenses of performing Work outside of regular working hours, on Saturday, Sunday, or legal holidays, shall be included in the above to the extent authorized by Owner.
2. Cost of all materials and equipment furnished and incorporated in the Work, including costs of transportation and storage thereof, and Suppliers' field services required in connection therewith. All cash discounts shall accrue to Contractor unless Owner deposits funds with Contractor with which to make payments, in which case the cash discounts shall accrue to Owner. All trade discounts, rebates and refunds and returns from sale of surplus materials and equipment shall accrue to Owner, and Contractor shall make provisions so that they may be obtained.
3. Payments made by Contractor to Subcontractors for Work performed by Subcontractors. If required by Owner, Contractor shall obtain competitive bids from subcontractors acceptable to Owner and Contractor and shall deliver such bids to Owner, who will then determine, with the advice of Engineer, which bids, if any, will be acceptable. If any subcontract provides that the Subcontractor is to be paid on the basis of Cost of the Work plus a fee, the Subcontractor's Cost of the Work and fee shall be determined in the same manner as Contractor's Cost of the Work and fee as provided in this Paragraph 11.01.
4. Costs of special consultants (including but not limited to engineers, architects, testing laboratories, surveyors, attorneys, and accountants) employed for services specifically related to the Work.
5. Supplemental costs including the following:
 - a. The proportion of necessary transportation, travel, and subsistence expenses of Contractor's employees incurred in discharge of duties connected with the Work.
 - b. Cost, including transportation and maintenance, of all materials, supplies, equipment, machinery, appliances, office, and temporary facilities at the Site, and hand tools not owned by the workers, which are consumed in the performance of the Work, and cost, less market value, of such items used but not consumed which remain the property of Contractor.
 - c. Rentals of all construction equipment and machinery, and the parts thereof whether rented from Contractor or others in accordance with rental agreements approved by Owner with the advice of Engineer, and the costs of transportation, loading, unloading, assembly, dismantling, and removal thereof. All such costs shall be in accordance with the terms of

said rental agreements. The rental of any such equipment, machinery, or parts shall cease when the use thereof is no longer necessary for the Work.

- d. Sales, consumer, use, and other similar taxes related to the Work, and for which Contractor is liable, as imposed by Laws and Regulations.
- e. Deposits lost for causes other than negligence of Contractor, any Subcontractor, or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable, and royalty payments and fees for permits and licenses.
- f. Losses and damages (and related expenses) caused by damage to the Work, not compensated by insurance or otherwise, sustained by Contractor in connection with the performance of the Work (except losses and damages within the deductible amounts of property insurance established in accordance with Paragraph 5.06.D), provided such losses and damages have resulted from causes other than the negligence of Contractor, any Subcontractor, or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable. Such losses shall include settlements made with the written consent and approval of Owner. No such losses, damages, and expenses shall be included in the Cost of the Work for the purpose of determining Contractor's fee.
- g. The cost of utilities, fuel, and sanitary facilities at the Site.
- h. Minor expenses such as telegrams, long distance telephone calls, telephone service at the Site, express and courier services, and similar petty cash items in connection with the Work.
- i. The costs of premiums for all bonds and insurance Contractor is required by the Contract Documents to purchase and maintain.

B. *Costs Excluded:* The term Cost of the Work shall not include any of the following items:

- 1. Payroll costs and other compensation of Contractor's officers, executives, principals (of partnerships and sole proprietorships), general managers, safety managers, engineers, architects, estimators, attorneys, auditors, accountants, purchasing and contracting agents, expeditors, timekeepers, clerks, and other personnel employed by Contractor, whether at the Site or in Contractor's principal or branch office for general administration of the Work and not specifically included in the agreed upon schedule of job classifications referred to in Paragraph 11.01.A.1 or specifically covered by Paragraph 11.01.A.4, all of which are to be considered administrative costs covered by the Contractor's fee.
- 2. Expenses of Contractor's principal and branch offices other than Contractor's office at the Site.
- 3. Any part of Contractor's capital expenses, including interest on Contractor's capital employed for the Work and charges against Contractor for delinquent payments.
- 4. Costs due to the negligence of Contractor, any Subcontractor, or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable, including but not

limited to, the correction of defective Work, disposal of materials or equipment wrongly supplied, and making good any damage to property.

5. Other overhead or general expense costs of any kind and the costs of any item not specifically and expressly included in Paragraphs 11.01.A.
- C. *Contractor's Fee:* When all the Work is performed on the basis of cost-plus, Contractor's fee shall be determined as set forth in the Agreement. When the value of any Work covered by a Change Order or when a Claim for an adjustment in Contract Price is determined on the basis of Cost of the Work, Contractor's fee shall be determined as set forth in Paragraph 12.01.C.
- D. *Documentation:* Whenever the Cost of the Work for any purpose is to be determined pursuant to Paragraphs 11.01.A and 11.01.B, Contractor will establish and maintain records thereof in accordance with generally accepted accounting practices and submit in a form acceptable to Engineer an itemized cost breakdown together with supporting data.

11.02 Allowances

- A. It is understood that Contractor has included in the Contract Price all allowances so named in the Contract Documents and shall cause the Work so covered to be performed for such sums and by such persons or entities as may be acceptable to Owner and Engineer.
- B. *Cash Allowances:*
 1. Contractor agrees that:
 - a. the cash allowances include the cost to Contractor (less any applicable trade discounts) of materials and equipment required by the allowances to be delivered at the Site, and all applicable taxes; and
 - b. Contractor's costs for unloading and handling on the Site, labor, installation, overhead, profit, and other expenses contemplated for the cash allowances have been included in the Contract Price and not in the allowances, and no demand for additional payment on account of any of the foregoing will be valid.
- C. *Contingency Allowance:*
 1. Contractor agrees that a contingency allowance, if any, is for the sole use of Owner to cover unanticipated costs.
- D. Prior to final payment, an appropriate Change Order will be issued as recommended by Engineer to reflect actual amounts due Contractor on account of Work covered by allowances, and the Contract Price shall be correspondingly adjusted.

11.03 Unit Price Work

- A. Where the Contract Documents provide that all or part of the Work is to be Unit Price Work, initially the Contract Price will be deemed to include for all Unit Price Work an amount equal to

the sum of the unit price for each separately identified item of Unit Price Work times the estimated quantity of each item as indicated in the Agreement.

- B. The estimated quantities of items of Unit Price Work are not guaranteed and are solely for the purpose of comparison of Bids and determining an initial Contract Price. Determinations of the actual quantities and classifications of Unit Price Work performed by Contractor will be made by Engineer subject to the provisions of Paragraph 9.07.
- C. Each unit price will be deemed to include an amount considered by Contractor to be adequate to cover Contractor's overhead and profit for each separately identified item.
- D. Owner or Contractor may make a Claim for an adjustment in the Contract Price in accordance with Paragraph 10.05 if:
 - 1. the quantity of any item of Unit Price Work performed by Contractor differs materially and significantly from the estimated quantity of such item indicated in the Agreement; and
 - 2. there is no corresponding adjustment with respect to any other item of Work; and
 - 3. Contractor believes that Contractor is entitled to an increase in Contract Price as a result of having incurred additional expense or Owner believes that Owner is entitled to a decrease in Contract Price and the parties are unable to agree as to the amount of any such increase or decrease.

ARTICLE 12 – CHANGE OF CONTRACT PRICE; CHANGE OF CONTRACT TIMES

12.01 Change of Contract Price

- A. The Contract Price may only be changed by a Change Order. Any Claim for an adjustment in the Contract Price shall be based on written notice submitted by the party making the Claim to the Engineer and the other party to the Contract in accordance with the provisions of Paragraph 10.05.
- B. The value of any Work covered by a Change Order or of any Claim for an adjustment in the Contract Price will be determined as follows:
 - 1. where the Work involved is covered by unit prices contained in the Contract Documents, by application of such unit prices to the quantities of the items involved (subject to the provisions of Paragraph 11.03); or
 - 2. where the Work involved is not covered by unit prices contained in the Contract Documents, by a mutually agreed lump sum (which may include an allowance for overhead and profit not necessarily in accordance with Paragraph 12.01.C.2); or
 - 3. where the Work involved is not covered by unit prices contained in the Contract Documents and agreement to a lump sum is not reached under Paragraph 12.01.B.2, on the basis of the Cost of the Work (determined as provided in Paragraph 11.01) plus a Contractor's fee for overhead and profit (determined as provided in Paragraph 12.01.C).

C. *Contractor's Fee*: The Contractor's fee for overhead and profit shall be determined as follows:

1. a mutually acceptable fixed fee; or
2. if a fixed fee is not agreed upon, then a fee based on the following percentages of the various portions of the Cost of the Work:
 - a. for costs incurred under Paragraphs 11.01.A.1 and 11.01.A.2, the Contractor's fee shall be 15 percent;
 - b. for costs incurred under Paragraph 11.01.A.3, the Contractor's fee shall be five percent;
 - c. where one or more tiers of subcontracts are on the basis of Cost of the Work plus a fee and no fixed fee is agreed upon, the intent of Paragraphs 12.01.C.2.a and 12.01.C.2.b is that the Subcontractor who actually performs the Work, at whatever tier, will be paid a fee of 15 percent of the costs incurred by such Subcontractor under Paragraphs 11.01.A.1 and 11.01.A.2 and that any higher tier Subcontractor and Contractor will each be paid a fee of five percent of the amount paid to the next lower tier Subcontractor;
 - d. no fee shall be payable on the basis of costs itemized under Paragraphs 11.01.A.4, 11.01.A.5, and 11.01.B;
 - e. the amount of credit to be allowed by Contractor to Owner for any change which results in a net decrease in cost will be the amount of the actual net decrease in cost plus a deduction in Contractor's fee by an amount equal to five percent of such net decrease; and
 - f. when both additions and credits are involved in any one change, the adjustment in Contractor's fee shall be computed on the basis of the net change in accordance with Paragraphs 12.01.C.2.a through 12.01.C.2.e, inclusive.

12.02 Change of Contract Times

- A. The Contract Times may only be changed by a Change Order. Any Claim for an adjustment in the Contract Times shall be based on written notice submitted by the party making the Claim to the Engineer and the other party to the Contract in accordance with the provisions of Paragraph 10.05.
- B. Any adjustment of the Contract Times covered by a Change Order or any Claim for an adjustment in the Contract Times will be determined in accordance with the provisions of this Article 12.

12.03 Delays

- A. Where Contractor is prevented from completing any part of the Work within the Contract Times due to delay beyond the control of Contractor, the Contract Times will be extended in an amount equal to the time lost due to such delay if a Claim is made therefor as provided in Paragraph 12.02.A. Delays beyond the control of Contractor shall include, but not be limited to, acts or

neglect by Owner, acts or neglect of utility owners or other contractors performing other work as contemplated by Article 7, fires, floods, epidemics, abnormal weather conditions, or acts of God.

- B. If Owner, Engineer, or other contractors or utility owners performing other work for Owner as contemplated by Article 7, or anyone for whom Owner is responsible, delays, disrupts, or interferes with the performance or progress of the Work, then Contractor shall be entitled to an equitable adjustment in the Contract Price or the Contract Times, or both. Contractor's entitlement to an adjustment of the Contract Times is conditioned on such adjustment being essential to Contractor's ability to complete the Work within the Contract Times.
- C. If Contractor is delayed in the performance or progress of the Work by fire, flood, epidemic, abnormal weather conditions, acts of God, acts or failures to act of utility owners not under the control of Owner, or other causes not the fault of and beyond control of Owner and Contractor, then Contractor shall be entitled to an equitable adjustment in Contract Times, if such adjustment is essential to Contractor's ability to complete the Work within the Contract Times. Such an adjustment shall be Contractor's sole and exclusive remedy for the delays described in this Paragraph 12.03.C.
- D. Owner, Engineer, and their officers, directors, members, partners, employees, agents, consultants, or subcontractors shall not be liable to Contractor for any claims, costs, losses, or damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) sustained by Contractor on or in connection with any other project or anticipated project.
- E. Contractor shall not be entitled to an adjustment in Contract Price or Contract Times for delays within the control of Contractor. Delays attributable to and within the control of a Subcontractor or Supplier shall be deemed to be delays within the control of Contractor.

ARTICLE 13 – TESTS AND INSPECTIONS; CORRECTION, REMOVAL OR ACCEPTANCE OF DEFECTIVE WORK

13.01 Notice of Defects

- A. Prompt notice of all defective Work of which Owner or Engineer has actual knowledge will be given to Contractor. Defective Work may be rejected, corrected, or accepted as provided in this Article 13.

13.02 Access to Work

- A. Owner, Engineer, their consultants and other representatives and personnel of Owner, independent testing laboratories, and governmental agencies with jurisdictional interests will have access to the Site and the Work at reasonable times for their observation, inspection, and testing. Contractor shall provide them proper and safe conditions for such access and advise them of Contractor's safety procedures and programs so that they may comply therewith as applicable.

13.03 Tests and Inspections

- A. Contractor shall give Engineer timely notice of readiness of the Work for all required inspections, tests, or approvals and shall cooperate with inspection and testing personnel to facilitate required inspections or tests.
- B. Owner shall employ and pay for the services of an independent testing laboratory to perform all inspections, tests, or approvals required by the Contract Documents except:
 - 1. for inspections, tests, or approvals covered by Paragraphs 13.03.C and 13.03.D below;
 - 2. that costs incurred in connection with tests or inspections conducted pursuant to Paragraph 13.04.B shall be paid as provided in Paragraph 13.04.C; and
 - 3. as otherwise specifically provided in the Contract Documents.
- C. If Laws or Regulations of any public body having jurisdiction require any Work (or part thereof) specifically to be inspected, tested, or approved by an employee or other representative of such public body, Contractor shall assume full responsibility for arranging and obtaining such inspections, tests, or approvals, pay all costs in connection therewith, and furnish Engineer the required certificates of inspection or approval.
- D. Contractor shall be responsible for arranging and obtaining and shall pay all costs in connection with any inspections, tests, or approvals required for Owner's and Engineer's acceptance of materials or equipment to be incorporated in the Work; or acceptance of materials, mix designs, or equipment submitted for approval prior to Contractor's purchase thereof for incorporation in the Work. Such inspections, tests, or approvals shall be performed by organizations acceptable to Owner and Engineer.
- E. If any Work (or the work of others) that is to be inspected, tested, or approved is covered by Contractor without written concurrence of Engineer, Contractor shall, if requested by Engineer, uncover such Work for observation.
- F. Uncovering Work as provided in Paragraph 13.03.E shall be at Contractor's expense unless Contractor has given Engineer timely notice of Contractor's intention to cover the same and Engineer has not acted with reasonable promptness in response to such notice.

13.04 Uncovering Work

- A. If any Work is covered contrary to the written request of Engineer, it must, if requested by Engineer, be uncovered for Engineer's observation and replaced at Contractor's expense.
- B. If Engineer considers it necessary or advisable that covered Work be observed by Engineer or inspected or tested by others, Contractor, at Engineer's request, shall uncover, expose, or otherwise make available for observation, inspection, or testing as Engineer may require, that portion of the Work in question, furnishing all necessary labor, material, and equipment.

- C. If it is found that the uncovered Work is defective, Contractor shall pay all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to such uncovering, exposure, observation, inspection, and testing, and of satisfactory replacement or reconstruction (including but not limited to all costs of repair or replacement of work of others); and Owner shall be entitled to an appropriate decrease in the Contract Price. If the parties are unable to agree as to the amount thereof, Owner may make a Claim therefor as provided in Paragraph 10.05.
- D. If the uncovered Work is not found to be defective, Contractor shall be allowed an increase in the Contract Price or an extension of the Contract Times, or both, directly attributable to such uncovering, exposure, observation, inspection, testing, replacement, and reconstruction. If the parties are unable to agree as to the amount or extent thereof, Contractor may make a Claim therefor as provided in Paragraph 10.05.

13.05 Owner May Stop the Work

- A. If the Work is defective, or Contractor fails to supply sufficient skilled workers or suitable materials or equipment, or fails to perform the Work in such a way that the completed Work will conform to the Contract Documents, Owner may order Contractor to stop the Work, or any portion thereof, until the cause for such order has been eliminated; however, this right of Owner to stop the Work shall not give rise to any duty on the part of Owner to exercise this right for the benefit of Contractor, any Subcontractor, any Supplier, any other individual or entity, or any surety for, or employee or agent of any of them.

13.06 Correction or Removal of Defective Work

- A. Promptly after receipt of written notice, Contractor shall correct all defective Work, whether or not fabricated, installed, or completed, or, if the Work has been rejected by Engineer, remove it from the Project and replace it with Work that is not defective. Contractor shall pay all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to such correction or removal (including but not limited to all costs of repair or replacement of work of others).
- B. When correcting defective Work under the terms of this Paragraph 13.06 or Paragraph 13.07, Contractor shall take no action that would void or otherwise impair Owner's special warranty and guarantee, if any, on said Work.

13.07 Correction Period

- A. If within one year after the date of Substantial Completion (or such longer period of time as may be prescribed by the terms of any applicable special guarantee required by the Contract Documents) or by any specific provision of the Contract Documents, any Work is found to be defective, or if the repair of any damages to the land or areas made available for Contractor's use by Owner or permitted by Laws and Regulations as contemplated in Paragraph 6.11.A is found to be defective, Contractor shall promptly, without cost to Owner and in accordance with Owner's written instructions:

1. repair such defective land or areas; or
 2. correct such defective Work; or
 3. if the defective Work has been rejected by Owner, remove it from the Project and replace it with Work that is not defective, and
 4. satisfactorily correct or repair or remove and replace any damage to other Work, to the work of others or other land or areas resulting therefrom.
- B. If Contractor does not promptly comply with the terms of Owner's written instructions, or in an emergency where delay would cause serious risk of loss or damage, Owner may have the defective Work corrected or repaired or may have the rejected Work removed and replaced. All claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to such correction or repair or such removal and replacement (including but not limited to all costs of repair or replacement of work of others) will be paid by Contractor.
- C. In special circumstances where a particular item of equipment is placed in continuous service before Substantial Completion of all the Work, the correction period for that item may start to run from an earlier date if so provided in the Specifications.
- D. Where defective Work (and damage to other Work resulting therefrom) has been corrected or removed and replaced under this Paragraph 13.07, the correction period hereunder with respect to such Work will be extended for an additional period of one year after such correction or removal and replacement has been satisfactorily completed.
- E. Contractor's obligations under this Paragraph 13.07 are in addition to any other obligation or warranty. The provisions of this Paragraph 13.07 shall not be construed as a substitute for, or a waiver of, the provisions of any applicable statute of limitation or repose.

13.08 Acceptance of Defective Work

- A. If, instead of requiring correction or removal and replacement of defective Work, Owner (and, prior to Engineer's recommendation of final payment, Engineer) prefers to accept it, Owner may do so. Contractor shall pay all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) attributable to Owner's evaluation of and determination to accept such defective Work (such costs to be approved by Engineer as to reasonableness) and for the diminished value of the Work to the extent not otherwise paid by Contractor pursuant to this sentence. If any such acceptance occurs prior to Engineer's recommendation of final payment, a Change Order will be issued incorporating the necessary revisions in the Contract Documents with respect to the Work, and Owner shall be entitled to an appropriate decrease in the Contract Price, reflecting the diminished value of Work so accepted. If the parties are unable to agree as to the amount thereof, Owner may make a Claim therefor as provided in Paragraph 10.05. If the acceptance occurs after such recommendation, an appropriate amount will be paid by Contractor to Owner.

13.09 Owner May Correct Defective Work

- A. If Contractor fails within a reasonable time after written notice from Engineer to correct defective Work, or to remove and replace rejected Work as required by Engineer in accordance with Paragraph 13.06.A, or if Contractor fails to perform the Work in accordance with the Contract Documents, or if Contractor fails to comply with any other provision of the Contract Documents, Owner may, after seven days written notice to Contractor, correct, or remedy any such deficiency.
- B. In exercising the rights and remedies under this Paragraph 13.09, Owner shall proceed expeditiously. In connection with such corrective or remedial action, Owner may exclude Contractor from all or part of the Site, take possession of all or part of the Work and suspend Contractor's services related thereto, take possession of Contractor's tools, appliances, construction equipment and machinery at the Site, and incorporate in the Work all materials and equipment stored at the Site or for which Owner has paid Contractor but which are stored elsewhere. Contractor shall allow Owner, Owner's representatives, agents and employees, Owner's other contractors, and Engineer and Engineer's consultants access to the Site to enable Owner to exercise the rights and remedies under this Paragraph.
- C. All claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) incurred or sustained by Owner in exercising the rights and remedies under this Paragraph 13.09 will be charged against Contractor, and a Change Order will be issued incorporating the necessary revisions in the Contract Documents with respect to the Work; and Owner shall be entitled to an appropriate decrease in the Contract Price. If the parties are unable to agree as to the amount of the adjustment, Owner may make a Claim therefor as provided in Paragraph 10.05. Such claims, costs, losses and damages will include but not be limited to all costs of repair, or replacement of work of others destroyed or damaged by correction, removal, or replacement of Contractor's defective Work.
- D. Contractor shall not be allowed an extension of the Contract Times because of any delay in the performance of the Work attributable to the exercise by Owner of Owner's rights and remedies under this Paragraph 13.09.

ARTICLE 14 – PAYMENTS TO CONTRACTOR AND COMPLETION

14.01 Schedule of Values

- A. The Schedule of Values established as provided in Paragraph 2.07.A will serve as the basis for progress payments and will be incorporated into a form of Application for Payment acceptable to Engineer. Progress payments on account of Unit Price Work will be based on the number of units completed.

14.02 Progress Payments

A. Applications for Payments:

- 1. At least 20 days before the date established in the Agreement for each progress payment (but not more often than once a month), Contractor shall submit to Engineer for review an

Application for Payment filled out and signed by Contractor covering the Work completed as of the date of the Application and accompanied by such supporting documentation as is required by the Contract Documents. If payment is requested on the basis of materials and equipment not incorporated in the Work but delivered and suitably stored at the Site or at another location agreed to in writing, the Application for Payment shall also be accompanied by a bill of sale, invoice, or other documentation warranting that Owner has received the materials and equipment free and clear of all Liens and evidence that the materials and equipment are covered by appropriate property insurance or other arrangements to protect Owner's interest therein, all of which must be satisfactory to Owner.

2. Beginning with the second Application for Payment, each Application shall include an affidavit of Contractor stating that all previous progress payments received on account of the Work have been applied on account to discharge Contractor's legitimate obligations associated with prior Applications for Payment.
3. The amount of retainage with respect to progress payments will be as stipulated in the Agreement.

B. Review of Applications:

1. Engineer will, within 10 days after receipt of each Application for Payment, either indicate in writing a recommendation of payment and present the Application to Owner or return the Application to Contractor indicating in writing Engineer's reasons for refusing to recommend payment. In the latter case, Contractor may make the necessary corrections and resubmit the Application.
2. Engineer's recommendation of any payment requested in an Application for Payment will constitute a representation by Engineer to Owner, based on Engineer's observations of the executed Work as an experienced and qualified design professional, and on Engineer's review of the Application for Payment and the accompanying data and schedules, that to the best of Engineer's knowledge, information and belief:
 - a. the Work has progressed to the point indicated;
 - b. the quality of the Work is generally in accordance with the Contract Documents (subject to an evaluation of the Work as a functioning whole prior to or upon Substantial Completion, the results of any subsequent tests called for in the Contract Documents, a final determination of quantities and classifications for Unit Price Work under Paragraph 9.07, and any other qualifications stated in the recommendation); and
 - c. the conditions precedent to Contractor's being entitled to such payment appear to have been fulfilled in so far as it is Engineer's responsibility to observe the Work.
3. By recommending any such payment Engineer will not thereby be deemed to have represented that:
 - a. inspections made to check the quality or the quantity of the Work as it has been performed have been exhaustive, extended to every aspect of the Work in progress, or

- involved detailed inspections of the Work beyond the responsibilities specifically assigned to Engineer in the Contract Documents; or
- b. there may not be other matters or issues between the parties that might entitle Contractor to be paid additionally by Owner or entitle Owner to withhold payment to Contractor.
4. Neither Engineer's review of Contractor's Work for the purposes of recommending payments nor Engineer's recommendation of any payment, including final payment, will impose responsibility on Engineer:
 - a. to supervise, direct, or control the Work, or
 - b. for the means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or
 - c. for Contractor's failure to comply with Laws and Regulations applicable to Contractor's performance of the Work, or
 - d. to make any examination to ascertain how or for what purposes Contractor has used the moneys paid on account of the Contract Price, or
 - e. to determine that title to any of the Work, materials, or equipment has passed to Owner free and clear of any Liens.
 5. Engineer may refuse to recommend the whole or any part of any payment if, in Engineer's opinion, it would be incorrect to make the representations to Owner stated in Paragraph 14.02.B.2. Engineer may also refuse to recommend any such payment or, because of subsequently discovered evidence or the results of subsequent inspections or tests, revise or revoke any such payment recommendation previously made, to such extent as may be necessary in Engineer's opinion to protect Owner from loss because:
 - a. the Work is defective, or completed Work has been damaged, requiring correction or replacement;
 - b. the Contract Price has been reduced by Change Orders;
 - c. Owner has been required to correct defective Work or complete Work in accordance with Paragraph 13.09; or
 - d. Engineer has actual knowledge of the occurrence of any of the events enumerated in Paragraph 15.02.A.

C. Payment Becomes Due:

1. Ten days after presentation of the Application for Payment to Owner with Engineer's recommendation, the amount recommended will (subject to the provisions of Paragraph 14.02.D) become due, and when due will be paid by Owner to Contractor.

D. Reduction in Payment:

1. Owner may refuse to make payment of the full amount recommended by Engineer because:
 - a. claims have been made against Owner on account of Contractor's performance or furnishing of the Work;
 - b. Liens have been filed in connection with the Work, except where Contractor has delivered a specific bond satisfactory to Owner to secure the satisfaction and discharge of such Liens;
 - c. there are other items entitling Owner to a set-off against the amount recommended; or
 - d. Owner has actual knowledge of the occurrence of any of the events enumerated in Paragraphs 14.02.B.5.a through 14.02.B.5.c or Paragraph 15.02.A.
2. If Owner refuses to make payment of the full amount recommended by Engineer, Owner will give Contractor immediate written notice (with a copy to Engineer) stating the reasons for such action and promptly pay Contractor any amount remaining after deduction of the amount so withheld. Owner shall promptly pay Contractor the amount so withheld, or any adjustment thereto agreed to by Owner and Contractor, when Contractor remedies the reasons for such action.
3. Upon a subsequent determination that Owner's refusal of payment was not justified, the amount wrongfully withheld shall be treated as an amount due as determined by Paragraph 14.02.C.1 and subject to interest as provided in the Agreement.

14.03 Contractor's Warranty of Title

- A. Contractor warrants and guarantees that title to all Work, materials, and equipment covered by any Application for Payment, whether incorporated in the Project or not, will pass to Owner no later than the time of payment free and clear of all Liens.

14.04 Substantial Completion

- A. When Contractor considers the entire Work ready for its intended use Contractor shall notify Owner and Engineer in writing that the entire Work is substantially complete (except for items specifically listed by Contractor as incomplete) and request that Engineer issue a certificate of Substantial Completion.
- B. Promptly after Contractor's notification, Owner, Contractor, and Engineer shall make an inspection of the Work to determine the status of completion. If Engineer does not consider the Work substantially complete, Engineer will notify Contractor in writing giving the reasons therefor.
- C. If Engineer considers the Work substantially complete, Engineer will deliver to Owner a tentative certificate of Substantial Completion which shall fix the date of Substantial Completion. There shall be attached to the certificate a tentative list of items to be completed or corrected before

final payment. Owner shall have seven days after receipt of the tentative certificate during which to make written objection to Engineer as to any provisions of the certificate or attached list. If, after considering such objections, Engineer concludes that the Work is not substantially complete, Engineer will, within 14 days after submission of the tentative certificate to Owner, notify Contractor in writing, stating the reasons therefor. If, after consideration of Owner's objections, Engineer considers the Work substantially complete, Engineer will, within said 14 days, execute and deliver to Owner and Contractor a definitive certificate of Substantial Completion (with a revised tentative list of items to be completed or corrected) reflecting such changes from the tentative certificate as Engineer believes justified after consideration of any objections from Owner.

- D. At the time of delivery of the tentative certificate of Substantial Completion, Engineer will deliver to Owner and Contractor a written recommendation as to division of responsibilities pending final payment between Owner and Contractor with respect to security, operation, safety, and protection of the Work, maintenance, heat, utilities, insurance, and warranties and guarantees. Unless Owner and Contractor agree otherwise in writing and so inform Engineer in writing prior to Engineer's issuing the definitive certificate of Substantial Completion, Engineer's aforesaid recommendation will be binding on Owner and Contractor until final payment.
- E. Owner shall have the right to exclude Contractor from the Site after the date of Substantial Completion subject to allowing Contractor reasonable access to remove its property and complete or correct items on the tentative list.

14.05 Partial Utilization

- A. Prior to Substantial Completion of all the Work, Owner may use or occupy any substantially completed part of the Work which has specifically been identified in the Contract Documents, or which Owner, Engineer, and Contractor agree constitutes a separately functioning and usable part of the Work that can be used by Owner for its intended purpose without significant interference with Contractor's performance of the remainder of the Work, subject to the following conditions:
 - 1. Owner at any time may request Contractor in writing to permit Owner to use or occupy any such part of the Work which Owner believes to be ready for its intended use and substantially complete. If and when Contractor agrees that such part of the Work is substantially complete, Contractor, Owner, and Engineer will follow the procedures of Paragraph 14.04.A through D for that part of the Work.
 - 2. Contractor at any time may notify Owner and Engineer in writing that Contractor considers any such part of the Work ready for its intended use and substantially complete and request Engineer to issue a certificate of Substantial Completion for that part of the Work.
 - 3. Within a reasonable time after either such request, Owner, Contractor, and Engineer shall make an inspection of that part of the Work to determine its status of completion. If Engineer does not consider that part of the Work to be substantially complete, Engineer will notify Owner and Contractor in writing giving the reasons therefor. If Engineer considers that part of the Work to be substantially complete, the provisions of Paragraph 14.04 will apply with respect to certification of Substantial Completion of that part of the Work and the division of responsibility in respect thereof and access thereto.

4. No use or occupancy or separate operation of part of the Work may occur prior to compliance with the requirements of Paragraph 5.10 regarding property insurance.

14.06 Final Inspection

- A. Upon written notice from Contractor that the entire Work or an agreed portion thereof is complete, Engineer will promptly make a final inspection with Owner and Contractor and will notify Contractor in writing of all particulars in which this inspection reveals that the Work is incomplete or defective. Contractor shall immediately take such measures as are necessary to complete such Work or remedy such deficiencies.

14.07 Final Payment

A. Application for Payment:

1. After Contractor has, in the opinion of Engineer, satisfactorily completed all corrections identified during the final inspection and has delivered, in accordance with the Contract Documents, all maintenance and operating instructions, schedules, guarantees, bonds, certificates or other evidence of insurance, certificates of inspection, marked-up record documents (as provided in Paragraph 6.12), and other documents, Contractor may make application for final payment following the procedure for progress payments.
2. The final Application for Payment shall be accompanied (except as previously delivered) by:
 - a. all documentation called for in the Contract Documents, including but not limited to the evidence of insurance required by Paragraph 5.04.B.6;
 - b. consent of the surety, if any, to final payment;
 - c. a list of all Claims against Owner that Contractor believes are unsettled; and
 - d. complete and legally effective releases or waivers (satisfactory to Owner) of all Lien rights arising out of or Liens filed in connection with the Work.
3. In lieu of the releases or waivers of Liens specified in Paragraph 14.07.A.2 and as approved by Owner, Contractor may furnish receipts or releases in full and an affidavit of Contractor that: (i) the releases and receipts include all labor, services, material, and equipment for which a Lien could be filed; and (ii) all payrolls, material and equipment bills, and other indebtedness connected with the Work for which Owner might in any way be responsible, or which might in any way result in liens or other burdens on Owner's property, have been paid or otherwise satisfied. If any Subcontractor or Supplier fails to furnish such a release or receipt in full, Contractor may furnish a bond or other collateral satisfactory to Owner to indemnify Owner against any Lien.

B. Engineer's Review of Application and Acceptance:

1. If, on the basis of Engineer's observation of the Work during construction and final inspection, and Engineer's review of the final Application for Payment and accompanying

documentation as required by the Contract Documents, Engineer is satisfied that the Work has been completed and Contractor's other obligations under the Contract Documents have been fulfilled, Engineer will, within ten days after receipt of the final Application for Payment, indicate in writing Engineer's recommendation of payment and present the Application for Payment to Owner for payment. At the same time Engineer will also give written notice to Owner and Contractor that the Work is acceptable subject to the provisions of Paragraph 14.09. Otherwise, Engineer will return the Application for Payment to Contractor, indicating in writing the reasons for refusing to recommend final payment, in which case Contractor shall make the necessary corrections and resubmit the Application for Payment.

C. Payment Becomes Due:

1. Thirty days after the presentation to Owner of the Application for Payment and accompanying documentation, the amount recommended by Engineer, less any sum Owner is entitled to set off against Engineer's recommendation, including but not limited to liquidated damages, will become due and will be paid by Owner to Contractor.

14.08 Final Completion Delayed

- A. If, through no fault of Contractor, final completion of the Work is significantly delayed, and if Engineer so confirms, Owner shall, upon receipt of Contractor's final Application for Payment (for Work fully completed and accepted) and recommendation of Engineer, and without terminating the Contract, make payment of the balance due for that portion of the Work fully completed and accepted. If the remaining balance to be held by Owner for Work not fully completed or corrected is less than the retainage stipulated in the Agreement, and if bonds have been furnished as required in Paragraph 5.01, the written consent of the surety to the payment of the balance due for that portion of the Work fully completed and accepted shall be submitted by Contractor to Engineer with the Application for such payment. Such payment shall be made under the terms and conditions governing final payment, except that it shall not constitute a waiver of Claims.

14.09 Waiver of Claims

- A. The making and acceptance of final payment will constitute:
 1. a waiver of all Claims by Owner against Contractor, except Claims arising from unsettled Liens, from defective Work appearing after final inspection pursuant to Paragraph 14.06, from failure to comply with the Contract Documents or the terms of any special guarantees specified therein, or from Contractor's continuing obligations under the Contract Documents; and
 2. a waiver of all Claims by Contractor against Owner other than those previously made in accordance with the requirements herein and expressly acknowledged by Owner in writing as still unsettled.

ARTICLE 15 – SUSPENSION OF WORK AND TERMINATION

15.01 *Owner May Suspend Work*

- A. At any time and without cause, Owner may suspend the Work or any portion thereof for a period of not more than 90 consecutive days by notice in writing to Contractor and Engineer which will fix the date on which Work will be resumed. Contractor shall resume the Work on the date so fixed. Contractor shall be granted an adjustment in the Contract Price or an extension of the Contract Times, or both, directly attributable to any such suspension if Contractor makes a Claim therefor as provided in Paragraph 10.05.

15.02 *Owner May Terminate for Cause*

- A. The occurrence of any one or more of the following events will justify termination for cause:
1. Contractor's persistent failure to perform the Work in accordance with the Contract Documents (including, but not limited to, failure to supply sufficient skilled workers or suitable materials or equipment or failure to adhere to the Progress Schedule established under Paragraph 2.07 as adjusted from time to time pursuant to Paragraph 6.04);
 2. Contractor's disregard of Laws or Regulations of any public body having jurisdiction;
 3. Contractor's repeated disregard of the authority of Engineer; or
 4. Contractor's violation in any substantial way of any provisions of the Contract Documents.
- B. If one or more of the events identified in Paragraph 15.02.A occur, Owner may, after giving Contractor (and surety) seven days written notice of its intent to terminate the services of Contractor:
1. exclude Contractor from the Site, and take possession of the Work and of all Contractor's tools, appliances, construction equipment, and machinery at the Site, and use the same to the full extent they could be used by Contractor (without liability to Contractor for trespass or conversion);
 2. incorporate in the Work all materials and equipment stored at the Site or for which Owner has paid Contractor but which are stored elsewhere; and
 3. complete the Work as Owner may deem expedient.
- C. If Owner proceeds as provided in Paragraph 15.02.B, Contractor shall not be entitled to receive any further payment until the Work is completed. If the unpaid balance of the Contract Price exceeds all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) sustained by Owner arising out of or relating to completing the Work, such excess will be paid to Contractor. If such claims, costs, losses, and damages exceed such unpaid balance, Contractor shall pay the difference to Owner. Such claims, costs, losses, and damages incurred by Owner will be reviewed by Engineer as to their reasonableness and, when

so approved by Engineer, incorporated in a Change Order. When exercising any rights or remedies under this Paragraph, Owner shall not be required to obtain the lowest price for the Work performed.

- D. Notwithstanding Paragraphs 15.02.B and 15.02.C, Contractor's services will not be terminated if Contractor begins within seven days of receipt of notice of intent to terminate to correct its failure to perform and proceeds diligently to cure such failure within no more than 30 days of receipt of said notice.
- E. Where Contractor's services have been so terminated by Owner, the termination will not affect any rights or remedies of Owner against Contractor then existing or which may thereafter accrue. Any retention or payment of moneys due Contractor by Owner will not release Contractor from liability.
- F. If and to the extent that Contractor has provided a performance bond under the provisions of Paragraph 5.01.A, the termination procedures of that bond shall supersede the provisions of Paragraphs 15.02.B and 15.02.C.

15.03 Owner May Terminate For Convenience

- A. Upon seven days written notice to Contractor and Engineer, Owner may, without cause and without prejudice to any other right or remedy of Owner, terminate the Contract. In such case, Contractor shall be paid for (without duplication of any items):
 - 1. completed and acceptable Work executed in accordance with the Contract Documents prior to the effective date of termination, including fair and reasonable sums for overhead and profit on such Work;
 - 2. expenses sustained prior to the effective date of termination in performing services and furnishing labor, materials, or equipment as required by the Contract Documents in connection with uncompleted Work, plus fair and reasonable sums for overhead and profit on such expenses;
 - 3. all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) incurred in settlement of terminated contracts with Subcontractors, Suppliers, and others; and
 - 4. reasonable expenses directly attributable to termination.
- B. Contractor shall not be paid on account of loss of anticipated profits or revenue or other economic loss arising out of or resulting from such termination.

15.04 Contractor May Stop Work or Terminate

- A. If, through no act or fault of Contractor, (i) the Work is suspended for more than 90 consecutive days by Owner or under an order of court or other public authority, or (ii) Engineer fails to act on any Application for Payment within 30 days after it is submitted, or (iii) Owner fails for 30 days

to pay Contractor any sum finally determined to be due, then Contractor may, upon seven days written notice to Owner and Engineer, and provided Owner or Engineer do not remedy such suspension or failure within that time, terminate the Contract and recover from Owner payment on the same terms as provided in Paragraph 15.03.

- B. In lieu of terminating the Contract and without prejudice to any other right or remedy, if Engineer has failed to act on an Application for Payment within 30 days after it is submitted, or Owner has failed for 30 days to pay Contractor any sum finally determined to be due, Contractor may, seven days after written notice to Owner and Engineer, stop the Work until payment is made of all such amounts due Contractor, including interest thereon. The provisions of this Paragraph 15.04 are not intended to preclude Contractor from making a Claim under Paragraph 10.05 for an adjustment in Contract Price or Contract Times or otherwise for expenses or damage directly attributable to Contractor's stopping the Work as permitted by this Paragraph.

ARTICLE 16 – DISPUTE RESOLUTION

16.01 Methods and Procedures

- A. Either Owner or Contractor may request mediation of any Claim submitted to Engineer for a decision under Paragraph 10.05 before such decision becomes final and binding. The mediation will be governed by the Construction Industry Mediation Rules of the American Arbitration Association in effect as of the Effective Date of the Agreement. The request for mediation shall be submitted in writing to the American Arbitration Association and the other party to the Contract. Timely submission of the request shall stay the effect of Paragraph 10.05.E.
- B. Owner and Contractor shall participate in the mediation process in good faith. The process shall be concluded within 60 days of filing of the request. The date of termination of the mediation shall be determined by application of the mediation rules referenced above.
- C. If the Claim is not resolved by mediation, Engineer's action under Paragraph 10.05.C or a denial pursuant to Paragraphs 10.05.C.3 or 10.05.D shall become final and binding 30 days after termination of the mediation unless, within that time period, Owner or Contractor:
1. elects in writing to invoke any dispute resolution process provided for in the Supplementary Conditions; or
 2. agrees with the other party to submit the Claim to another dispute resolution process; or
 3. gives written notice to the other party of the intent to submit the Claim to a court of competent jurisdiction.

ARTICLE 17 – MISCELLANEOUS

17.01 Giving Notice

- A. Whenever any provision of the Contract Documents requires the giving of written notice, it will be deemed to have been validly given if:

1. delivered in person to the individual or to a member of the firm or to an officer of the corporation for whom it is intended; or
2. delivered at or sent by registered or certified mail, postage prepaid, to the last business address known to the giver of the notice.

17.02 Computation of Times

- A. When any period of time is referred to in the Contract Documents by days, it will be computed to exclude the first and include the last day of such period. If the last day of any such period falls on a Saturday or Sunday or on a day made a legal holiday by the law of the applicable jurisdiction, such day will be omitted from the computation.

17.03 Cumulative Remedies

- A. The duties and obligations imposed by these General Conditions and the rights and remedies available hereunder to the parties hereto are in addition to, and are not to be construed in any way as a limitation of, any rights and remedies available to any or all of them which are otherwise imposed or available by Laws or Regulations, by special warranty or guarantee, or by other provisions of the Contract Documents. The provisions of this Paragraph will be as effective as if repeated specifically in the Contract Documents in connection with each particular duty, obligation, right, and remedy to which they apply.

17.04 Survival of Obligations

- A. All representations, indemnifications, warranties, and guarantees made in, required by, or given in accordance with the Contract Documents, as well as all continuing obligations indicated in the Contract Documents, will survive final payment, completion, and acceptance of the Work or termination or completion of the Contract or termination of the services of Contractor.

17.05 Controlling Law

- A. This Contract is to be governed by the law of the state in which the Project is located.

17.06 Headings

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

DIVISION 1 - GENERAL REQUIREMENTS

SECTION 01010

SUMMARY OF WORK

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

Plans, General Conditions, Supplementary Conditions, and Specification Sections apply to this Section.

1.2 PROJECT DESCRIPTION

- A. The Project: The Project consists of an upgrade to the landfill gas flare control system at the Salem County Solid Waste Complex, as summarized below and shown on the Contract Documents. The landfill is located in Alloway Township, New Jersey.
- B. The Work: The Work to be performed by the CONTRACTOR under this project consists of performing all work and providing all labor, services, tools, machinery, equipment, and materials necessary to complete the project. The Work includes but is not limited to the following items:
1. Construction surveying and layout.
 2. Miscellaneous site work including temporary erosion and sediment control, cleanup, and restoration.
 3. Providing temporary field offices, sanitary facilities, electrical service, and communication equipment for the Contractor's use as needed.
 4. Other work required by the Contract Documents.
 5. Procure and maintain a rental flare for duration of project, sized appropriately to maintain vacuum on the gas collection system and to handle landfill gas destruction.
 6. Replace heat trace wiring and pipe insulation on connections to the existing knockout pot (KOP).
 7. Install new control panel, VFD(s), connection of wiring and conduit, and replacement of sensors and accessories supplied by others under this contract.

8. Installation and connection of remote monitoring (RMC) equipment designed and fabricated by others. As noted on the drawings, some RMC connections in the field will be accomplished by others.
9. All structural supports and electrical connections to provide a functioning system to provide vacuum to the gas collection system and convey the collected gas to the existing flare.

1.3 CONTRACTOR USE OF PREMISES

- A. **Work Days:** The CONTRACTOR shall have equipment and material delivery access to and from the site from 7:30 a.m. to 3:30 p.m., Monday through Friday, and 8:00 a.m. to 12:00 p.m. on Saturdays (Salem County holidays are excluded). The CONTRACTOR will be allowed to work on the landfill outside of these hours provided the CONTRACTOR receives prior approval from the OWNER.
- B. **Access:** At least one week before work is started, the CONTRACTOR shall arrange with the OWNER a sequence of procedures, means of access, space for storage of materials and equipment, and use of approaches and roadways. CONTRACTOR's use of the premises shall be confined to the areas approved by the OWNER.
- C. **Smoking:** Smoking is prohibited on the landfill.
- D. **Site Access:** Access the landfill surface by the existing haul road along the northeast side of the landfill.

1.4 OWNER OCCUPANCY AND LANDFILL OPERATIONS

The OWNER will occupy the site and continue to conduct landfill operations at the active landfill cells. THE CONTRACTOR shall cooperate with the OWNER during construction operations to minimize conflicts and facilitate OWNER usage. The CONTRACTOR shall perform the Work so as not to interfere with the OWNER's landfill operations and maintenance, environmental monitoring, and other OWNER activities at the site.

1.5 SITE CONDITIONS

- A. **Historical Use of Site:** The Project is to be constructed in the vicinity of ongoing landfill gas flaring operations and other active supporting equipment, both electrical and pneumatic. The CONTRACTOR shall enforce safety procedures to minimize hazards to workers, the public, and the environment.
- B. **Existing Grades:** The existing grades may vary from those indicated on the Drawings.
- C. **Existing Features:** CONTRACTOR is required to field verify the location of existing features. The OWNER's record drawings are available to the

CONTRACTOR to field verify existing features. The existence and location of existing features are not guaranteed. Before beginning site work, the CONTRACTOR is to investigate and verify the existence and location of underground utilities and existing features. The OWNER and the ENGINEER take no responsibility for the accuracy of these record drawings implied or otherwise.

- D. Field Verification: Prior to construction, verify the location of existing features at points of connection or tie-in to the Work.
- E. Field Conditions and Measurements: The CONTRACTOR shall base all measurements, both horizontal and vertical, from established benchmarks. The CONTRACTOR shall be responsible for field verification of all dimensions and conditions at the job site.
- F. Discrepancies: Should the CONTRACTOR discover any discrepancy between actual conditions and those indicated which prevent following good practice or the intent of the Drawings and Specifications, he shall notify the ENGINEER, request clarification and instructions, and shall not proceed with his work until he has received the same from the ENGINEER.

1.6 SUBMITTALS

- A. Site Health and Safety Plan: The work at the landfill is within a zone of potential landfill leachate and landfill gas migration. The CONTRACTOR is responsible for site health and safety for his employees. The OWNER and ENGINEER will make available to the selected CONTRACTOR relevant laboratory analysis of landfill gas and landfill leachate on request. Within 15 days before starting work, the CONTRACTOR shall prepare a Site Health and Safety Plan, and provide a copy of this Plan to the ENGINEER and the OWNER for informational purposes only. The Site Health and Safety Plan shall be prepared in accordance with applicable provisions of OSHA regulations 29 CFR 1910.120 and 1926, and "A Compilation of Landfill Gas Field Practices and Procedures", prepared by SWANA Landfill Gas Division, dated August 2011. A copy of the SWANA report is appended to this document.
- B. Resume of proposed full time on-site superintendent.

1.7 PROPOSED SEQUENCE OF CONSTRUCTION

- A. Project stakeout and utility verification.
- B. Site preparation to receive and install rental portable landfill gas flare.
- C. Coordination to disconnect and demolish selected equipment.
- D. Installation and testing of newly installed, upgraded, or replaced equipment.

- E. System activation coordination.
- F. Deactivation of rental portable landfill gas flare.
- G. Restore disturbed areas to original condition.

1.8 SUPERINTENDENT

Provide a single qualified full time superintendent for the duration of the project. CONTRACTOR shall not change superintendent without OWNER's written permission. CONTRACTOR's proposal to change personnel must be justifiable to the OWNER, and must demonstrate that the proposed replacement possesses adequate qualifications.

PART 2 PRODUCTS (Not Applicable)

PART 3 EXECUTION (Not Applicable)

END OF SECTION

SECTION 01025

MEASUREMENT AND PAYMENT

PART 1 - GENERAL

1.1 DESCRIPTION

- A. The items listed in Part 3.1 below, refer to and are the same pay items listed on the Bid Proposal Form. They constitute all of the lump sum and unit cost pay items for the completion of the work.

No direct or separate payment will be made for providing miscellaneous temporary or accessory works, services, including OWNER's and CONTRACTOR'S field offices and sheds, job signs, sanitary requirements, testing, safety devices, submittals, record drawings, water supplies, dust controls, power, maintaining traffic, removal of contractor generated waste, watchmen, security, bonds, insurance, and all other conditions of the General Conditions. Compensation for all such labor, materials, and services shall be included in the bid prices stipulated for the lump sum and unit cost pay items.

- B. Each lump sum and unit price bid price will be deemed to include an amount considered by the CONTRACTOR to be adequate compensation to cover the CONTRACTOR'S overhead and profit for each of the separately identified pay items.
- C. CONTRACTOR mobilization and demobilization shall be paid for separately with a lump sum pay item. The amount the CONTRACTOR Bids for the MOBILIZATION/DEMobilIZATION pay item shall not exceed 5% of the Contract Bid amount without mobilization. The CONTRACTOR shall be allowed to request a partial payment for mobilization of up to 70% of the Lump Sum bid price after the completion of mobilization, and request for the remaining balance of the Lump Sum bid price after the completion of demobilization.
- D. Construction staking, layout surveys, as-built drawings, and construction quality control shall not be paid for separately and shall be included in the bid prices stipulated for the lump sum and unit price pay items.
- E. Siltation and erosion controls including, but not limited to silt fencing and super silt fencing, erosion control matting, and other measures, and compliance with all stormwater management/sediment control regulations shall not be paid for

separately and shall be included in the bid prices stipulated for the lump sum and unit price pay items.

- F. All CONTRACTOR Health and Safety provisions to perform the work will not be paid for separately and shall be included in the bid prices stipulated for the lump sum and unit price pay items.
- G. CONTRACTOR shall locate existing utilities prior to excavation. Utility location shall not be paid for separately and shall be included in the bid prices stipulated for the lump sum and unit pay items.
- H. Monthly Payment Applications for Lump Sum or Unit Price Items in progress shall be based on the percent complete at the end of each month as determined by the ENGINEER. During the last week of each month, the CONTRACTOR is responsible for providing the ENGINEER and OWNER with records of construction that has occurred during the month. The ENGINEER will consider the information provided by the CONTRACTOR and other information as necessary before making a determination on the percent complete on each pay item for the month. The CONTRACTOR's monthly payment application should reflect the percent complete for each pay item as determined by the ENGINEER.

1.2 RELATED DOCUMENTS

- A. Plans and general provisions of the contract, including General Provisions and Special Provisions and other Specification Sections, apply to this Section.

1.3 SUMMARY

- A. This Section specifies administrative and procedural requirements for lump sum, unit price, and contingency pay items.
 - 1. A lump sum price is an amount proposed by Bidders and stated on the Bid Form as a price where measurement will not be made for payment for materials, services and/or work identified in the plans and specifications for a particular pay item. The CONTRACTOR will not be entitled to any adjustment in a lump sum bid price as a result of any change caused by a variation in quantities as a result of more accurate measurements. The CONTRACTOR agrees to accept the aforesaid lump sum bid price as complete and total compensation for all work to be performed under a lump sum pay item.

2. A unit price is an amount bid and stated on the Bid Proposal Form as a price per unit of measurement based on the measured quantities for materials and/or services.
3. Additional work may be required during the progress of the project primarily due to changing landfill conditions. The unit price proposed by the bidders and stated on the Bid Form as a price per unit of measurement of work completed that will be added to the project by field order or work change directive. A Field Order will be issued to the CONTRACTOR by the ENGINEER for additional work deemed necessary by the OWNER. It will be the responsibility of the CONTRACTOR to request additional time (if needed) to be added to the Contract Time Period for any work added to the project by Field Order.
4. Lump sum prices include all necessary material, labor, equipment, overhead, profit and applicable taxes.
5. The OWNER reserves the right to reject the CONTRACTOR's measurement of work-in-place that involves use of established unit cost bid prices, and instead to have this work measured by an independent surveyor at the OWNER'S expense.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION

3.1 MEASUREMENT AND PAYMENT

ITEM 1 MOBILIZATION

Measurement and Payment: Measurement of the various items of work for Mobilization will be made for payment and all items shall be included in the Contract Lump Sum Price.

Payment for Mobilization shall be made at the Contract Lump Sum Price which price and payment shall be full compensation for the preparatory work and operations in mobilizing for the commencement of the work including, but not limited to, those operations necessary for the movement of personnel, equipment, supplies, and incidentals to the project site, and for any other pre-construction expense necessary for the start of the work. Mobilization and Demobilization shall also include bonds; permits; utility services; sanitary facilities; temporary field offices for CONTRACTOR and OWNER/ ENGINEER; construction photographs; surveying; field measurements for payment, and record drawings.

The lump sum price for Mobilization and Demobilization shall not exceed 5% of the of the Contract Bid amount without mobilization. The CONTRACTOR shall be allowed to request a partial payment for mobilization of up to 70% of the Lump Sum bid price after the completion of mobilization, and request for the remaining balance of the Lump Sum bid price after the completion of demobilization.

ITEM 2 FLARE CONTROL PANEL & MOTOR STARTER CONTROL PANEL

Measurement and Payment: Measurement for the various items of work for Flare Control Panel & Motor Starter Control Panel will be made for payment and all items shall be included in the Contract Lump Sum Price.

Payment for Flare Control Panel & Motor Starter Control Panel shall be made at the Contract Lump Sum Price which price and payment shall be full compensation for the equipment, supplies, materials, and incidentals to replace and upgrade the flare control panel and motor starter control panel and to install and connect replacement variable frequency drives (VFDs) located on the blower skid, and for any other construction expense necessary for the panel replacement.

ITEM 3 FLARE AUXILIARY PANELS

Measurement and Payment: Measurement for the various items of work for Flare Auxiliary Panels will be made for payment and all items shall be included in the Contract Lump Sum Price.

Payment for Flare Auxiliary Panels shall be made at the Contract Lump Sum Price which price and payment shall be full compensation for the equipment, supplies, materials, and incidentals to replace and upgrade the two flare auxiliary panel enclosures located at the flare, and for any other construction expense necessary for the panel replacement.

ITEM 4 CONDENSATE SUMP & KNOCKOUT POT UPGRADES

Measurement and Payment: Measurement for the various items of work for Condensate Sump & Knockout Pot Upgrades will be made for payment and all items shall be included in the Contract Lump Sum Price.

Payment for the Condensate Sump & Knockout Pot Upgrades shall be made at the Contract Lump Sum Price which price and payment shall be full compensation for the equipment, supplies, materials, and incidentals to install condensate sump level sensor connection, replace condensate sump pump control wire conduit, replace insulation and heat trace at the knockout pot, removal of knockout pot pump, and incidentals.

ITEM 5 AIR COMPRESSOR BUILDING CONTROLS

Measurement and Payment: Measurement for the various items of work for Air Compressor Building Controls will be made for payment and all items shall be included in the Contract Lump Sum Price.

Payment for Air Compressor Building Controls shall be made at the Contract Lump Sum Price which price and payment shall be full compensation for the project layout utility location, site preparations, equipment, supplies, materials, and incidentals to run signal wire from new flare control panel to the air compressor inside the air compressor building, using new and existing conduit.

ITEM 6 STARTUP AND TRAINING

Measurement and Payment: Measurement for the various items of work for Startup and Training will be made for payment and all items shall be included in the Contract Lump Sum Price.

Payment for Startup and Training shall be made at the Contract Lump sum Price which price and payment shall be full compensation for the startup operations and testing of newly installed equipment and components and the on-site training of staff on new equipment in practices of their startup, shutdown, operation, troubleshooting, and maintenance. Contractor shall be on site for a minimum of three (3) days during flare system startup to provide troubleshooting and to identify any defects requiring corrective action. Indicate special procedures; provide parts list, spare parts to be kept on site, and contact information for technical support.

ITEM 7 RENTAL FLARE

Measurement and Payment: Measurement for the various items of work for the Rental Flare will be made for payment and all items shall be included in the Contract Lump Sum Price.

Payment for the Rental Flare shall be made at the Contract Lump sum Price which price and payment shall be full compensation for the procurement, delivery, site preparations, setup, tear down, operation, and maintenance of the Rental Flare throughout the duration of the project. Setup, operation, and tear down procedures to include all equipment, supplies, materials, and incidentals to connect the rental flare to the landfill gas collection system, electrical connection, and related appurtenances.

ITEM 8 SHADE FENCE

Measurement and Payment: Measurement for the various items of work for the Shade Fence will be made for payment and all items shall be included in the Contract Lump Sum Price.

Payment for the Shade Fence shall be made at the Contract Lump sum Price which price and payment shall be full compensation for the project layout, utility location, site preparations, equipment, materials, and construction.

END OF SECTION

SECTION 01200

PROJECT MEETINGS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division-1 Specification Sections, apply to this Section.

1.2 SUMMARY

This Section specifies administrative and procedural requirements for project meetings including but not limited to:

- A. Pre-Construction Conference
- B. Progress Meetings

1.3 DESCRIPTION

The ENGINEER will schedule and administer a preconstruction conference, weekly construction progress meetings, and specially called meetings throughout the progress of work. The ENGINEER will be responsible for preparing the agenda, making arrangements, preparing the meeting minutes and presiding at these meetings.

Representatives of CONTRACTOR, Subcontractor(s), and Suppliers attending these meetings shall be qualified and authorized to act on behalf of the entity each represents.

1.4 PRECONSTRUCTION CONFERENCE

Within fifteen (15) days after the Notice to Proceed and before starting the work, a joint meeting shall be held with representatives of the OWNER, ENGINEER, CONTRACTOR and his Superintendent and other invited parties or government agencies which may be affected by or have jurisdiction over the project. This meeting is intended to introduce the various key personnel from each organization and to discuss the Contract Documents, the start of construction, order of work, labor and legal requirements, approved insurance requirements, names of the major subcontractors, method of payment, shop drawing submittal schedule, protection of existing facilities and other pertinent items associated with the Project. The CONTRACTOR shall bring three (3) copies of a construction schedule to this meeting.

The suggested agenda for the preconstruction meeting as applicable:

- A. Introduction of key personnel and roles
- B. Overview of project
 - 1. Project summary
 - 2. Contract completion time
 - 3. Liquidated damages
 - 4. Guarantee of work
- C. Project schedule
- D. Critical work sequencing
- E. Labor requirements
- F. Relationship and coordination with:
 - 1. Other Contracts
 - 2. On-going landfill operations
- G. Use of premises
 - 1. Right-of-ways and easements
 - 2. Access and traffic control
 - 3. Office, work and storage areas
 - 4. Temporary facilities/utilities
 - 5. Safety and first aid procedures
 - 6. Security procedures
 - 7. Posting of signs
 - 8. Clean-up procedures
 - 9. OWNER requirements
- H. Procedures and processing of:
 - 1. Field decisions
 - 2. Change orders
 - 3. Applications for payment
 - 4. Partial payments
 - 5. Record documents
 - 6. Shop drawings
 - 7. Request for extension of Contract time
- I. Construction facilities, controls and aids
- J. Staking of work
- K. Equipment to be used
- L. Material/manufacturers/suppliers to be used
- M. Major equipment/material deliveries
- N. On-site material storage requirements
- O. Laboratory testing of materials
- P. Project inspections
- Q. Permit requirements

1.5 PROGRESS MEETINGS

During the course of the Contract, progress meetings will be organized and conducted by the ENGINEER to discuss the progress of the Contract weekly. The CONTRACTOR and his construction superintendent shall attend these meetings.

The suggested agenda for these meetings:

- A. Review minutes of previous meeting.
- B. Review of work progress since previous meeting.
- C. Field observations, problems, conflicts.
- D. Problems which impede the construction schedule.
- E. Review of off-site fabrication and delivery schedules (critical/long-lead items).
- F. Corrective measures and procedures to regain projected schedule.
- G. Revisions to construction schedule.
- H. Progress scheduled during next work period.
- I. Shop drawing submittals.
- J. Maintenance of quality standards.
- K. Pending changes and substitutions.
- L. Review proposed changes for:
 - 1. Effect on construction schedule and on completion date.
 - 2. Effect on other Contracts of the project.
- M. Other business.

END OF SECTION

SECTION 01300

SUBMITTALS

PART 1 – GENERAL

1.01 DESCRIPTION

A. Scope of Work: The CONTRACTOR shall develop and distribute project submittals in accordance with procedures specified herein. The required submittals include, but are not limited to the following:

1. Construction progress schedules
2. Proposed products list
3. Product data
4. Shop drawings
5. Samples
6. Certificates
7. Manufacturer's instructions
8. Health and Safety Plan
9. Record Drawings
10. Survey data

B. Related Work Described Elsewhere

1. All Sections.

1.02 SUBMITTAL PROCEDURES

- A. Transmit each submittal with ENGINEER accepted form. Electronic submittals are acceptable and preferred.
- B. Sequentially number the transmittal form. Revise submittals with original number and a sequential alphabetic suffix.
- C. Identify Project, CONTRACTOR, Subcontractor or supplier; pertinent drawing and detail number, and specification section number, as appropriate.
- D. Apply Contractor's stamp, signed or initialed certifying that review, approval, verification of Products required, field dimensions, adjacent construction Work, and coordination of information is in accordance with the requirements of the Work and Contract Documents.
- E. Schedule submittals to expedite the Project, and deliver to ENGINEER at business address. Coordinate submission of related items.

- F. For each submittal, allow 10 days for review (excluding delivery time to and from the CONTRACTOR, if hard copies are submitted).
- G. Identify variations from Contract Documents and Product or system limitations which may be detrimental to successful performance of the completed Work.
- H. When revised for resubmission, identify all changes made since previous submission.
- I. Distribute copies of reviewed submittals as appropriate. Instruct parties to promptly report any inability to comply with requirements.
- J. Submittals not requested will not be recognized or processed.

1.03 CONSTRUCTION PROGRESS SCHEDULES

- A. Submit initial schedule in duplicate within 10 days after date of OWNER-CONTRACTOR Agreement.
- B. Revise and resubmit as required by the OWNER or ENGINEER.
- C. Submit revised schedules with each Application for Payment, identifying changes since previous version.
- D. Submit a chart with separate lines for each major portion of Work, identifying first workday of each week.
- E. Show complete sequence of construction by activity, identifying Work of separate stages and other logically grouped activities.
- F. Indicate estimated percentage of completion for each item of Work at each submission.

1.04 PROPOSED PRODUCTS LIST

- A. Within 10 days after date of OWNER-CONTRACTOR Agreement, submit list of major products proposed for use, with name of manufacturer, trade name, and model number of each product.
- B. For products specified only by reference standards, give manufacturer, trade name, model or catalog designation, and reference standards.

1.05 PRODUCT DATA

A. Product Data for Review:

1. Submitted to ENGINEER for review for the limited purpose of checking for conformance with information given and the design concept expressed in the contract documents.
2. After review, provide copies and distribute in accordance with SUBMITTAL PROCEDURES article above and for record documents purposes described in Section 01700.

B. Product Data for Information:

1. Submitted for the ENGINEER'S knowledge as contract administrator or for the OWNER.

C. Product Data for Project Closeout:

1. Submitted for the OWNER'S benefit during and after project completion.

D. Submit the number of copies required by the CONTRACTOR, plus two copies which will be retained by the ENGINEER.

E. Mark each copy to identify applicable products, models, options, and other data. Supplement manufacturers' standard data to provide information specific to this Project.

F. After review distribute in accordance with the Submittal Procedures article above and provide copies for record documents described in Section 01700.

1.06 SHOP DRAWINGS

A. Shop Drawings for Review:

1. Submitted to ENGINEER for review for the limited purpose of checking for conformance with information given and the design concept expressed in the contract documents.
2. After review, produce copies and distribute in accordance with SUBMITTAL PROCEDURES article above and for record documents purposes described in Section 01700.

B. Shop Drawings for Information to be submitted for the ENGINEER'S knowledge as contract administrator or for the OWNER.

- C. Shop Drawings for Project Closeout to be submitted for the OWNER'S benefit during and after project completion.
- D. Submit the number of opaque reproductions which CONTRACTOR requires, plus two copies which will be retained by ENGINEER. Electronic versions are acceptable.

1.07 CERTIFICATES

- A. When specified in individual specification sections, submit certification by the manufacturer, installation/application subcontractor, or the CONTRACTOR to ENGINEER, in quantities specified for Product Data.
- B. Indicate material or Product conforms to or exceeds specified requirements. Submit supporting reference data, affidavits, and certifications as appropriate.
- C. Certificates may be recent or previous test results on material or Product, but must be acceptable to ENGINEER.

1.08 MANUFACTURER'S INSTRUCTIONS

- A. When specified in individual specification sections, submit printed instructions for delivery, storage, assembly, installation, start-up, adjusting, and finishing, to ENGINEER for delivery to OWNER in quantities specified for Product Data.
- B. Indicate special procedures, parts list, spare parts to be kept on hand, perimeter conditions requiring special attention, and special environmental criteria required for application or installation.

1.9 HEALTH AND SAFETY PLAN

- A. The CONTRACTOR shall develop a Health and Safety Plan, which specifically addresses the Work to be performed, in accordance with OSHA requirements and SWANA Landfill Gas Field Practices and Procedures (August 2011). The CONTRACTOR is directed particularly in Section H of the SWANA document with regard to drilling procedures. The Health and Safety Plan shall include provisions which anticipate possible exposure to waste materials, landfill gas, and other related conditions during installation of the wells, probes, piping, and other aspects of the Work.
- B. The CONTRACTOR shall submit a complete Health and Safety Plan to the OWNER and ENGINEER prior to commencing the Work for informational purposes. The CONTRACTOR will not be allowed to commence the Work until a Health and Safety Plan has been submitted. The CONTRACTOR and Subcontractor shall be solely responsible for the health and safety of their employees.

1.11 RECORD DRAWINGS

Submit record drawings in accordance with Section 01700.

PART 2 – PRODUCTS (Not Used)

PART 3 – EXECUTION (Not Used)

END OF SECTION

SECTION 01500

MOBILIZATION, FACILITIES, AND TEMPORARY CONTROLS

PART 1 – GENERAL

1.01 DESCRIPTION

- A. Scope of Work: The CONTRACTOR shall provide all labor, materials, equipment and incidentals required to provide the following:
 - 1. Mobilization.
 - 2. Temporary Controls: Enclosures and fencing, protection of the Work, water control, onsite facilities, electricity, and rental portable landfill gas flare procurement, delivery, installation, and removal.
 - 3. Demobilization.
- B. Related Work Described Elsewhere
 - 1. Section 01700 – Contract Closeout

1.02 MOBILIZATION

Mobilization shall include the obtaining of all permits, bonds, and insurance; transportation to the site of all equipment and construction facilities; connection of all temporary utilities and services, and all other preparatory work and operations required for the proper performance, and completion of the Work. The CONTRACTOR shall provide independent, temporary utilities and services and shall not utilize the landfill facilities during construction.

- A. Temporary Electricity. CONTRACTOR to provide temporary electrical service during construction at no additional cost to OWNER, if required for health and safety or other reasons during performance of the Work.
- B. Temporary Water Service. Provide, maintain and pay for suitable quality potable water service as required for CONTRACTOR'S needs at time of project mobilization. The OWNER will not provide a source of water for CONTRACTOR or Subcontractor personnel or, if needed, for construction purposes.
- C. Temporary Sanitary Facilities. CONTRACTOR to provide and maintain separate sanitary facilities and enclosures during construction. Provide at time of project mobilization.

1.03 TEMPORARY CONTROLS

- A. Work Area Designation. Fencing and/or orange cones shall be used to mark the active construction area or other areas of safety concern during construction. The CONTRACTOR shall minimize the active construction area.
- B. Water Control. Maintain excavations free of water. Provide, operate, and maintain pumping equipment.
- C. Protection of Installed Work
 - 1. Protect installed Work and provide special protection where specified in individual specification sections.
 - 2. Provide temporary and removable protection for installed Products. Control activity in immediate work area to prevent damage.
- D. Security
 - 1. The CONTRACTOR shall provide security and facilities necessary to protect Work, existing construction facilities, and OWNER'S operations from unauthorized entry, vandalism, or theft, to the extent practical.
 - 2. Coordinate with OWNER'S and other's security programs.
- E. Access Roads
 - 1. Designated existing on-site access roads shall be used for construction traffic.
 - 2. Provide means of removing mud from vehicle wheels before entering streets.
 - 3. Coordinate with Facility operator prior to roadway or parking lot work that will impede traffic, and arrange for appropriate traffic control for the safety of work crew and facility users and to protect the Work.
- F. Progress Cleaning
 - 1. Maintain areas away from excavating activities free of waste materials, debris, and rubbish. Maintain site in a clean and orderly condition.

1.04 DEMOBILIZATION

Demobilization includes removing from the site any private or public properties which were accessed by the CONTRACTOR to perform the Work, all resources, equipment, materials, temporary support facilities, utilities, and all remaining construction debris at the completion of the project.

PART 2 – PRODUCTS

2.01 RENTAL BLOWER/FLARE DESCRIPTION

- A. Scope of Work: The CONTRACTOR shall provide all labor, materials, equipment and incidentals required to provide the following:
1. Procurement and delivery of a rental portable landfill gas flare with blower. The flare shall be a utility/candle flare with wind shroud and automated propane ignition.
 2. Site preparation for use of rental flare including earthwork preparation, electrical connections, and connections to the gas collection and conveyance system. A blind flange connection (2 location options) is available for connecting to the inlet of the blower provided with the rental flare.
 3. Maintenance and operation of rental flare for the duration of the project.
 4. Disconnect and remove rental flare and restore site conditions to original condition.

2.02 RENTAL BLOWER/FLARE SKID

- A. The CONTRACTOR is to procure (rent) and install a temporary blower/flare skid to handle all landfill gas flows for the duration of the project. The rental flare shall be skid-mounted and shall include ancillary equipment including knockout pot, blower(s), isolation valves, and flow meter.
- B. Controls and accessories to include the following:
- Propane supply with a spark plug igniter for flame ignition.
 - Thermocouple for flame temperature confirmation.
 - Ultraviolet flame scanner or thermocouple for flame confirmation.
 - Flare control panel.
 - Auto re-start on loss of flame.
 - Automatic dialer system for failure to restart.
 - Pneumatically-operated emergency shut-off valve.
 - Flow meter.
 - Data recorder to record flow rate.
 - Flame arrester.

C. The equipment shall be furnished by a supplier who is fully experienced and qualified in the use of this type of equipment for landfill gas applications. The equipment shall be designed and fabricated in accordance with the best available practices and methods. Following is a list of potential suppliers of blower/flare skid rental units for this application.

1. Edgeboro; Chris Lee; 253-861-4812; Clee@edgeboro.com
2. Ryan Equipment Sales; David Ryan; 610-517-2400; ryanequipment@aol.com
3. Perennial Energy, Inc.; Brad Alexander; 417-256-2002; balexander@perennialenergy.com

2.03 PERFORMANCE CRITERIA

A. The blower(s) and flare shall be designed for continuous operation in an outdoor environment and shall conform to the following, measured at standard 14.7 psia and 68 degrees F condition:

Rated Flare Capacity, MMBtu/hr (HHV):	15
Anticipated gas flow, scfm:	500
Site elevation, MSL:	30
Gas composition:	
Methane	45-55 percent
Carbon Dioxide	40-50 percent
Oxygen	0-5 percent
Trace gases	0-1 percent
LFG moisture content, percent:	100
Blower inlet vacuum, inches water column	40
Approximate Landfill gas inlet temperature, °F	80
Approximate motor horsepower:	15

B. When rated volumetric capacity is reduced to 40 percent of design, blowers under the specified inlet conditions shall not surge or overload the motor.

2.6 IGNITION PROCEDURE

A. The pilot and main flame shall be controlled by ultraviolet (UV) scanner (optional), thermocouples, solenoids, relays, and timers (or PLC) to perform the following functions:

1. Spark ignition of propane gas creates pilot flame that ignites LFG main flame.
2. When pilot is successfully ignited, blower(s) and actuator valve on flare inlet are activated.

3. When main flame is successfully ignited (as detected by a UV scanner or thermocouple), pilot propane gas is shut off.
4. If pilot is not ignited after three attempts within the pre-selected time interval, the pilot is shut off, a trouble light is illuminated and alarm sent (via the autodialer).
5. If main flame is not ignited within the pre-selected time interval, the pilot is shut off, and the trouble light is illuminated and alarm sent.
6. If the main flame fails, the blower(s) is turned off, and the inlet valve is closed and alarm sent.
7. In the event of loss of flame, the flare and blower(s) shall automatically restart after an adjustable time delay of 5 to 15 minutes.

2.04 PRODUCT DELIVERY, STORAGE, AND HANDLING

- A. All parts shall be properly protected so that no damage or deterioration will occur during a prolonged delay from the time of shipment until installation is completed and the units and equipment are ready for operation.
- B. The equipment shall be delivered on site as fully assembled as transportation will allow.

PART 3 – EXECUTION

3.01 INSTALLATION

- A. All equipment shall be installed in strict accordance with the manufacturer's recommendations and codes and standards.
- B. All skid-mounted equipment shall be installed plumb and perpendicular to piping.
- C. The CONTRACTOR shall connect the inlet of the blower/flare skid to the existing blind flange indicated on the drawings to allow the flow of landfill gas to the rental flare. The supplier may assist in this effort.
- D. The CONTRACTOR shall provide for electrical power to the blower/flare skid by installing the necessary conductors and conduit to connect to existing 3-phase power available in the vicinity of the existing flare station. Several options exist and will be discussed at the pre-bid meeting.
- E. The CONTRACTOR shall coordinate the electrical work with the equipment manufacturer and panel fabricator to provide a complete, integrated, and automatic system.

- F. The CONTRACTOR shall sequence the installation and programming of this work so that there is no complete system shutdown (meaning no gas combustion in either the rental flare or permanent flare) extending greater than 6 hours in any 24-hour period.

3.02 START-UP AND TESTING

- A. Functional and Validation Tests. Upon completion of the installation, functional and validation tests shall be performed by the CONTRACTOR with the assistance of the supplier's representative, in the presence of the ENGINEER.

3.03 DEMONSTRATIONS

- A. Demonstrations shall be separate from the installation, startup, and equipment adjustment services described in 3.02 above. System operations under all alarm conditions shall be demonstrated. Some of these alarm conditions may be simulated (e.g., via electrical jumpers) for demonstration purposes.
- B. The Demonstration Test shall demonstrate that all items of these Specifications have been met by the equipment as installed and shall include, but not be limited to, the following tests:
 - 1. That the system has been properly installed and all parts are in correct alignment.
 - 2. That there are no mechanical or electrical defects in any of the parts.
 - 3. That the controls perform satisfactorily, including automatic starting and stopping, manual operation, safety shutdowns, autodialer operation, and under all alarm conditions.

END OF SECTION

SECTION 01600

MATERIALS AND EQUIPMENT

PART 1 – GENERAL

1.01 DESCRIPTION OF REQUIREMENTS

- A. CONTRACTOR furnished materials and equipment shall be new and shall not have been in service at any other installation unless otherwise approved in writing by the OWNER and ENGINEER. Material and equipment shall conform to applicable specifications unless otherwise approved in writing by the ENGINEER.
- B. Fabricated and manufactured products shall be designed, fabricated, and assembled in accordance with the best engineering and shop practices. Like parts of duplicate units shall be manufactured to standard sizes and gages to be interchangeable.
- C. Two or more items of the same kind shall be identical, by the same manufacturer.
- D. Products shall be suitable for the intended service conditions.
- E. Equipment dimensions, sizes, and capacities shown or specified shall be adhered to unless variations are specifically approved in writing by the ENGINEER.
- F. Equipment and material shall not be used for any purpose other than that for which it is specified or designed.
- G. Where equipment or material is specifically shown or specified to be reused in the work, special care shall be used in removal, handling, storage, and reinstallation, to assure proper function in the completed Work.
- H. CONTRACTOR shall arrange for transportation, storage, and handling of products which require off-site storage, restoration, or renovation.
- I. Installation of all Work shall comply with manufacturer's printed instructions. CONTRACTOR shall obtain and distribute copies of the manufacturer's instructions to the parties involved in the installation, including two (2) copies to the ENGINEER. Also a set of instructions shall be available at the job site during installation and until completion. All equipment and products shall be handled, installed, connected, cleaned, conditioned, and adjusted in accordance with the manufacturer's instructions and specified instructions. Should specified requirements or job conditions conflict with the manufacturer's instructions, these conflicts shall be called to the ENGINEER's attention for review.

- J. All materials and equipment which are furnished and/or installed by the CONTRACTOR shall be guaranteed. The guarantee shall be against manufacturing and/or design inadequacies, materials and workmanship not in conformity with the paragraph above, hidden damage, improper assembly, failure of device and/or components, excessive leakage or other circumstances which would cause the equipment to fail under normal design and/or specific operating conditions for a period of one year or a longer period as may be shown and/or specified from the date of acceptance of the equipment by the OWNER. If a piece of equipment, device, or component shall fail within the above specified term of the guarantee, it shall be replaced and installed with reasonable promptness by the CONTRACTOR without cost to the OWNER.

1.02 TRANSPORTATION AND HANDLING

- A. Equipment and materials shall be loaded and unloaded by methods affording adequate protection against damage. Precaution shall be taken to prevent injury to the equipment or materials during transportation and handling. Suitable equipment will be used and the materials or equipment shall be under control at all times. Under no condition shall the material or equipment be dropped, bumped, or dragged.

1.03 STORAGE AND PROTECTION

- A. All equipment, products, and materials shall be stored in accordance with the manufacturer's instructions, with seals and labels intact and legible. Humidity and temperature shall be maintained within the ranges required by the manufacturer's instructions.
 - 1. Products subject to damage by the elements shall be stored in weather-tight enclosures.
 - 2. Fabricated products shall be stored above the ground on blocks or skids.
 - 3. Products which are subject to deteriorations shall be covered with impervious coatings with adequate ventilation to avoid condensation.
 - 4. Loose granular materials shall be stored in a well-drained area on solid surfaces to prevent mixing with foreign matter.
 - 5. Pipe shall be stored in a manner to prevent the entry of dirt and debris.
- B. Storage shall be arranged in such a manner so as to provide easy access for inspection. Periodic inspections shall be made of all stored products to assure that they are maintained under specified conditions, and free from damage, contamination, or deterioration.

PART 2 – PRODUCTS (Not Used)

PART 3 – EXECUTION

3.01 DEMONSTRATION AND TESTING

- A. Construct and field test all work components in accordance with the individual specifications and manufacturer requirements.
- B. Acceptability of the Work's performance will be based on the work performing as specified in the Contract Documents, either under actual or simulated operating conditions as approved by the ENGINEER. The intent of the demonstration and testing is for the CONTRACTOR to demonstrate to the OWNER and the ENGINEER that the Work will function as a completed and operable system.

END OF SECTION

SECTION 01631

PRODUCT SUBSTITUTIONS

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section specifies administrative and procedural requirements for handling requests for substitutions made after award of the Contract.
- B. The CONTRACTOR's Construction Schedule and the Schedule of Submittals are included under Section "Submittals."
- C. Standards: Refer to Section "Definitions and Standards" for applicability of industry standards to products specified.
- D. Procedural requirements governing the CONTRACTOR's selection of products and product options are included under Section "Materials and Equipment."

1.2 DEFINITIONS

- A. Definitions used in this Article are not intended to change or modify the meaning of other terms used in the Contract Documents.
- B. Substitutions: Requests for changes in products, materials, equipment, and methods of construction required by Contract Documents proposed by the CONTRACTOR after award of the Contract are considered requests for "substitutions." The following are not considered substitutions:
 - 1. Substitutions requested by Bidders during the bidding period, and accepted prior to award of Contract, are considered as included in the Contract Documents and are not subject to requirements specified in this Section for substitutions.
 - 2. Revisions to Contract Documents requested by the OWNER or ENGINEER.
 - 3. Specified options of products and construction methods included in Contract Documents.
 - 4. The CONTRACTOR's determination of and compliance with governing regulations and orders issued by governing authorities.

1.3 SUBMITTALS

- A. Substitution Request Submittal: Requests for substitution will be considered if received within 30 days after commencement of the Work. Requests received more than 30 days after commencement of the Work may be considered or rejected at the discretion of the ENGINEER.
1. Submit four (4) copies of each request for substitution for consideration. Submit requests in the form and in accordance with procedures required for Change Order proposals.
 2. Identify the product, or the fabrication or installation method to be replaced in each request. Include related Specification Section and Drawing numbers. Provide complete documentation showing compliance with the requirements for substitutions, and the following information, as appropriate:
 - a. Product Data, including Drawings and descriptions of products, fabrication and installation procedures.
 - b. Samples, where applicable or requested
 - c. A detailed comparison of significant qualities of the proposed substitution with those of the Work specified. Significant qualities may include elements such as size, weight, durability, performance and visual effect.
 - d. Coordination information, including a list of changes or modifications needed to other parts of the Work and to construction performed by the OWNER and separate CONTRACTORS that will become necessary to accommodate the proposed substitution.
 - e. A statement indicating the substitution's effect on the CONTRACTOR's Construction Schedule compared to the schedule without approval of the substitution. Indicate the effect of the proposed substitution on overall Contract Time.
 - f. Cost information, including a proposal of the net change, if any in the Contract Sum.
 - g. Certification by the CONTRACTOR that the substitution proposed is equal-to or better in every significant respect to that required by the Contract Documents, and that it will perform adequately in the application indicated. Include the CONTRACTOR's waiver of rights to additional payment or time that may subsequently become

necessary because of the failure of the substitution to perform adequately.

- B. ENGINEER's Action: Within one week of receipt of the request for substitution, the ENGINEER will request additional information or documentation necessary for evaluation of the request. Within two (2) weeks of receipt of the request, or one week of receipt of the additional information or documentation, whichever is later, the ENGINEER will notify the CONTRACTOR of acceptance or rejection of the proposed substitution. If a decision on use of a proposed substitute cannot be made or obtained within the time allocated, use the product specified by name. Acceptance will be in the form of a Change Order.

PART 2 PRODUCTS

2.1 SUBSTITUTIONS

- A. Conditions: The CONTRACTOR's substitution request will be received and considered by the ENGINEER when one or more of the following conditions are satisfied, as determined by the ENGINEER; otherwise requests will be returned without action except to record noncompliance with these requirements.
1. Extensive revisions to Contract Documents are not required.
 2. Proposed changes are in keeping with the general intent of Contract Documents.
 3. The request is timely, fully documented and properly submitted.
 4. The request is directly related to an "or equal" clause or similar language in the Contract Documents.
 5. The specified product or method of construction cannot be provided within the Contract Time. The request will not be considered if the product or method cannot be provided as a result of failure to pursue the Work promptly or coordinate activities properly.
 6. The specified product or method of construction cannot receive necessary approval by a governing authority, and the requested substitution can be approved.
 7. A substantial advantage is offered the OWNER, in terms of cost, time, energy conservation or other considerations of merit, after deducting offsetting responsibilities the OWNER may be required to bear. Additional responsibilities for the OWNER may include additional compensation to the ENGINEER for redesign and evaluation services, increased cost of other construction by the OWNER or separate CONTRACTORS, and similar considerations.

8. The specified product or method of construction cannot be provided in a manner that is compatible with other materials, and where the CONTRACTOR certifies that the substitution will overcome the incompatibility.
9. The specified product or method of construction cannot be coordinated with other materials, and where the CONTRACTOR certifies that the proposed substitution can be coordinated.
10. The specified product or method of construction cannot provide a warranty required by the Contract Documents and where the CONTRACTOR certifies that the proposed substitution provide the required warranty.
11. The CONTRACTOR's submittal and ENGINEER's acceptance of Shop Drawings, Product Data or Samples that relate to construction activities not complying with the Contract Documents does not constitute an acceptable or valid request for substitution, nor does it constitute approval.

PART 3 EXECUTION (Not Applicable)

END OF SECTION

SECTION 01700

PROJECT CLOSEOUT

PART 1 – GENERAL

1.01 DESCRIPTION

- A. Scope of Work: The CONTRACTOR shall provide all labor, materials, equipment and incidentals necessary to close out the project as specified herein. Activities may include, but are not limited to final cleaning, preparation of record documents, operations and maintenance documents, delivery of spare parts, and transfer of warranties.
- B. Related Work Described Elsewhere
 - 1. All Sections.

1.02 CLOSEOUT PROCEDURES

- A. The CONTRACTOR shall submit written certification that Contract Documents have been reviewed, Work has been inspected, and that Work is complete in accordance with Contract Documents and ready for ENGINEER'S review.
- B. Provide submittals to OWNER that are required by governing or other authorities.
- C. Submit final Application for Payment identifying total adjusted Contract Sum, previous payments, and sum remaining due.

1.03 FINAL CLEANING

- A. Execute final cleaning prior to final project assessment.
- B. Clean equipment and fixtures with cleaning materials appropriate to the surface and material being cleaned. CONTRACTOR shall remove all project related dirt, stones and other debris from the roadways, parking lot and other paved surfaces.
- C. Remove from the site all waste and surplus materials, rubbish, and construction facilities installed by the CONTRACTOR.
- D. Verify that grading, seeding, and repair of all disturbed areas have been accomplished to the satisfaction of OWNER and ENGINEER. Verify that temporary erosion and sediment control structures and features installed by the CONTRACTOR have been removed and that permanent structures and features have been repaired as necessary and left in place.

1.04 PROJECT RECORD DOCUMENTS

- A. Maintain on site one set of the following record documents and record actual revisions to the Work:
 - 1. Drawings.
 - 2. Specifications.
 - 3. Addenda.
 - 4. Change Orders and other modifications to the Contract.
 - 5. Reviewed Shop Drawings, Product Data, and Samples.
 - 6. Manufacturer's instruction for assembly, installation, and adjusting.
 - 7. Survey Notes and Calculations
 - 8. Construction Photographs (digital acceptable)
- B. Ensure entries are complete and accurate, enabling future reference by OWNER.
- C. Store record documents separate from documents used for construction.
- D. Record information concurrent with construction progress.
- E. Specifications. Legibly mark and record at each Product section description of actual Products installed, including the following:
 - 1. Manufacturer's name and product model and number.
 - 2. Product substitutions or alternates utilized.
 - 3. Changes made by Addenda and modifications.
- F. Record Drawings. Legibly mark each item to record actual construction including:
 - 1. Graphically depict changes by modifying or adding to plans, details, sections, elevations or schedules.
 - 2. Make changes on each sheet affected by changes.
 - 3. Record information concurrently with construction progress.
 - 4. Measured horizontal and vertical locations of wells, piping and appurtenances, referenced to permanent surface improvements.
 - 3. Field changes of dimension and detail.
 - 4. Details not on original Contract drawings.

- G. As-Built Drawings shall include survey data and plans shall include the following, at a minimum:
1. Placement and orientation of equipment, panels, and modified or upgraded features.
 2. As-Built Details.
 3. As-Built Drawings shall be submitted in hard copy and electronic format to the ENGINEER.
- H. Submit documents to ENGINEER with claim for final Application for Payment.

PART 2 – PRODUCTS (Not Used)

PART 3 – EXECUTION (Not Used)

END OF SECTION

SECTION 02200

EARTHWORK

PART 1 – GENERAL

1.1 DESCRIPTION

- A. Scope of Work: The CONTRACTOR shall provide all labor, materials, equipment and incidentals required to perform all excavating, trenching, and backfilling as specified herein, and indicated for the purpose of constructing and installing conduit and associated facilities (e.g., valves, pull boxes) required to complete the work.
- B. The CONTRACTOR shall provide all temporary means needed to maintain excavations in a continuously dewatered condition to include shoring and pumping if required.
- C. The CONTRACTOR shall stockpile suitable existing material during earthwork activities and use the material as backfill. Suitable existing soils shall be removed and stockpiled separately for use as topsoil.
- D. The CONTRACTOR shall perform all earthwork in such a manner as to minimize the disturbed area. The disturbed area along excavations shall be limited to within 20 feet of the centerline of piping or conduit.
- E. Related Work Described Elsewhere
 - 1. Section 15050 – Pipe, Pipe Fittings, and Valves

1.2 PROJECT CONDITIONS

- A. Existing Structures: Shown on the Drawings may be certain surface and underground structures adjacent to the work. Such structures may include, but are not limited to, concrete pump stations, and piping, utilities, and drainage culverts. This information has been obtained from existing records. It is not guaranteed to be correct or complete and is shown for the convenience of the CONTRACTOR. The CONTRACTOR shall explore ahead of the required excavation to determine the exact location of all structures. They shall be supported and protected from injury by the CONTRACTOR. If they are broken or injured, they shall be restored to their original condition by the CONTRACTOR at no cost to the Owner.

1.3 EXCAVATION CLASSIFICATION

All excavation shall be considered unclassified. The expense of excavating, removal, hauling, dewatering and disposal of all materials including hard materials, rock materials and other materials specified herein shall be included in the lump sum contract pricing. No additional compensation will be made for excavation of hard and rock material.

PART 2 – MATERIALS

2.1 SOIL MATERIALS

- A. Pipe bedding material shall be clean, dry sand that is free of clay, muck, organic matter, and other deleterious substances. Material data sheets shall be submitted to the ENGINEER for approval prior to use on-site.
- B. Soil backfill material shall be clean structural fill free of stones larger than 2 inches, construction debris, refuse, muck, soft clay, loam, sponge material, vegetation/organic matter, or angular rock. Suitable excavation material may be used for backfill.

PART 3 – EXECUTION

- 3.1 **Stability of Excavations:** Slope sides of excavations, when necessary, to comply with codes and ordinances of agencies having jurisdiction. Shore and brace where sloping is not possible either because of space restrictions or stability of material excavated. Maintain sides and slopes of excavations in a safe condition until completion of backfilling.
- 3.2 **Stockpile excavated materials to be reused as backfill on the up-gradient side of the excavation.** Segregate differing excavation materials as to type. Provide positive drainage for all existing and newly graded areas and other construction areas, including stockpile locations, during each phase of the work. All necessary temporary controls shall be provided to prevent washout and erosion.
- 3.3 **Dry conditions shall be maintained by the CONTRACTOR in all excavations for structures.**
- 3.4 **PIPE TRENCH PREPARATION**
 - A. Trench width shall be minimized to greatest extent practical but shall conform to the following:
 - 1. Sufficient to provide room for installing, jointing, and inspecting piping, but in no case wider at top of pipe than pipe barrel outside diameter plus 2 feet, unless otherwise indicated.
 - 2. Enlargements at pipe joints may be made if required and approved by the ENGINEER.
 - 3. Sufficient for sheeting, bracing, sloping, and dewatering as required.
 - 4. Sufficient to allow thorough compaction of backfill adjacent to bottom half of pipe.
 - B. Depth of trench as indicated on the Drawings shall be field-located by the CONTRACTOR with approval of the ENGINEER.

- C. The trench shall be backfilled with materials as indicated on the Drawings and as specified herein. The trench shall be backfilled and compacted to provide a firm, uniform grade.
- D. All trenches shall be constructed in a uniform grade. Excavations of trenches shall be kept in a dry condition. The CONTRACTOR shall be responsible for maintaining the dry conditions.
- E. The CONTRACTOR shall not excavate during inclement weather conditions, as determined by the ENGINEER.

3.5 GRADING

- A. General: Uniformly grade areas within limits of construction under this Section, including adjacent transition areas. Compact with uniform slopes to provide positive drainage.

3.6 SOIL EROSION OR SEDIMENT CONTROL

- A. Install erosion and sediment controls as required by field conditions and in compliance with the New Jersey Soil Erosion and Sediment Control Manual.
- B. Protection of Graded Areas: Protect newly graded areas from traffic and erosion. Keep free of trash and debris.
- C. Reconditioning Compacted Areas: Where completed compacted areas are disturbed by subsequent construction operations or adverse weather, scarify surface, reshape, and compact to required density prior to further construction.

3.7 DISPOSAL

- A. The CONTRACTOR shall place waste materials encountered during earthwork activities in neat piles adjacent to the work area. At one hour prior to the Landfill's close, the CONTRACTOR shall haul the excavated waste materials to the active landfilling operations area at the site, or at a frequency directed by either the OWNER or ENGINEER. OWNER shall not require the CONTRACTOR to pay tipping fee for disposal of excavated waste materials encountered during work activities.

END OF SECTION

SECTION 15050

PIPE, PIPE FITTINGS, AND VALVES

PART 1 - GENERAL

1.1 DESCRIPTION

- A. Scope of Work: The CONTRACTOR shall supply all materials, equipment, and labor needed to install complete and make ready for use all pipe, pipe fittings, and valves as specified herein and as indicated on the Drawings.
- B. Related Work Described Elsewhere
 - 1. Section 02200 – Earthwork

1.2 SUBMITTALS

- A. The CONTRACTOR shall prepare and submit to the ENGINEER, for review and approval, certificates of compliance on materials furnished and manufacturer's brochures containing complete information and instructions pertaining to the storage, handling, installation, inspection, maintenance, and repair of each type of pipe, conduit, fittings, and valves furnished.
- B. The CONTRACTOR shall prepare and submit Shop Drawings to the ENGINEER for review and approval. The Shop Drawings shall show all dimensions, connections, wire or cable diagrams, and material details. All tie-ins to the existing system shall be field-verified and shown on the Shop Drawings.

1.3 REFERENCE

- A. The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only. Use of the most recent version is required.

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM D 1784	Specification for Rigid Poly (Vinyl Chloride) (PVC) Compounds and Chlorinated Poly (Vinyl Chloride) (CPVC) Compounds
ASTM D 1785	Specification for Poly (Vinyl Chloride) (PVC) Plastic Pipe, Schedules 40, 80, and 120
ASTM D 2513	Specification for Thermoplastic Gas Pressure Pipe Tubing and Fittings
ASTM D 2564	Specification for Solvent Cements for Poly (Vinyl Chloride) (PVC) Plastic Piping Systems

- ASTM D 2774 Practice for Underground Installation of Thermoplastic Pressure Piping
- ASTM D 2855 Practice for Making Solvent-Cemented Joints with Poly (Vinyl Chloride) (PVC) Pipe and Fittings

AMERICAN NATIONAL STANDARD INSTITUTE (ANSI)

- ANSI/NFPA 70 National Electric Code
- ANSI C 80.1/UL 6 Rigid Steel Conduit, Zinc Coated (RMC)
- ANSI C 80.3/UL 797 Electrical Metallic Tubing, Zinc Coated (EMT)
- ANSI C 80.5/UL 6A Rigid Aluminum Conduit (ARC)
- ANSI C 80.6/UL 1242 Intermediate Metal Conduit, Zinc Coated (IMC)

NATIONAL ELECTRICAL MANUFACTURERS ASSOCIATION (NEMA)

- NEMA FB 1 Fittings, Cast Metal Boxes, Conduit Bodies for Conduit, EMT and Cables
- NEMA RN 1/UL 6 Polyvinyl Chloride (PVC) Externally Coated Galvanized Rigid Steel Conduit and Intermediate Metal Conduit
- NEMA TC 2/UL 651 Electrical Rigid Polyvinyl Chloride (PVC) Conduit
- NEMA TC3 PVC Fittings for use with Rigid PVC Conduit and Tubing

PART 2 - PRODUCTS

2.1 POLYVINYL CHLORIDE (PVC) PIPE AND FITTINGS

- A. All PVC pipe and pipe fittings shall be Schedule 80 PVC conforming to ASTM D 1784, ASTM D 1785 (for pipe), and ASTM D 2467 (for fittings). Acceptable manufacturers include Nibco Chemtrol (219-295-3000), CertainTeed (610-341-7768), ASAHI/America (800-343-3618), or approved equal.
- B. PVC pipe and pipe fittings shall be manufactured from a compound that meets the requirements of Type 1, Grade 1, Polyvinyl Chloride PVC 1120, Class 12454-B, as outlined in ASTM D 1784. A Type 1, Grade 1 compound is characterized as having the highest requirements for mechanical properties and chemical resistance.
 - 1. Compound from which pipe is produced shall have a design stress rating of 2000 psi at 73 degrees F, listed by the Plastic Piping Institute.

2. Materials from which pipe and pipe fittings are manufactured shall have been tested and approved by NSF International.
3. Pipe shall be homogenous throughout and shall be free from cracks, holes, foreign inclusions, and other defects.

2.2 PIPELINE LOCATOR/WARNING TAPE

- A. Tape shall be a metallic locator/warning tape imprinted with the words “Caution Gas Line Buried Below”, “Caution Buried Electric,” or “Caution Communication Lines Buried Below” as supplied by Terra Tape (800-231-2417), or approved equal.

2.3 RIGID METAL CONDUITS (RMC AND IMC) AND FITTINGS

- A. Rigid Steel Conduit: ANSI C80.1 and UL 6, RMC full-weight pipe, hot-dip galvanized with threaded ends, top coated outside to protect against white rust, a standard fully threaded coupling on one end, plastic cap on both ends; Republic Conduit, Allied Tube and Conduit, Wheatland Tube Company or equal.
- B. Rigid Aluminum Conduit: ANSI C80.5 and UL 6A; ARC, full-weight pipe, built to the same standards as rigid steel conduit with threaded ends, a standard fully threaded coupling on one end, plastic caps on both ends; Republic Conduit, Allied Tube and Conduit, Wheatland Tube Company or equal. Only aluminum fittings shall be used with aluminum conduit.
- C. Intermediate Metal Conduit: ANSI C80.6 and UL 1242, IMC, high strength steel metal pipe, hot dip galvanized with threaded ends, top coated to avoid white rust, a standard fully threaded coupling on one end, plastic caps on both ends, interior coated with highly corrosion resistant lubricating finish for easier wire pulling; Republic Conduit, Allied Tube and Conduit, Wheatland Tube Company or equal.
- D. PVC Externally Coated Conduit: NEMA RN 1 and UL 6; rigid steel conduit with external 0.040 inch exterior gray PVC coating and internal galvanized surface, a fully threaded, PVC coated coupling on one end, plastic cap on both ends; Perma-Cote, Kor-Kap, Plasti-bond, OCal or equal.
- E. Fittings and Conduit Bodies: NEMA FB 1; threaded type, fitting material shall match conduit material (i.e., steel with steel, aluminum with aluminum), with a gasketed cover; O-Z Gedney Form 7 or equal. Threadless fittings are not acceptable for RMC and IMC.
- F. Watertight Expansion and Deflection Fittings: Provide fittings at each building expansion joint for straight conduit run longer than 200 feet, weatherproof for outdoor installation with bonding jumper across each expansion fitting for ground continuity, Deflection fittings capable of accommodating not less than 3/4-inch displacement from normal condition in any direction including longitudinal (conduit centerline) direction; O-Z Gedney Type AX, DX, AXDX, EX, EXPB, PW, PBW, Crouse Hinds, or equal.

- G. Insulated Grounding Type Bonding Bushings: In threaded metal conduits for terminations to motor control center, switchgear, panels, switchboard, power circuit pull boxes, junction and termination boxes; O-Z Gedney Type BLG for RMC and IMC, Type ABLG for ARC, Thomas and Betts or equal.
- H. Insulating Bushings: for conduit terminations to lighting fixtures, pull boxes and junction boxes containing control wiring; O-Z Gedney Type A, Thomas and Betts or equal.
- I. Flashing and Counter flashing: Threaded cast iron flash and counter-flash units with bushings if required to accommodate conduit size, Semco No. 1100-2 Series, J.R. Smith No. 1750 Series, or equal.
- J. Corrosion Protection: When ferrous conduit is threaded in the field, the threads shall be coated with an approved electrically conductive, corrosion resistant compound intended for the purpose. No other tapes, greases or compounds are permitted.

2.4 RIGID NON-METALLIC CONDUIT AND FITTINGS

- A. Conduit: Materials those are resistant to moisture and corrosive agents; sufficiently strong to withstand abuse normal to its installation conditions; rigid PVC or equal.
- B. Fittings and Conduit Bodies: NEMA FB 1.

2.5 ELECTRICAL METALLIC TUBING (EMT) AND FITTINGS

- A. EMT: ANSI C80.3 and UL 797; lightweight thinwall conduit, rigid steel, electro-galvanized and enameled on the inside; "X-Duct Jr.," "GE EMT," "Electrounit," or equal.
- B. Fittings and Conduit Bodies: NEMA FB 1; steel, compression type, rated for the installation conditions. Set-screw or crimp-on type fittings are not acceptable. Aluminum fittings or conduit bodies are not allowed with EMT.
- C. EMT Connectors: Insulated throat type, Thomas and Betts, Appleton Electric Co. or equal, rated for the installation conditions.

2.6 FLEXIBLE METAL CONDUIT (FMC) AND FITTINGS

- A. Fittings and Conduit Bodies: NEMA FB 1; steel; clamp or screw-in type.
- B. Flexible Conduit Connectors: Thomas and Betts, Appleton Electric Co. or equal, galvanized steel with integral insulated throat.

2.7 LIQUID-TIGHT FLEXIBLE CONDUIT AND FITTINGS

- A. Conduit: Flexible metal conduit with PVC jacket.

- B. Fittings and Conduit Bodies: NEMA FB 1.
- C. Flexible Conduit Connectors: Thomas and Betts, Appleton Electric Co. or equal, galvanized steel with integral insulated throat.

2.8 SUPPORTS AND ATTACHMENTS

- A. Conduit Clamps, Straps, and Supports: Steel or malleable iron. Devices or hardware using spring tension or friction for securing or supporting are not permitted.
- B. Concrete Drilled Anchors: Refer to Division 03, Section 031500, Concrete Accessories, for approved anchors.
- C. Self-Drilling and Self-Tapping Bolts: Atlas Corp. "Teks 2", or equal.
- D. Sheetmetal Screws: Parker-Kalon, American or equal, self-tapping, hardened steel, cadmium plated, binding head or countersunk flat head to suit application.
- E. Hanger Rods: 1/4 inch minimum, hot dip galvanized Unistrut Corp., Super Strut Corp., or equal, applied as shown. Use channel nuts, hex nuts, saddle type and flat washers and similar accessory items, each best suited to specific application:
- F. Channel section, 12-gage (2.75 mm), 1-5/8 x 2-7/16 inches (9.53 by 39.7 mm): P5500.
- G. Studs, nuts and similar items: of sizes and types noted and compatible with channel section to which applied.
- H. Flat plate, angle, shaped and special fittings and beam clamps, of types noted and compatible with channel section to which applied.
- I. Conduit straps: P2580-10 to P2553-40, two holes type.
- J. Conduit straps: Appleton, Steel City, or equal, one-hole, sheet steel, for 1/2 and 3/4-inch conduits only.
- K. "U" bolts: Schedule 40 pipe sizes with threaded legs and nuts.
- L. Universal pipe clamps, 1/2 to 2 inches (13 to 50 mm) conduits: P2911 to P2917.
- M. I.P.S. type pipe hangers as shown.

PART 3 - EXECUTION

3.1 GENERAL

- A. Pipe shall be stored or stacked so as to prevent damage by marring, crushing, or piercing. Maximum stacking height shall be limited to 6 feet.
- B. Pipe and pipe fittings shall be handled carefully in loading and unloading. They shall be lifted by hoists and lowered on skidways in such a manner as to avoid shock. Derricks, ropes, or other suitable equipment shall be used for lowering the pipe into the extraction well borings. Pipe and pipe fittings shall not be dropped or dumped.

3.2 PVC PIPE STORAGE

- A. For storage of PVC pipe and fittings over 5 days, a location shall be chosen out of direct sunlight, or the piping and fittings shall be covered.

3.3 PVC PIPE INSTALLATION

- A. PVC pipe installation shall conform to these specifications, the manufacturer's recommendations, and as outlined in ASTM D 2774.

3.4 JOINING OF PVC PIPE

- A. Joining of pipe shall be in accordance with ASTM D 2855 and with the manufacturer's recommendations.

- B. Preparation:

- 1. All pipes shall be inspected for cuts, scratches, or other damage prior to installation. Pipe with imperfections shall not be used. All burrs, chips, etc. shall be removed from pipe interior and exterior. The interior of the pipe shall be cleared of foreign matter; e.g., loose dirt, tape, and paper. All loose dirt and moisture shall be wiped from the interior and exterior of the pipe end and the interior of the fitting. All pipe cuts shall be square, perpendicular to the center line of pipe. Pipe ends shall be beveled prior to applying primer and solvent cement so that the cement does not get wiped off during insertion into the fitting socket.

- C. Solvent Welding:

- 1. A coating of primer as recommended by pipe supplier shall be applied to the entire interior surface of the fitting socket and to an equivalent area on the exterior of the pipe prior to applying solvent cement. The solvent cement shall comply with the requirements of ASTM D 2564 and shall be applied in strict accordance with manufacturer's specifications. Pipe shall not be primed or solvent welded during precipitation or when atmospheric temperature is below 40 degrees F or above 90 degrees F.

- D. Curing:

1. After solvent welding, the pipe shall remain undisturbed until cement has thoroughly set. As a guideline for joint setting time, use 1 hour for ambient temperatures 60-90 degrees F, or 2 hours when ambient temperature is 40-60 degrees F.

E. Alignment:

1. Pipe and pipe fittings shall be selected so that there will be as small a linear deviation as possible at the joints, and so that inverts present a smooth surface. Pipe and fittings which do not fit together to form a tight fitting will be rejected.

3.5 FLEXIBLE PVC PIPE CONNECTIONS

- A. Connections to pipe shall be made with clamps in accordance with manufacturer's step by step procedures and recommendations.

3.6 CONDUIT INSTALLATION

- A. Install wiring and cables in conduit or other wiring raceway systems covered in this Division. Provide separate raceway systems for each of the following wiring categories:
 - B. 480Y/277 Volt normal power.
 - C. 480Y/277 Volt emergency power.
 - D. 208Y/120 Volt normal power.
 - E. 208Y/120 Volt emergency power.
 - F. Variable Frequency Drives (VFD): line, load, and control wiring in separate conduits.
 - G. Fire alarm.
 - H. EMCS/FMCS and other class 2 & 3 circuits.
 - I. SCADA System.
 - J. Intercommunication system.

3.7 CONDUIT SIZE, ARRANGEMENT, AND SUPPORT

- A. Minimum conduit size:
 1. The minimum conduit size shall be 3/4 inch trade size in buildings or for exterior above ground installations.

2. The minimum conduit size shall be 1 inch trade size for underground and under building slab installations.
 3. 1/2 inch EMT/FMC or 3/8 inch FMC permitted under certain conditions addressed elsewhere in these Specifications or as detailed on the Drawings.
- B. Conduit systems shall be worked into complete, integrated arrangements, with like elements to present an orderly, neat, and workmanlike appearance as specified herein.
 - C. Install conduit, raceways, junction boxes and device back boxes concealed, except as shown or noted otherwise. Conduits, raceways, junction boxes and device back boxes may be exposed in unfinished areas or in mechanical equipment rooms. Where conduits or raceways are exposed, above suspended ceilings, or under raised floors, they shall run parallel with walls or structural elements.
 - D. Vertical runs shall be plumb; horizontal runs level and parallel with structure, as appropriate. Groups shall be racked together neatly with both straight runs and bends parallel and uniformly spaced.
 - E. Conduits shall be securely fastened in place at intervals of not more than those required by the Code for the respective conduit type and size, with suitable clamps or fasteners of approved type, and vertical conduits shall be properly supported to present a mechanically rigid and secure installation.
 - F. Maintain at least six (6) inches clearance between conduit and piping. Maintain twelve (12) inches clearance between conduit and heat sources such as flues and exhausts, steam pipes, and flare components.
 - G. No conduit shall be fastened to other conduits or pipes or installed so as to prevent the ready removal of other pipes for repairs. No conduits shall be attached to suspended ceiling support wiring systems or bracing.
 - H. For concrete structures, conduit directly supported from floor, walls, and ceiling shall be spaced out at least 1/4 inch using one-hole malleable straps with pipe spacers or, if three (3) or more conduits are located in a parallel run, they shall be spaced out from the structure approximately 5/8 inch to 1 inch by means of framing channel.
 - I. Individual conduits hung from roof structure shall be supported by split-ring hangers and wrought-iron hanger rods. Where three (3) or more conduits are suspended from the ceiling in parallel runs, use steel channels, Kindorf, Unistrut or equal, hung from 1/2-inch rods to support the conduits. The conduit on these channels shall be held in place with conduit clamps designed for the particular channel that is used.
 - J. Secure conduit racks to concrete walls and ceilings by means of cast-in-place anchors; die-cast, rustproof alloy expansion shields; or cast flush anchors. Wooden

plugs, plastic inserts, or gunpowder driven inserts shall not be used as a base to secure conduit supports. Conduit shall be supported immediately on each side of a bend and not more than three (3) feet from an enclosure where a straight run of conduit ends.

- K. Welding, brazing, or other heating of the conduit is not permitted.
- L. Clearance: Do not obstruct spaces required by Code in front of electrical equipment, access doors, etc.
- M. The interior of raceways shall be thoroughly clean and free from cement, paint, grease, plaster, and dirt.
- N. Empty conduit in which wire is to be installed by others, including telephone and computer conduits, shall have pull lines installed. The pull line shall be 3/32 inches nylon or polyolefin having not less than 200 pound tensile strength. No less than twenty-four (24) inches of slack shall be left at each end of the pull line. Attach a tag approved for the purpose to ends of pull line with nylon string and marked in indelible ink with location of other end and service for which conduit is provided.

3.8 CONDUIT INSTALLATION

- A. Drawings indicate, generally, routes of branch circuits. Runs to panels are indicated as starting from nearest outlet. Provide conduits to panels as though routes were indicated in their entirety.
- B. Subcontractor shall not commence installation of conduits until conduit runs have been accounted for and properly planned.
- C. Conduits shall be continuous from panels to distributing centers, outlets or switches. Pull boxes and splice boxes shall be installed where shown and where otherwise required to facilitate installation of conductors and to comply with code requirements. Different types of conduits shall not be intermixed in run.
- D. Conduits shall be installed to be free of traps, where condensation water could accumulate.
- E. When required for ease of cable pulling and as necessary to meet code, provide malleable conduit fittings or pull boxes even though not shown. Turns shall consist of malleable fittings or concentric bends.
- F. Bends and offsets shall be avoided where possible, but where necessary, shall be made with an approved one shot bender or conduit-bending machine. Make bends and offsets of as large a radius as construction will permit so as not to damage the conduit. Conduit bends shall not be kinked and shall not be flattened more than 5 percent of the outside diameter of the conduit. Where exposed conduits are run in groups, bends shall have a common center, with minimum inner radius eight times inside diameter of conduit. Standard elbows are not allowed at these locations.

- G. The use of 1/2 inch conduit is permitted for the following.
1. Lighting switch legs where there are not more than 6 conductors.
 2. EMCS/FMCS and other Class 2 or 3 control and signal wiring.
- H. The use of flexible conduit is restricted. Flexible conduit is not permitted in walls, above inaccessible ceiling spaces or within other concealed or inaccessible spaces. A bare equipment grounding conductor shall be installed in conduit runs having a length of flexible metallic conduit, liquid-tight flexible metal conduit, or non-metallic conduit as part of the run. Liquid-tight flexible metal conduit shall be used in damp or wet locations requiring flexible conduit.
1. Flexible metal conduit or liquid-tight flexible metal conduit is permitted for final connection to transformers, rotating or vibrating equipment. The length of size or type flexible conduit shall not exceed three (3) feet for this purpose.
 2. Flexible metal conduit or liquid-tight flexible metal conduit to sensors on piping shall not exceed four (4) feet.
 3. Above suspended ceilings, flexible metal conduit, 3/8 inch trade size minimum, is permitted for final connection from the above ceiling outlet box to the light fixture. Flexible metal conduit to light fixtures shall not exceed six (6) feet.
- I. Plug or cap unused conduit openings with a suitable device designed for the purpose. Caulking compound shall not be used for plugging conduit openings. Plug conduit with approved firestop material where conduits leave heated area and enter unheated area.
- J. Underground stub-ups shall use wrapped or PVC-coated rigid steel galvanized 90-degree elbows with a minimum radius not less than that permitted by Code or as noted on the Drawings and wrapped or PVC-coated rigid steel galvanized conduit riser.
- K. Penetrations through Concrete: Provide galvanized rigid steel nipples threaded both ends before concrete is poured. Each end of nipples shall extend three (3) inches beyond wall or floor surfaces.
1. Provide standard pipe caps on each end of each empty nipple.
 2. Where conduit of smaller size than nipple or individual cables pass through nipples, pack annular space with fire-inert material, in accordance with Division 07, Section 078413, Penetration Firestopping, for a minimum depth of two (2) inches each side or three (3) inches on one side.

3. Where grout is noted provide Dry Wall Products, Inc. "Waterplug", U.S. Grout Corp., or equal, mixed and placed in accordance with manufacturer's instructions and three (3) inches minimum depth.
- L. Rigid Metal Conduit: Connect with threaded ends, fully threaded couplings, thread into integrally cast hubs or use double locknuts and insulating bushings. Threadless fittings are not acceptable.
- M. Electrical Metallic Tubing: Connect with compression type connectors and couplings.
- N. Rigid steel conduit to EMT connection shall consist of EMT connector and threaded rigid conduit coupling.
- O. Where rigid steel conduit is installed in concrete slab on grade provide three (3) inches minimum thickness concrete encasement below conduit, tape wrap conduit with two layers of half-lapped 10-mil thick, black virgin vinyl polyethylene tape or factory-applied epoxy or PVC coating.
- P. Keep conduits closed and moisture-tight during construction.
- Q. Conduit runs across roofs shall be supported [on redwood stand-off supports not less than six (6) inches (150 mm) nor more than eight (8) inches above the roof surface, and at intervals not greater than eight (8) feet. The supports shall be set in asphalt on tar roofs or other roofs where asphalt is a compatible agent, or shall be securely fastened to the roof with an appropriate roofing adhesive material on roofing materials where asphalt is not a compatible material.
- R. Conduit systems used for telephone/data system cabling shall not have more than a sum of 270-degree of bends between pull boxes, outlet boxes or termination closets.
- S. No conduit shall be installed exposed on floor in areas except when approved by the project design engineer or inspector.

3.9 UNDERGROUND CONDUIT INSTALLATION

- A. Depth of conduit shall be thirty (30) inches minimum to top of conduit. Where interference with other underground work occurs, conduits shall pass below the other work.
- B. Grade conduits uniformly to drain to below-grade structures.
- C. Wrap direct-buried galvanized steel conduit with two layers of half-lapped 10-mil thick, black virgin vinyl polyethylene tape or factory-applied epoxy or PVC coating. In either case, exposed threads or damage to coating or tape shall be repaired prior to backfilling.

- D. Conduit systems, to be occupied by communications conductors, shall be separated from power distribution conduits by twenty-four (24) inches of tamped earth.
- E. Conduit Route Marking:
 - 1. Mark the route of direct-buried conduits using continuous warning tape buried in the trench above the conduits.
 - 2. In unpaved areas, bury the tape in the trench twelve (12) inches below the surface. In paved areas, install the tape in the trench just below the pavement section.
 - 3. Take necessary precautions to ensure that the warning tape is not pulled, distorted, or otherwise misplaced during backfilling.
- F. Add magnetic #10AWG tracer wire top of the underground non-metallic conduits or duct banks. The tracer wire shall be continuous along the path of the duct banks and conduit stub ups and shall be exposed in the manholes and at each stub up with minimum of twelve (12) inches pigtail in an embedded concrete box.
- G. Duct spacers shall be used to install ducts for maintaining duct spacing during concrete pour. The spacers shall be tied together with the ducts and reinforcement bars to form one integrated assembly.

END OF SECTION

APPENDIX A

SWANA HEALTH AND SAFETY GUIDELINES

SOLID WASTE ASSOCIATION OF NORTH AMERICA

A COMPILATION OF LANDFILL GAS FIELD PRACTICES AND PROCEDURES

**AUGUST
2011**



SWANA[®]
SOLID WASTE ASSOCIATION
of North America



A COMPILATION OF LANDFILL GAS FIELD PRACTICES AND PROCEDURES

by the

**Landfill Gas Management Division of
the Solid Waste Association
of North America (SWANA)**

August 2011

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FORWARD

This document was prepared by the SWANA Landfill Gas Management Division and is based on its professional assessment of current practices and procedures relating to the control, recovery, and utilization of landfill gas. The observations and suggestions in this document should serve as a starting point for readers who are interested in furthering their own knowledge of the subject matter.

SWANA plans to supplement the materials in this report from time to time as warranted by significant breakthroughs in technology and technique. This edition is an update to the original 1985 edition and the 1992 revision.

SWANA, along with its members and chapters, does not assume any liability with respect to the use of, or for damages resulting from the use of, any information, equipment, method, or process discussed in this report. Mere reference to such information, equipment, method, or process does not constitute an endorsement thereof by SWANA or its members and chapters.

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August 2011



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SECTION I: HEALTH AND SAFETY

A. PURPOSE AND GENERAL INTRODUCTION

History of SWANA Health and Safety Manual

Over the years, SWANA has strived to provide valuable written resources to its members and to the solid waste industry in general. The predecessor of this document, published in August 1991, contributed significantly to an awareness of health and safety in that earlier audience; as of this writing, hundreds of copies of the manual have been sold. The current version builds on the August 1991 edition and on past volunteer efforts of industry members.

Importance of Health and Safety Related to Landfill Gas Management

Coinciding with the installation and start-up of an active landfill gas collection and control system (LGCCS), the Landfill Manager is often required to hire or assign responsible individuals (Landfill Gas Technicians) to safely operate and maintain the system. Whether operation and maintenance services are provided in-house or by consultants, the Landfill Manager must verify that those selected to perform duties are properly trained and work in compliance with applicable regulations; these may include federal regulations regarding emissions (NSPS 40 CFR 60 Subpart WWW), and local and federal health and safety regulations (OSHA, etc.).

Typical landfill gas contains 30 to 60 percent methane (CH_4), which is explosive at certain gas concentrations (referred to as the explosive limit, typically 5 to 15 percent by volume in air for methane). Methane is also a simple asphyxiant. Hydrogen sulfide (H_2S) can also be present in landfill gas at potentially dangerous levels, and is often a factor contributing to non-fire-related injuries or deaths associated with landfill gas. Volatile Organic Compounds (VOCs) are also found in landfill gas. Some types of VOCs are carcinogens. Condensate (liquid generated from landfill gas) is perhaps the most difficult medium to characterize regarding its chemical constituents; and although it consists primarily of water, condensate may contain sufficient quantities of contaminants to warrant special handling (see Personal Protective Equipment, PPE, in Section E). Depending on the site, condensate may include constituents such as polar organic acids and aldehydes.

Proper operation and management of an LGCCS involves interacting, often day-to-day, with landfill operations. Landfill Gas Technicians travel the same roads as refuse trucks and other associated heavy equipment; they work around active tipping operations, and encounter the same hazards as other landfill staff. Landfill Gas Technicians are exposed to electricity or compressed air or nitrogen, primarily while operating flare stations and leachate pumps in the field; they may require specific training to become qualified to perform these duties responsibly. Thus, in addition to understanding health and safety issues directly associated with landfill gas management, persons responsible for operating and maintaining an LGCCS must also be aware of, and take part in, all other general safety programs, including safety meetings and training programs related to landfills. Conversely, it is advisable for personnel who work at the landfill, or even those regularly visiting the landfill, to have a general understanding of landfill gas and the landfill's specific gas management program.

Besides being responsible for regulatory compliance from an environmental perspective, the Landfill Manager must ensure that persons selected for this work are trained to perform required duties safely. Obstacles can occur, however. Landfills sometimes face budgetary constraints



that limit funds available to address landfill gas management. In many cases, too, management of a landfill gas collection system is performed by two or more personnel with varying degrees of experience. For these reasons, it is critical that Landfill Managers establish Standard Operating Procedures (SOPs) that can document ways to perform common tasks associated with landfill gas management, and programs for addressing unusual situations that could happen during the life of a landfill. SWANA suggests that Landfill Managers become proficient in establishing operating standards for a specific LGCCS, when warranted, and for training the Landfill Manager's staff.

Entries into confined space entry work are often responsible for critical injuries or deaths associated with landfill gas. While this manual, in part, assists in identifying confined space and recommends avoidance, it is not intended to serve as instruction related to confined space entry. SWANA suggests that SOPs for LGCCSs refrain from addressing confined space entry. Confined space on landfills (leachate vaults, manholes, vessels, etc.) should be labeled as such and secured, with staff instructed about the associated hazards. **ONLY PROPERLY TRAINED PERSONNEL SHOULD EVER ENTER A CONFINED SPACE.**

Purpose of This Manual

This manual is intended to serve as a reference for the Landfill Manager and landfill personnel, and to assist in the safe management of municipal solid waste landfill gas collection and control systems. As described below, the goal of this manual is to refresh, refocus, and reorganize the 1991 edition such that it is not only updated, but clarifies content for those working in the landfill gas industry for the first time.

Refresh - A fresh prospective from a new group of volunteers provides additional insight and updates the document regarding today's issues and concerns. The writing team that created this document is active in the industry in varying areas, which adds to the quality and credibility of the manual. Furthering this effort, SWANA has insisted that accredited health and safety and legal professionals review the document to ensure that regulatory and liability issues are properly referenced and addressed. A reference is included in the Appendix, identifying internet resources relative to the topic.

Refocus - Primarily due to the overwhelming amount of material that this document could cover, as demonstrated by the 1991 edition, the writing team decided to clearly define the target audience and create a common theme throughout. After several discussions, the writers decided to define the target audience as two groups: new landfill management personnel, and contractors. New management personnel are often burdened with significant responsibilities in a short period of time, requiring condensed, informative, and well-organized content to address responsibilities, of which health and safety is paramount. On the other hand, contractors working on landfills are often unfamiliar with landfill practices, and are frequently required to develop project-specific health and safety manuals for landfill projects. This manual is intended to serve as a reference for both sets of readers.

Reorganize - Reorganization of the manual is a logical means of accomplishing these purposes. The writing team's goal of building on past work necessitated a condensation of material from the 1991 edition, in a format that creates a more "user-friendly" document. As described below, this "tiered" format, with a significant, well-organized Appendix, provides clearly defined resources and useful information on specific topics.



Health and Safety Concerns

An initial step in developing this health and safety manual was to identify the range of health and safety concerns likely to be encountered while operating and maintaining a landfill gas management system. **Table A-1** contains the results of this exercise. Although concerns specific to flammability characteristics of landfill gas are often paramount in the minds of Landfill Gas Technicians as they perform duties, a key objective of the manual is to stress that equally hazardous health and safety concerns exist in the operating environment, which may not be directly related to managing landfill gas. This wider context for addressing hazards emphasizes the need for cross-training with regard to health and safety in which landfill operational personnel have at least a basic knowledge of the landfill gas management system, and Landfill Gas Technicians participate in all health and safety training programs required for landfill employees.

TABLE A-1

HEALTH AND SAFETY CONCERNS - LANDFILL GAS MANAGEMENT

<ul style="list-style-type: none"> • Inhalation of landfill gas. 	<ul style="list-style-type: none"> – Methane in landfill gas is a simple asphyxiant (displaces oxygen, but is not toxic). – Hazardous components (H₂S, etc.).
<ul style="list-style-type: none"> • Exposure to landfill gas. 	<ul style="list-style-type: none"> – Explosive (lower and upper explosive limit). – Volatile Organic Compounds (vinyl chloride, etc.).
<ul style="list-style-type: none"> • Fires in the waste fill. 	
<ul style="list-style-type: none"> • Environment (sun, wind, rain, snow/ice, heat, cold, dust, etc.). 	
<ul style="list-style-type: none"> • Insects (mosquitoes, ticks, chiggers, bees, etc.). 	
<ul style="list-style-type: none"> • Poisonous plants (poison ivy, poison oak, poison sumac, etc.). 	
<ul style="list-style-type: none"> • Animals (bears, snakes, coyotes, rats, etc.). 	
<ul style="list-style-type: none"> • Landfill activities (heavy equipment, traffic, etc.). 	
<ul style="list-style-type: none"> • Slip, trip, and fall hazards (vegetation, erosion ruts, debris). 	
<ul style="list-style-type: none"> • Confined spaces. 	
<ul style="list-style-type: none"> • Hazardous energy: mechanical, electrical, chemical, gravity, thermal, pneumatic, radiation, and hydraulic. 	

SWANA warns that the **Table A-1** is meant to list common hazards. Hazards not shown on the table can pertain to your specific situation.

Components of a Typical Landfill Gas Collection System

- Well heads.
- Lateral collection pipes.
- Conveyance pipe (including looped system).



- Condensate management structures (traps, knockouts, etc.).
- Flare station or beneficial use facility.

Equipment and Instruments Typically Required at a Landfill Site

- Typical landfill instruments (manometer, GEM landfill gas analyzer, temp gauge, etc.).
- PPE (steel shank boots, safety vest, hard hat, gloves, insect protection, etc.) (see Section E).
- Communication (radio and/or cell phone).

INHALATION OF LANDFILL GAS

At some point, every Landfill Gas Technician wonders if inhalation of landfill gas will cause bodily harm. Usually, this curiosity happens after exposure has occurred and often is coupled with apprehension (see Section L). H₂S is of great concern in dealing with sites that accept large amounts of C&D waste and contain significant amounts of moisture. Death from landfill gas inhalation results mostly from exposure to H₂S above 800 ppm, which is possible in some landfills. Exposure to gas can also arise from the repair of leachate or condensate lines. Technicians should be wary of potential hazards arising from gas in these lines.

Notwithstanding the apparent lack of danger, SWANA recommends that exposure to landfill gas be avoided, if at all possible, and believes reasonable precautions can significantly reduce an individual's contact with gas. Perhaps the most significant characteristic of an active LGCCS, relative to minimizing gas emission and exposure, is the fact that, under normal conditions, the portion of a system upstream of the gas mover (blower compressor, etc.) operates under a vacuum; this, by its nature, brings atmospheric air into the system when the system is breached.

VACUUM IS YOUR FRIEND

All active LGCCSs move gas by inducing a pressure gradient force (through movement also known as convection). Gas follows the path of least resistance toward the source of lower absolute pressure, commonly referred to as (relative) vacuum. The fact that in a well-maintained gas collection system, vacuum is present means that, if there is a small leak, air at a higher pressure will enter the source of the leak, precluding landfill gas from leaking out of that source. A practical example involves sample ports on well heads that have caps rather than valves to seal them between monitoring events. When the cap is removed, air quickly flows into the well as a result of vacuum. If substantial, leaks of this nature will be evident at the flare station in the form of higher oxygen and/or balance gas (as measured with instrumentation); in some cases, enough air can be brought into the system to extinguish the flame at the flare, shutting down the entire system.

Key Point - The source of vacuum in LGCCSs, whether it originates from a flare station or beneficial end-use facility, is a critical component of maintaining a safe working environment. Vacuum not only provides a means of extracting and conveying gas, it ensures that leaks in the system do not emit gas to the atmosphere. Personnel should make sure, at the beginning and throughout a regularly scheduled monitoring event, that the vacuum source is operating and stable.



Major leaks, or those that cause an unstable flame at the flare or combustion device, may trigger alarms or automatic shutdowns at the flare. For this reason, it is critical to monitor gas constituents at the flare station immediately prior to regular landfill gas collection system monitoring; these constituents should be checked throughout the day to confirm stable operation. It is also important to inform all relevant personnel, especially those stationed on or near the source of the vacuum, that you will be working in the field and that they should not disrupt or adjust the vacuum. When vacuum is lost during a monitoring event, it not only disrupts work, but makes the work environment more dangerous.

Although monitoring an LGCCS that is not under vacuum is not typical practice, portions of the system may from time to time operate under slight positive pressure. As the system ages, header pipes may settle and condensate collect in low spots along a pipe, reducing and sometimes sealing off the flow of gas altogether. If the LGCCS on the other side of this blockage is not influenced by vacuum through another path (e.g., a looped collection header), there will often be a reduction of vacuum such that positive pressure is developed within the gas system components. This pressure could build up enough to cause leaks through mechanical joints (flanges and screw clamps on flex hose, for example) or through the surface cover of the landfill. If not addressed, these areas of the landfill will likely become a source of danger and odor. Liquid collection systems are usually under positive pressure, and can pose a substantial health hazard if lines are being repaired or expanded (see Section D – Liquids Management).

It is important to remember that lost vacuum in a portion of the LGCCS is considered an unusual occurrence that may require a work permit, special equipment, and appropriate expertise to repair. Tier 2 of this manual provides further information on how to respond to these types of situation.

Landfill Gas Components That Are Simple Asphyxiants (Displacing Oxygen, But Not Toxic)

Methane and carbon dioxide, which are the primary constituents of typical landfill gas generated by municipal solid waste, are simple asphyxiants in that they are non-toxic but do displace oxygen. Methane and carbon dioxide are odorless. Gas-related odors derive from contaminants in the landfill gas. Asphyxiants are usually defined as follows:

Asphyxiant - A material capable of reducing the level of oxygen in the body to dangerous levels. Simple asphyxiants merely displace air in the environment. This reduces the concentration of oxygen below the normal level of around 21 percent, which can lead to breathing difficulties, unconsciousness or even death (Reference: *Physical and Theoretical Chemistry Laboratory, Oxford University*).

Key to the ability of any gas (or gases) to displace air is the presence of an enclosed area (or confined space) to trap gas at the source. Build-up of landfill gas is also possible in topographic depressions or trenches on calm days. If conditions are appropriate, gas may displace air within the space, creating an oxygen-deficient atmosphere. **As a key point of this document, SWANA stresses that Landfill Gas Technicians should be able to recognize and avoid potential confined space entry at all times.** (Further information about confined space is found in Section G.) Note that most injuries and deaths attributed to landfill gas involve personnel entering confined space without proper training and/or equipment (see Appendix I for incidents).



Hazardous Components in Landfill Gas

As described in more detail in Section D, landfill gas contains major constituents (CH₄, O₂, N₂, and CO₂) and trace contaminants that can prove hazardous to on-site personnel. Accuracy and sensitivity in testing for these chemicals will vary, depending on analytical procedures and equipment used during work activities at the landfill. Priority pollutants of chief regulatory concern include various hazardous components of landfill gas. Perhaps the most prominent toxic contaminant in landfill gas that could be present at potentially harmful levels is hydrogen sulfide (H₂S). H₂S is a colorless, toxic, very flammable gas which, in low concentrations, has an offensive odor described as that of rotten eggs. H₂S, however, quickly numbs the olfactory senses (sense of smell), so reliance on detecting an odor can lead to very dangerous conditions, and even cause virtually instant death.

H₂S is usually present at some concentration, generally below 100 ppm, in landfill gas. It is unlikely that dangerous concentrations of H₂S will develop, except:

- In vaults or other confined spaces where oxygen deficiency may be a hazard.
- In low-lying areas of the landfill.
- If a landfill contains large amounts of sulfate, such as where natural or man-made gypsum is present along with high levels of moisture, very high (lethal) concentrations of H₂S could be produced (large amounts of construction debris containing wallboard concentrated in one location would be an example).

Dangerous and unexpected pockets of H₂S gas may therefore be encountered under some circumstances. Personnel must be trained for, and remain alert to, these possibilities.

Table A-2 lists physiological responses to H₂S that can be encountered during landfill operations.

TABLE A-2
PHYSIOLOGICAL RESPONSE TO VARIOUS CONCENTRATIONS
OF HYDROGEN SULFIDE

Response	H ₂ S Concentration (ppm)
Maximum allowable concentration for prolonged exposure, 8 hours.	10
Slight symptoms possible after several hours.	70-150
IDLH - Level at which exposure is immediately dangerous to life and health.	100
Death possible/probable. Permanent nervous system damage.	400-700
Immediate death.	1,000



Note: Laboratories are often not able to properly analyze for H₂S due to its reactivity. Colorimetric stain tubes (such as Draeger or Sensidyne) diffusion type tube monitoring may be generally adequate. Note that when using diffusion type tubes, some interferants may mask detection of the chemical of interest.

EXPOSURE TO LANDFILL GAS

Perhaps the most prominent concern regarding work around landfill gas is its potential to combust or explode. This concern is well founded in that methane in landfill gas can burn at concentrations as low as 5 percent in air (referred to as the lower explosive limit, or LEL). When the LGCCS is operating normally, the Landfill Gas Technician is rarely exposed to landfill gas at combustible levels (see **Vacuum Is Your Friend**). Since portions of the system may not be working effectively, however, it is critical to eliminate the use of equipment, tools, instrumentation, flashlights, or any other devices that could serve as ignition sources in a combustible gas mixture.

Landfill Gas Technicians often find it necessary to add or replace sample ports in the landfill gas system. Though the system typically operates under a vacuum, technicians should not assume that vacuum is present without verification—loss of vacuum is often the motive for installing a sample port. The tool most commonly used to install the port is a battery-powered drill. Most such drills are not “intrinsically safe” (see definition below). If portions of the system into which the port is being installed are under pressure (an unusual occurrence), conditions could be ripe for gas to be released from the drilled hole in sufficient quantities to create a flammable mixture, which could then be ignited by sparks from the drill.

Intrinsically safe - Equipment and wiring *not* capable of releasing sufficient electrical or thermal energy under normal or abnormal conditions to cause ignition of a flammable or combustible atmospheric mixture in its most easily ignitable concentration. NOTE: Other types of explosion safety are also acceptable. Technicians should locate the approval label.

Situations such as these can be remedied with common sense. If vacuum cannot be directly verified, the Landfill Gas Technician should use an intrinsically -safe or hand-operated drill, thus removing the potential source of ignition. When monitoring of the surrounding air is required, a combustible gas analyzer, or preferably a multi-gas meter, should be used to verify that safe concentrations exist. The meter should be activated and remain with the technician whenever the vacuum could be broken.

As safety procedures are developed, they should be recorded in standard work permits and distributed to personnel as necessary (see Section J).

ENVIRONMENT

From a health and safety perspective, physical hazards at landfills are often considered less important than explosive characteristics of landfill gas. But physical hazards are often the source of injuries. Technicians must be trained for and ready to work in this environment.

The landfill environment features all of the hazards associated with an outdoor natural environment, coupled with those found at any large-scale construction site. Landfill Gas Technicians can face weather conditions ranging from extreme cold to extreme heat, and from



wet to dry. Insects and pests associated with natural environments, including spiders, snakes, or other animals, can also be found on landfills, and on or around gas wells and other components of the landfill gas system. Landfill Gas Technicians should carry sun block, insect repellent, and items such as those that hikers or outdoor enthusiasts use.

In addition to these items, protective clothing, sufficient water, dust protection, and vision protection must be available so that landfill personnel can complete tasks with minimal potential for injury.

Slip, Trip, and Fall Hazards

Landfill Gas Technicians must be constantly aware of where they walk while performing their tasks. Many gas collection wells are located on the landfill's side slopes. Often, those areas have vegetated cover that may camouflage hazards on the surface, including erosion ruts, construction debris, refuse, and leachate seeps that can impede walking. Landfill Gas Technicians should wear appropriate foot wear such as sturdy hiking boots with steel toes and steel shanks. Additional site-specific equipment, such as crampons, snowshoes, or snake-repellent gaiters, may be required, depending on expected conditions.

Landfill Activities

Many injuries and deaths on landfills are associated with heavy construction and compaction equipment operating on the landfill. Much of this equipment is extremely large, and the operator may have poor visibility. The fatigue of operators who perform repetitive tasks for long periods of time is an additional danger. Landfill Gas Technicians typically constitute one of the smallest features of this environment, and are dwarfed by equipment commonly found there. Landfill Gas Technicians often work in close proximity to heavy equipment when monitoring gas collection wells near the active landfill face, or while sharing the same roads. Single-lane roads with poor visibility (blind corners, hills, etc.) are common, requiring Landfill Gas Technicians to be constantly aware of activities around them as they perform tasks.

Landfill Gas Managers must develop a traffic management plan, essentially a *choreography* that lets everyone know where they should be and when, for the benefit of all site workers. Equipment operators must be advised when landfill personnel are working near them, and visitors to the landfill must be adequately informed of the dangers. Landfill Gas Technicians must make an effort to remain visible to fellow workers and customers at the landfill. Wearing high-visibility lime-green or fluorescent orange safety vests (see **Personal Protective Equipment, PPE**) with reflective materials, and staying away from blind spots of large equipment, are recommendations to put into practice. A technician can minimize the time spent in high-traffic areas by carefully planning routes and ensuring that equipment, materials, and tools necessary to complete tasks are being personally carried, that instruments are calibrated, and that batteries (along with spares) are fully charged.

Communication with site workers, especially equipment operators, is an important component of maintaining a safe working environment. This can be accomplished by radio or by using hand signals through which the Landfill Gas Technician verifies that the equipment operator has noticed his or her presence through a confirming hand signal. A daily operations meeting is a good place to advise personnel where you will be working throughout the day.



B. PLANNING

Employees are required to comply with safety rules and regulations applicable to their activities and conduct. Personnel must be physically able and mentally willing to comply with safety requirements. Managers should organize and plan for contingencies. Planning should include the following:

1. Designate responsibility outlined as follows (a single person may fill more than one of these roles):
 - a. Principal-in-Charge (engineering company principal, Public Works Director, etc.).
 - b. Technical/Project Director (Project Principal/Associate/Director, etc.).
 - c. Safety Officer/Manager (at the office) (Project Manager/Company Safety Manager, Landfill Operations Manager, etc.).
 - d. Site Safety Coordinator (field) (Project Engineer, Landfill Operations Supervisor, etc.).
2. Verify worker fitness for landfill work. In some situations, certain employees need to be in a medical surveillance program. Physical health examination reports, certified by a licensed and qualified occupational health physician, should state that the worker is fit to wear the required respirator (see Section L).
3. Identify the nearest hospital and emergency notification phone numbers.
4. Prepare (hospital) admissions information, prior to need, for each employee as appropriate.

The following admissions information is often required:

- a. Name, address, telephone.
- b. Emergency contact information - relationship, telephone, spouse (patient's).
- c. Employer - address, telephone.
- d. Insurance company - name, address, telephone, policy holder, policy number.



C. SAFETY PLANS AND PROGRAMS

A site-specific Health and Safety Plan (HASP) should be developed for each landfill site. This plan should be tailored to both the site and the situation. At a minimum, the HASP should include a site location plan with a map showing directions to the local hospital. The HASP should also provide emergency contact information, a description of responsibilities, and an organizational structure for the site. A brief overview of site work activities covered by the plan; a description of hazards, both physical (e.g., entry into excavations) and chemical (hazard assessment information); and a list of air monitoring/action levels and required PPE should be included. Proper decontamination of equipment and PPE, and disposal of contaminated materials, should be indicated. The HASP should also provide an incident report form for listing deviations or additions that were incorporated into the document, and should include a visitor's log. The reader should consult OSHA 29 CFR 1910.120 for Site-Specific Plan requirements.

SAFETY MANAGEMENT

At a minimum, the following recommendations should be implemented:

1. Designated safety personnel should be qualified to manage compliance with requirements and safety concerns.
2. Safety procedures set forth in a site-specific HASP should be documented and reviewed with all workers prior to the start of work. The site-specific HASP is required to be maintained at the job site.
3. Scheduled health and safety meetings should be held regularly to review the safety program and the site-specific HASP.
4. Unsafe behaviors should be immediately stopped if discovered, and should be replaced by procedures that protect the health and safety of workers.
5. Required safety equipment must be maintained on site, according to the manufacturer's recommendations, and should be checked periodically for damage, necessary repairs, and replacement and/or function.
6. If respirators are used, a written respiratory protection program will be required from each employer that describes SOPs governing selection and use of respirators, medical examination and approval, fit testing, respirator inspection, cleaning and disinfecting, repair, and storage. All employees who may be required to wear respirators will be required to be fit tested and trained in their proper use (see Section L).
7. A list containing names and phone numbers of appropriate local authorities (fire department, air quality, etc.) should be part of the site-specific HASP, a copy of which should be maintained at the job site at all times. Included in this list should be a map with directions to the nearest hospital. The site-specific HASP must be readily available to all workers at the site.
8. Contracts for landfill gas testing, construction, or operation should include a requirement that safety procedures, as set forth in the site-specific HASP and the Contractor's health and safety plan, will be followed by all parties involved in the work.



OSHA requires that companies develop a general health and safety plan or program (OSHA 1910.120 and OSHA 1926). Work locations such as landfills must also comply with this requirement, since field construction contractors may be working at the landfill sites (activities related to construction are discussed in Sections H and J). General health and safety programs should address the following components, as necessary and appropriate, depending on conditions and state and local laws:

1. Accident Prevention Program (General Safety).
2. Hazard Communication and “Right-to-Know.”
3. Noise Control.
4. Dust Control.
5. Respiratory Protection Program.
6. Confined Space Entry Safety Program.
7. Medical Surveillance (mandatory under certain circumstances; optional in others).
8. Safety Training Program (including hazardous materials and hazardous waste site training).
9. Personnel and Work Environment Monitoring.
10. Records Maintenance (for all of the above).

1. Accident Prevention Program

A written accident prevention program covering general safety issues is a basic building block of an overall health and safety program. The program should contain the company or organization policy, objectives of the program, and assignments of responsibility for health and safety. Availability of resources should also be addressed. Employee training sessions and routine “tailgate” safety meetings are advisable and, in some instances, required.

2. Hazard Communication and “Right-to-Know” Standards

OSHA’s Hazard Communication Standard does not apply to landfill gas, since hazardous chemicals in the gas are not “used” by the operator. However, principles of the standard will serve the best interests of the landfill owner/operator, the landfill gas developer, or the consultant. Hazard communication programs provide a good start for properly informing personnel of the dangers to which they may be exposed. The Hazard Communication Standard *does* apply to chemicals used in construction and recovery system operation and maintenance activities. The Federal Hazard Communication Standard is covered in 29 CFR Part 1910.1200.

If personnel perform such tasks as constructing or repairing and maintaining PVC landfill gas collection systems, and therefore work with PVC primer and cement, work with these materials is covered under requirements of Hazard Communication and “Right-to-Know” statutes. Material Safety Data Sheets (MSDSs) must be maintained and personnel trained in their use. MSDSs may also be required at landfill gas recovery plants where water treatment or other types of chemicals are a part of the operation.



Information regarding the constituents of landfill gas (vinyl chloride, methylene chloride, benzene, or toluene) should be included in such programs. It may be impractical to attempt to identify all of these chemicals; only those of special significance, or those found in high enough concentrations to be of concern, should be addressed in detail. For municipal sites, such an approach, while not required by law, would be prudent.

3. Noise Control

Where high levels of noise are present (when, for example, a coworker cannot be heard while speaking in a normal volume from a distance of 3 feet for prolonged periods), a noise control program is typically required. Appropriate use of hearing protection, either ear plugs or ear muffs, or both, should be enforced. OSHA's Noise Control Standard is covered in 29 CFR Part 1910.95.

4. Dust Control

Typical dust control or mitigation practices require the regular use of a water truck or some other means of dust suppression. Where high levels of dust and particulates may be generated from excavation, drilling, or earthmoving operations, a dust control program, sometimes including fugitive dust monitoring and sampling, is typically required.

5. Respiratory Protection Program

Respiratory protection programs should accomplish the following tasks:

- a. Hazard identification and assessment.
- b. Written standard operating procedures.
- c. Employee training.
- d. Periodic medical assessment of employees and approval for respirator fitting and use.
- e. Appropriate respirator selection for a specific job.
- f. Proper qualitative fitting of respirators to personnel.
- g. Maintenance and storage of respiratory protection equipment.
- h. Periodic reevaluation of the program.

Persons involved in the administration of a respiratory protection program should be thoroughly familiar with the Protection Factor (PF) of Air-Purifying Respirators (APRs) used, the Maximum Use Concentration (MUC) of the APRs, determination of the Maximum Use Limitation (MUL) of a respirator, Permissible Exposure Limits (PELs), Threshold Limit Values (TLVs), levels Immediately Dangerous to Life and Health (IDLHs), and other concepts such as warning properties and respirator filter breakthrough. Note that APRs are not permitted for landfill gas work because of inadequate warning properties. Supplied-air respirators are typically used at landfills unless stringent, reliable monitoring for hydrogen sulfide, methane, and carbon dioxide is continuously performed in the breathing zone.



Specific regulatory requirements for respiratory protection are delineated in CFR 29, Part 1910.134, for general industry, and 29 CFR 1926.103 for the construction industry. Relevant health standards include:

- Federal OSHA PELs, which are legal standards; these are found in 29 CFR 1910.1000, Subpart Z.
- State-published PELs, which often adopt the American Conference of Governmental Industrial Hygienists (ACGIH) TLVs; these standards are usually lower (more stringent) than PELs.
- The current annual edition of "Threshold Limit Values and Biological Exposure Indices," published by the ACGIH. This document contains the often-cited Threshold Limit Value/Time-Weighted-Average (TLV-TWA), Threshold Limit Value/Short-Term Exposure Limit (TLV-STEL), and Ceiling (C) exposure limits.
- National Institute of Occupational Safety and Health (NIOSH) Recommended Exposure Limits (RELs), found in the "NIOSH Pocket Guide to Chemical Hazards" (2005), which is available from the U.S. Government Printing Office and may be downloaded from the NIOSH website at www.cdc.gov/niosh/npg/default.html.

Note that these sources address different lists of chemicals and have different limits for the chemicals that they do address.

Hierarchy of Protection (Engineering Controls)

It is a basic tenet of occupational health that employers must first use whatever engineering controls are available to reduce hazards. If, after instituting controls, conditions still warrant respiratory protection, such protection must be implemented. At an operating landfill, the vacuum system is the primary engineering control. Another example would be application of water spray to prevent fugitive dust emissions.

Medical Assessment for Respirator Use--

Individuals who may be required to use a respirator must see a qualified physician to undergo an occupational physical assessment for proposed respirator use. This is a legal requirement. A physician who is Board-certified in Occupational Health is recommended. There are numerous medical issues that must be addressed by a qualified medical professional, such as diabetes, cardiovascular problems, and the like, which are not readily apparent to the untrained individual.

Respirator Fit Testing--

Respirator fit testing is performed after approval by a qualified physician. Fit testing is intended to verify the seal of a particular brand of respirator to an individual's face, to demonstrate respirator effectiveness, to instill confidence in respiratory performance, and to allow the individual being tested to experience the physical limitations imposed by the respirator.



6. Confined Space Entry Program

Many spaces present at landfills, such as manholes or pump stations, may be “confined.” A confined space is defined by OSHA 29 CFR 1910.146 as a space that is large enough and so configured that an employee can bodily enter and perform work; confined space also has limited or restricted means for entry or exit, and is not designed for continuous employee occupancy.

The OSHA Construction Standard 29 CFR 1926.31 defines a confined space as any space that has a limited means of egress, which is subject to the accumulation of toxic or flammable contaminants, or has an oxygen-deficient atmosphere.

Facilities with confined spaces are required by 29 CFR 1910.146 to have a confined space entry program that includes training and written safety procedures for each defined confined space at the facility. Employees that work in or around confined spaces should receive appropriate training, and be familiar with and comply with the facility’s confined space entry program.

During any confined space entry, these general guidelines should be followed:

- Do not enter a confined space until the safety precautions described in the entry permit have been taken. If there is no permit yet, you are not ready to enter.
- Safety precautions that should be observed prior to the start of permit-required confined space work include, but are not limited to, the following:
 - Posting a properly completed and approved confined space entry permit outside the confined space.
 - Closing and placing locks or tags on any system that may affect the safety of personnel in or around the confined space, such as electrical lines, steam pipes, or pipes containing toxic chemicals.
 - Conducting atmospheric monitoring to ensure that the atmosphere inside the confined space does not contain hazardous or explosive gases, and that there is adequate oxygen.
 - Ensuring that procedures and equipment for responding to emergencies, such as evacuating personnel or responding to fires, are in place. These include, but are not limited to:
 - Posting standby personnel outside the space.
 - Posting emergency phone numbers and points of contact in highly visible locations by site telephones.

Equipment required for an emergency can include:

- SCBAs.
- Tripod-mounted emergency hoists.
- Safety harnesses and lifelines.
- Fire extinguishers.



7. Medical Surveillance

In addition to medical approval for use of respiratory protection equipment, baseline physicals and medical surveillance may be required for work under special circumstances. If exposure to concentrations of specific toxic chemicals such as benzene, vinyl chloride, and asbestos is above action levels, medical surveillance is required by law. *Technicians who routinely work directly with landfill gas at municipal landfills should receive routine medical examinations.* 29 CFR Part 1910.20 governs access to employee exposure medical records.

8. Safety Training Program

A basic safety training program is usually provided to serve the following functions:

- a. Teach and inform employees about basic safety concerns.
- b. Address job-specific hazards likely to be encountered.
- c. Fulfill certain legal notification and training requirements.
- d. Heighten employee awareness.

9. Personnel and Work Environment Monitoring

Consistent with the “general duty clause” in the OSHA statute, an employer must monitor employees and/or the work environment whenever a risk for employee exposure is known or can be suspected. Requirements for personnel or work environment monitoring are dependent on the type of work being performed and specific site conditions. Monitoring may or may not be appropriate, depending on the situation, and whether or not it is specifically required by federal, state, or local regulations. Unless it can be demonstrated that monitoring is not required, monitoring should be performed at all times. Air monitoring should be conducted when excavating in refuse or repairing leachate or condensate piping. Consideration should be given to the fact that landfills are subject to changing conditions.

Typically in industrial processes, contaminants or substances that may cause health threats are known and monitoring is straightforward. For certain specific substances of concern, action levels at and above which monitoring must take place are specified by regulation (example: the action level for vinyl chloride is 0.5 parts per million, or ppm). The action level for a given substance is typically set at one half the TLV or OSHA PEL, but may be specified otherwise by regulation. When it is necessary to monitor work on waste sites, more complex issues may be encountered. A thorough site characterization is necessary at the outset of site work for the safety of personnel who will engage in field monitoring, construction, engineering, or landfill gas recovery activities. The monitoring or sampling plan may need to be modified or adjusted, based on findings.

Monitoring or sampling techniques should involve the use of a combustible gas analyzer (CGA), an organic vapor analyzer-flame ionization detector (OVA-FID), and a photo ionization detector (OVA-PID) to monitor total gas concentration in air and estimate the percentage of trace contaminants, based on analytical data. In general, FID instruments, which react too strongly to methane, provide less useful information about toxic vapors, which methane can “mask.” A monitoring or sampling plan should demonstrate an approach with a justifiable rationale, and



should be scrutinized for statistical validity. The necessity for such monitoring or additional sampling should be determined by an experienced and qualified professional who can evaluate the types of hazards and risks present, and the extent of exposure for the work to be performed. Note: CGA and FID instruments require a minimum of 15 percent oxygen to function correctly.

10. Records Maintenance

Accurate, reproducible, and verifiable records are essential for an effective overall health and safety program. They also provide protection against liability, and preclude situations where compliance cannot be demonstrated. Records should include medical assessment and respirator use approvals, certification of respirator fit test, respirator eyeglass insert information, respirator maintenance records, exposure monitoring data, gas characterization information, etc.



D. HAZARD ASSESSMENT AND IDENTIFICATION

Identification of hazards to be protected against is a necessary step in the implementation of respiratory and bodily protection. Extreme caution is warranted in dealing with situations where landfill gas is detected within the explosive range, or high concentrations of hydrogen sulfide are present. Other kinds of special hazards are listed in Section H, "Safety Procedures for Well Drilling and Construction."

A Job Safety Analysis (also known as a Job Task Safety Analysis or Activity Hazard Analysis) is used to identify physical and chemical hazards, appropriate PPE, and safeguards to prevent exposure and injuries from identified hazards. The Job Safety Analysis involves the following elements:

- The steps involved in performing a specific job task.
- The existing or potential safety and health hazards associated with each step of the task.
- The recommended safeguards, action(s), and PPE that will eliminate or reduce the hazards and minimize the risk of occurrence of a workplace injury or illness.

(For guidance on conducting Job Safety Analysis, see *OSHA Publication 3071 - Job Hazard Analysis - 2002*, <http://www.osha.gov/Publications/osha3071.html>)

In the case of landfill gas, hazard assessment and identification should include site-specific characterization of the gas. Initial characterization may be performed by gas chromatograph/mass spectrometer. Once chemicals are qualitatively identified, more specific quantitative data should be obtained using a more specific analytical detector for the classes of chemicals in question. The analytical method selected should be capable, at a minimum, of identifying compounds of concern at concentration levels at or below any action levels set for those compounds (i.e., one half the TLV or PEL).

At a minimum, hazard assessment should include characterization of hydrogen sulfide in the landfill gas. H₂S has been observed at landfills with large amounts of construction debris (especially gypsum board wastes) at levels exceeding 1,000 ppm, which is well above the IDLH value of 100 ppm for H₂S.

Identification of contaminants in landfill gas may be difficult due to the heterogeneous nature of landfills and the dynamic nature of biological decomposition occurring there. Hence, landfill gas composition varies from site to site, as well as throughout a site. An appropriate initial characterization, however, can predict chemicals that are present and their relative concentrations. When characterization is performed, care must be exercised in interpreting results, taking into account the specific limitations of the collection and the analytical methods and hardware used.

In addition to primary landfill gas constituents (CH₄, O₂, N₂, and CO₂), trace contaminants are present in landfill gas. There are hundreds to thousands of trace contaminants, most of which are at such low levels that it is impractical to identify all of them. Accuracy and sensitivity to a given class of chemicals will vary, depending on the analytical methods and hardware used. Chemicals that have received the most regulatory scrutiny are volatile priority pollutants. These,

generally, are the aliphatic, aromatic, cyclical, and chlorinated hydrocarbons. Other classes of chemicals may also be present in landfill gas, in gas condensate from various phases of a recovery process, and in leachate. They may include organic and inorganic acids and bases, sulfur compounds, metals, and metal hydrides.

The following priority pollutants may be found in landfill gas:

Chemical	Formula	Exposure Limits (PEL, TLV, IDLH¹)
Hydrogen Sulfide	H ₂ S	PEL = 20 ppm (Ceiling - 1971) TLV = 1 ppm (8-hr TWA ² , 5 ppm (STEL ³) IDLH = 100 ppm
Methyl Mercaptan	CH ₃ SH	PEL = 0.5 ppm (8-hr TWA), 10 ppm (ceiling) TLV = 0.5 ppm (8-hr TWA) IDLH = 150 ppm
Benzene	C ₆ H ₆	PEL = 1 ppm (8-hr TWA), 5 ppm (STEL) TLV = 0.5 ppm (8-hr TWA), 2.5 ppm (STEL) IDLH = 500 ppm
Chloroethene (Vinyl Chloride)	CH ₂ :CHCl	PEL = 1 ppm (8-hr TWA), 5 ppm (STEL) TLV = 1 ppm (8-hr TWA)
1,2-Dibromoethane (Ethylene Dibromide)	BrCH ₂ CH ₂ Br	PEL = 20 ppm (8-hr TWA), 30 ppm (ceiling), 50 ppm (maximum peak above ceiling for 5-minute period in 8 hrs) TLV = A3 carcinogen IDLH= 100 ppm
1,2-Dichloroethane (Ethylene Dichloride)	ClCH ₂ CH ₂ Cl	PEL = 50 ppm (8-hr TWA), 100 ppm (ceiling), 200 ppm (maximum peak above ceiling for 5-minute period in any 3 hrs) TLV = 10 ppm (8-hr TWA) IDLH = 50 ppm
Dichloromethane (Methylene Chloride)	CH ₂ Cl	PEL = 25 ppm (8-hr TWA), 125 ppm (STEL) TLV = 50 ppm (8-hr TWA) IDLH = 2,300 ppm
Tetrachloroethylene (Perchloroethylene)	Cl ₂ C:CCl ₂	PEL = 100 ppm (8-hr TWA), 200 ppm (ceiling), 300 ppm (maximum peak above ceiling for 5-minute period in any 3 hrs) TLV = 25 ppm (8-hr TWA), 100 ppm (STEL) IDLH = 150 ppm
Tetrachloromethane (Carbon Tetrachloride)	CCl ₄	PEL = 10 ppm (8-hr TWA), 25 ppm (ceiling), 200 ppm (maximum peak above ceiling for 5- minute period in any 3 hrs)

Chemical	Formula	Exposure Limits (PEL, TLV, IDLH ¹)
		TLV = 5 ppm (8-hr TWA), 10 ppm (STEL) IDLH = 200 ppm
1,1,1-Trichloroethane (Methyl Chloroform)	CH ₃ CCl ₃	PEL = 350 ppm (8-hr TWA) TLV = 350 (8-hr TWA), 450 ppm (STEL) IDLH = 700 ppm
Trichloroethylene	HCIC:CCl ₂	PEL = 100 ppm (8-hr TWA), 200 ppm (ceiling), 300 ppm (maximum peak above ceiling for 5-minute period in any 2 hrs) TLV = 10 ppm (8-hr TWA), 25 ppm (STEL) IDLH = 1,000 ppm
Trichloromethane (Chloroform)	CHCl ₃	PEL = 50 ppm (ceiling) TLV = 10 ppm (8-hr TWA) IDLH = 500 ppm

¹ PEL = Occupational Health and Safety Administration (OSHA) Permissible Exposure Limit, TLV = American Conference of Industrial Hygienists (ACGIH) Threshold Limit Values (guideline), IDLH = Immediately Dangerous to Life and Health based on NIOSH Revised Guidelines.

² 8-hr TWA = Time weighted average for an 8-hr exposure period.

³ STEL = 15-minute Short-term Exposure Limit.



E. SAFETY EQUIPMENT

Employees at landfill gas sites often perform tasks that require equipment to protect them from chemical and physical hazards that may be encountered. OSHA requires that employers issue such equipment after they assess the nature and extent of potential chemical and physical hazards associated with the work. Regarding the assessment, this section provides guidance to employers whose personnel may be exposed to landfill gas.

Any worker engaged in operating landfill gas facilities should wear the protective safety equipment required on typical industrial or construction work sites, including items listed below. These items are subject to OSHA regulations. **Table E-1** (below) shows OSHA standards related to the use of PPE. The relevant national consensus standards are provided in **Table K-1** (see Section K):

1. Full-length trousers are recommended.
2. Shirts with sleeves are recommended (short-sleeve shirts are acceptable). Do not use synthetic fabrics, unless they are flame-retardant.
3. ANSI-approved steel-toe and shank footwear are recommended:
 - a. Safety footwear should cover the ankle and have sturdy tread appropriate for outdoor use and a defined heel.
4. Hardhat:
 - a. Employees should wear ANSI-approved hard hats during field activities, unless they know there are no potential overhead hazards.
5. ANSI-approved high-visibility vests are recommended.
6. Safety glasses with side shields:
 - a. Employees should wear safety glasses during field activities, unless they know there are no potential hazards to the eye.
 - b. Contact lenses may be used in most situations, provided appropriate eye protection such as safety eyewear is also used.

Workers engaged in construction or maintenance of landfill gas facilities should wear the protective safety equipment listed above, plus:

1. Protective gloves:
 - a. Chemically protective gloves are mandatory while working with wet solid waste or where exposure to leachate or condensate is possible.
 - b. Glove material should be impermeable to expected contaminants.



- c. Selection of protective materials is dependent on the potential hazards present, and should be based on performance data and recommendations provided by material manufacturers.
 - d. Because some people can be allergic to rubber products, be prepared to offer alternatives to natural rubber gloves.
2. Hearing protection, depending on noise levels in the work environment:
 - a. A Hearing Conservation Program should be implemented.

Other protective equipment may include:

1. Chemically protective overalls (Saranex, Tyvek, etc.):
 - a. In selecting overalls, consideration should be given to such factors as size, durability, chemical compatibility, and heat stress potential.
 - b. Appropriate sizes of protective garments for large and small individuals should be provided.
2. Steel-toe and shank neoprene boots.
3. Chemically protective gloves (e.g., Viton, neoprene, nitrile).
4. Respiratory protection appropriate to the level of hazard (see Section L and Section C, Item 5).
5. Self-Contained Breathing Apparatus (SCBA), fitted with a pressure-demand type regulator and a 30-minute (minimum) bottle or supplied air system. (This equipment is needed if the concentration of contaminants can change rapidly in the workspace, or if methane, carbon dioxide, or hydrogen sulfide is present at concentrations above action levels, as defined in the HASP.)

The following equipment should be available at the job site in quantities sufficient to cover all anticipated activities:

1. Clean water, soap, and paper towels.
2. First aid kit, eye wash station, stretcher, and blanket.
3. Two fire extinguishers: 20:A-80:BC.
4. "No Smoking" signs. (These are necessary where employees unfamiliar with the operation of landfill gas systems may be present.)
5. For confined space entry equipment requirements, see Section I.
6. Combustible Gas Analyzer (CGA) with oxygen indicator. (As described in Section K, this equipment is operated continuously whenever landfill gas is potentially present in the workspace. Note that the concentration of oxygen must be checked first, since most CGAs



will not provide a proper reading of combustible gas concentrations in an oxygen-deficient atmosphere.)

7. Hydrogen sulfide indicator. (Hydrogen sulfide may be measured on the same multi-gas tester as combustible gas and oxygen levels. As described in Section K, this instrument should be operated continuously whenever there is a potential for landfill gas to enter the workspace.)
8. Additional monitoring equipment for toxic vapors and aerosols.
9. Barricades and/or barrier tape. (This equipment is necessary where employees unfamiliar with the operation of landfill gas systems may be present.)
10. Covers for excavations that will remain open at the end of the day.
11. Air-moving equipment that can provide ventilation if employees are working in environments with substandard air (trenches, condensate drain pits, etc.).
12. Fire-resistant blanket suitable for extinguishing a small fire or for maintaining body heat of personnel in shock.
13. Construction equipment equipped with vertical exhaust or spark arrestors if located within 2 feet of grade.
14. Flagging, traffic markers, and high-visibility safety vests for use when working around operating equipment or near public roadways.

Employees should utilize protective equipment required by the HASP. Safety items must be inspected before use. Items that contact the body must be cleaned and sanitized, as appropriate, before other employees can use them. Defective or damaged PPE must be taken out of service immediately.

Table E-1 shows OSHA standards related to the use of PPE.

TABLE E-1

OSHA STANDARDS FOR THE USE OF PERSONAL PROTECTIVE EQUIPMENT

Type of Protection	Regulation	Source
General	29 CFR 1910.132 29 CFR 1910.1000-1045	41 CFR, Part 50-204.7 - General Requirements for Personal Protective Equipment OSHA Rulemaking
Eye and Face	29 CFR 1910.133(a)	ANSI Z87.1 - Eye and Face Protection ¹



TABLE E-1

OSHA STANDARDS FOR THE USE OF PERSONAL PROTECTIVE EQUIPMENT

Type of Protection	Regulation	Source
Noise Exposure	29 CFR 1910.95	41 CFR 50-204.10 and OSHA Rulemaking
Respiratory	29 CFR 1910.134	ANSI Z88.2 - Standard Practice for Respiratory Protection
Head	29 CFR 1910.135	ANSI Z89.1 - Safety Requirements for Industrial Head Protection
Foot	29 CFR 1910.136	ASTM F2413-05 - Standard for Foot Protection
Electrical Protective Devices	29 CFR 1910.335(a)(2)	NFPA 70E - Standard for Electrical Safety in the Workplace
High-Visibility Safety Apparel	29 CFR 1926.651(d)	ANSI/ISEA 107-2004 - National Standard for High-Visibility Safety Apparel

¹ American National Standards Institute (ANSI), 1430 Broadway, New York, NY 10018.



F. PERSONAL HEALTH AND HYGIENE

1. Ensuring personal safety and the safety of fellow workers requires that employees remain mentally alert at all times. No alcohol or drugs are permitted. Smoking should be prohibited on the landfill site. No worker should handle excavated solid waste without wearing chemically protective gloves. Parts of the body accidentally exposed to waste, leachate, or condensate should be washed immediately with soap and water. Eating meals on the landfill should be prohibited, and washing of hands prior to eating should be required.
2. Any cut or abrasion that occurs on the landfill should be examined and/or treated immediately by a physician or other licensed health care professional, because the chance of incurring infection while working in this environment is high. A tetanus shot may be recommended for personnel involved in site construction and/or testing activities. Any person who makes contact with fresh waste has a potential to contact bloodborne pathogens. It is recommended these persons participate in a bloodborne pathogen program. Employers should consult medical professionals to determine if hepatitis B immunizations are appropriate.
3. Workers should avoid contact with hazardous plants, or those known or suspected to be hazardous, growing on the landfill.
4. Animals, snakes, spiders, and insects should be avoided. First aid supplies should be maintained and placed in a location readily available to personnel. If unusual flora or fauna are expected, they should be characterized and identified as potential hazards in the site-specific HASP. Note: Expect to find such creatures whenever you open a closed space, such as well casings or portable toilets. Antidotes and/or medication should be maintained for persons with severe allergies.
5. The address, telephone number, and map to the nearest hospital and medical emergency room should be prominently posted. In addition, the telephone number of an ambulance and fire department/rescue unit should be prominently posted and maintained in the site-specific HASP.
6. Workers should wash hands prior to eating, drinking, smoking, or changing clothes.



G. LANDFILL GAS-RELATED SAFETY PROCEDURES

1. As a general safety rule, work with landfill gas should be performed by a team consisting of a minimum of two people. In situations where hazards are minimal, and where it is necessary to allow an individual to work alone, another responsible person must be aware of the solitary worker's tasks and scheduled time of completion and return, and, if possible monitor that individual's progress.
2. When working on (or within 1,000 feet of) an active or completed solid waste landfilled area, workers should be alert to the existence of (or potential for the presence of) landfill gas. Some authorities assume 1,000 feet is the maximum distance that landfill gas will migrate through soil under **average** conditions. Migration distance, however, may be greater through underground conduits (such as the gravel pack around a leachate pipeline or fractured bedrock), in favorable subsurface soil conditions, or where surface conditions interfere with normal surface venting.

Hazards could be one or more of the following:

- a. Spontaneous fires caused by exposed and/or decomposing waste.
 - b. Fires and explosions in confined or enclosed spaces caused by an accumulation of landfill gas.
 - c. Oxygen deficiency in topographically low areas, underground trenches, vaults, conduits, and structures because air in these locations was displaced by landfill gas.
 - d. Other potentially toxic, flammable, or hazardous gases that may be present as constituents of landfill gas, including, but not limited to, hydrogen sulfide (H₂S), hydrogen (H₂), and other volatile organic compounds (VOCs).
 - e. Sudden subsidence or collapse of the landfill surface caused by the collapse of subsurface voids, which may be formed by decomposition, poor compaction, or subsurface landfill fires.
3. Confined spaces may be present at landfills (see Confined Space Entry Safety Program in Section C, Item 6).
 4. Flammable conditions may be present at landfills. It is not recommended to work where flammable gas levels are above 10 percent of the lower explosive limit (LEL) due to the potential for fire or explosion.
 5. Oxygen levels between 19.5 and 23.5 percent are considered acceptable conditions for working. Oxygen concentrations below or above these limits are not acceptable.
 6. The Resource Conservation and Recovery Act (RCRA) (40 CFR, Part 257.3-8, Safety) places a limit of 25 percent of the LEL (1.25 percent methane) on the maximum allowable methane concentration in landfill facility structures on or near landfills. OSHA regulations related to flammable or combustible environments may place a more stringent requirement on the maximum concentration allowed in a work environment (i.e., an occupied structure that is not private and residential).



7. The flammable range (LEL to UEL) for methane is approximately 5 to 15 percent in air at sea level at 25°C. As little as 0.3 millijoule of static electricity is sufficient to cause methane ignition. This is about 1/50th the amount of static electricity accumulated by a person walking across a carpeted floor on a dry day. The specific (vapor) density of methane is 0.6 that of air; in contrast, the specific density of undiluted landfill gas is normally about 1.0 (close to that of air, depending on constituent concentrations). Personnel should not, therefore, automatically assume that because landfill gas contains methane, the mixture is lighter than air and will rise. The behavior of landfill gas varies with its constituent makeup, which also varies.
8. Prior to the entry of workers into an excavation, vault, or below-grade ditch, and routinely during intrusive work into waste, the atmosphere should be tested for explosive conditions, oxygen deficiency, and H₂S levels. Air blowers or fans should be available for positive ventilation. APRs with chemical cartridges may be used for gaseous contaminants (but not for hydrogen sulfide, methane, or carbon dioxide) if ALL of the following conditions are met:
 - a. The oxygen concentration is satisfactory.
 - b. The chemical contaminants have been identified.
 - c. The concentrations have been monitored.
 - d. The cartridges are effective in removing the contaminants.
 - e. All contaminants have good warning properties, or the employer has developed a process of evaluating cartridge service life.

Mechanical filter respirators should be used only for protection against the particulate matter for which they are rated.

A pressure-demand SCBA or supplied air respirator must be used when entering all other areas containing hazardous and/or oxygen-deficient atmospheres.

9. Fires and explosions always require a source of ignition. Smoking should be strictly forbidden anywhere on landfills and surrounding properties and buildings. Non-sparking and/or explosion-proof tools should be used in vaults, trenches, and other enclosed areas. Positive ventilation is required in construction shacks or other temporary or permanent structures on or near a landfill. Temporary structures on the landfill surface should be constructed on blocks or other supports, with a ventilated area under the main floor. Construction equipment should be equipped with a vertical exhaust at least 5 feet above grade and/or with spark arrestors. Other potential ignition sources include cell phones, two-way radios, flashlights, digital cameras, and other powered equipment.
10. Hydrogen sulfide gas is usually present at some concentration, generally below 100 ppm (NIOSH IDLH concentration), in landfill gas. Very high (lethal) concentrations of H₂S may be produced where natural or manmade gypsum occurs (including construction debris containing wallboard concentrated in one location), and can interact with high levels of moisture. Dangerous and unexpected pockets of H₂S gas may therefore be encountered (Table I-1 lists the physiological responses to this chemical). Personnel must be trained for, and remain alert to, these possibilities.

Given that concentrations of H₂S at a landfill can be variable or unknown, APRs are never acceptable in the case of H₂S. In situations when high concentrations of H₂S are known or suspected, pressure-demand SCBA or supplied air respirators should be used.



H. SAFETY PROCEDURES FOR WELL DRILLING AND CONSTRUCTION

1. One person representing the landfill owner should be present at all times during construction. That individual will have the responsibility of observing safety procedures, and will be trained in the use of all recommended safety equipment.
2. Smoking should be strictly forbidden anywhere on the landfill.
3. Fire extinguishers should be on hand during drilling (two 20:A-80:BC fire extinguishers are recommended). The drilling crew should be alert to the potential for drill tools to spark against rock or metal, causing fire in or at the top of the bore hole. Landfill gas will typically burn almost invisibly under such circumstances. Fires should be extinguished by covering the boring with soil, using earthmoving equipment. As a contingency before drilling, arrangements should be made to have a loader or equivalent equipment available or on call in case of a borehole fire, along with excess soil that can be used to cover the borehole if a fire should break out.
4. Field personnel should stay away from the edge of any borehole that is 14 inches in diameter or greater until it is fully completed. Due to the typically oxygen-deficient environment “down hole,” an individual who falls into an open borehole, even a short distance, would likely not survive. Workers required to work within 5 feet of the edge of the borehole need to be protected from falling into the opening either by a safety grate, guard rail, tether, or more than one means. Federal fall protection standards should be enforced. It should be determined beforehand under what circumstances individuals working in the vicinity of drilling activities will need to be tethered to a fixed object.
5. No worker should be allowed to work alone at any time near the edge of the well under construction. At least one other worker must be present beyond areas considered to be subject to the possible effects of landfill gas or cave-in. The number of persons working near the borehole should also be limited to the number necessary to accomplish the task, though there should always be sufficient workers present nearby to remove an injured worker or to summon help if it is safe for others to enter the area where the injured worker is located. If the situation appears unsafe, help should be summoned and appropriate measures (PPE, proper tie-downs, etc.) taken before other workers enter the area where an injured worker is located.
6. During drilling, special consideration must be given to the strength of the refuse surrounding the borehole. Refuse may be prone to instability that may cause side wall failure of a borehole at any time. Individuals present at the time of failure could be drawn into an oxygen-deficient environment or buried.

At all times, personnel performing drilling work must remain alert to changing subsurface conditions and signs of impending physical failure, including fissures or cracks on the ground that indicate a failure might occur. It is not uncommon to experience a “hollowing out” effect, which creates a cavity at depths much larger than the boring due to side wall failure “down hole.” This could cause a sudden collapse to happen at the surface. It should be remembered that the drill rig usually exerts a large, vibratory force at the surface in the vicinity of a boring, which may exacerbate borehole wall failure.



7. Drilling personnel must also remain alert to the potential for encountering subsurface hazards, particularly in older landfills where screening of materials may have been less controlled. Although rare, a variety of hazardous situations have been encountered during drilling in landfills, especially near military or chemical processing facilities. Potential hazards include:
 - a. Unknown hazardous chemicals in drums or containers. These could contain combustible or explosive, reactive, toxic, or corrosive materials.
 - b. Military munitions.
 - c. Asbestos.
 - d. Compressed gas cylinders (CGCs).
 - e. Biomedical waste.
 - f. Radioactive waste.
8. Periodically during well construction, the work area should be monitored for concentrations of methane and hydrogen sulfide. Continuous monitoring is better. Toxic organic compounds may be present and may include vinyl chloride, benzene, and other chemicals that are known to exist within landfills (see Section K).
9. If well construction is not completed by the end of the workday, the hole must be covered with a plate or cover of sufficient size to prevent access to the hole, and must be of sufficient thickness and structural strength to support expected loads. The plate or cover should be placed so that it cannot be removed by persons not authorized to remove the cover. The edges of the cover must be covered with a sufficient quantity of soil to limit the amount of gas escaping. Barricades with caution tape should be placed around the covered hole outside the range of possible cave-ins to prevent unauthorized persons from entering the area.
10. All pipes should be capped at the end of each working day.
11. An exhaust hood can be used to control venting of landfill gas vapors while drilling, to the limit exposure of personnel and the environment to hazards. This is mandatory in some locales.



I. SAFETY PROCEDURES FOR EXCAVATION, TRENCHING, AND PIPE INSTALLATION

Employees involved in landfill gas operations are likely to work in or around excavations, and are exposed to hazards similar to those faced by construction personnel. Employees should learn to recognize these hazards and to avoid situations that put them, other employees, and contractors at risk. At a minimum, employees and contractors are required to operate in compliance with the trenching and shoring requirements described in OSHA 29 CFR 1926. Employees should be aware of the following safe excavation work practices:

1. Pre-excavation activities:

- a. Before excavation, the location of any underground utilities, such as gas, sewer, electricity, and telephone lines, should be determined and marked. In public areas, most states require that operators contact the state's utility location service. Calling 811 from any location in the USA will connect to the utility location service. On private property, each owner must determine the location of its underground utilities. It may be necessary to use non-intrusive subsurface investigation techniques to identify underground utilities and installations.
- b. Excavations should be conducted under the direction of a competent person. OSHA defines "competent person" as an individual who has sufficient training and experience to be able to recognize hazards, and the authority to take corrective action. The competent person should be located on site and:
 - i. Perform inspections prior to the start of each shift, and as needed throughout the shift, to ensure safe operation.
 - ii. Remove employees from hazardous areas when there is evidence of possible cave-in.
 - iii. Identify and correct hazards associated with excavation.
- c. Operators may choose to require a permit before excavation occurs. State regulations should be investigated, as standards and requirements vary.
- d. Surface encumbrances (buildings, utility poles, pavement, or other structures that may be undermined by excavation) that have the potential to create hazards for employees or to become subject to physical damage must be removed, supported, or neutralized, as necessary, prior to the start of excavation work.
- e. The competent person must evaluate soil conditions and determine the shoring or sloping requirements for the trench or excavation, based on soil evaluation:
 - i. If no attempt is made to determine soil type, excavations must be sloped at an angle not steeper than 1.5 (horizontal) to 1 (vertical) (34 degrees); otherwise, a trench box or other protective system must be used.
 - ii. For excavations greater than 20 feet (6 m) deep, sloping and/or shoring requirements and systems must be designed by a professional engineer licensed to practice in the state where the work is being performed.



- iii. Smoking is prohibited within 50 feet of trenching and piping. Prohibition of smoking on the entire landfill is recommended.

2. During excavation:

General

- a. Do not stand under a live load, including the load of an excavator bucket.
- b. No material, including trench spoil, may be stored within 2 feet of the edge of an excavation.
- c. Avoid polluting water bodies by placing spoil piles away from the water and preventing the accumulation of spoils on slopes.
- d. Remove standing water using pumps, and continuously monitor the water level and pump operation.
- e. Place environmentally impacted soils on plastic liners, and cover spoil piles with plastic to prevent further spreading of contamination. Liners and covers should be durable enough for the intended period of storage.

Equipment

- a. Unless special precautions are implemented, keep heavy equipment, tools, and individuals more than 10 feet from any power line or exposed electrical distribution component. For lines rated above 30 kilovolts, follow the table in Table A of OSHA Standard 29 CFR 1409.
- b. Construction equipment should have a vertical exhaust at least 5 feet above grade and/or spark arrestors.
- c. All excavations that are 4 feet deep or deeper must have a ladder for access into the excavation, with no more than 25 feet of lateral travel in any direction. The ladder must extend beyond the top of the excavation by at least 3 feet.
- d. When mobile equipment is working near an excavation, and the operator cannot see the edge of the excavation well, a warning system, such as barricades, hand or mechanical signals, or stop logs, should be utilized.
- e. Tools, equipment, or heavy machinery should not be placed where they may affect the structural stability of the excavation or can fall into it.
- f. If possible, excavations should not be left open when unattended. If an excavation must be kept open, proper covers, fencing, and security should be provided to prevent access to the excavation during non-working hours.
- g. Personnel should stand away from vehicles being loaded or unloaded to avoid being struck by spillage or falling materials.
- h. The swing radius of excavation equipment should be completely avoided.



Air Contaminants

- a. Monitor air quality during excavation activities at landfill sites. Use forced ventilation, if needed (contaminants of concern and acceptable entry conditions are described in Section K).
- b. Provide forced-air ventilation, if needed, to keep concentrations of contaminants of concern below acceptable levels, as described in Section K, **Field Sampling for Health and Safety**. Calculations of required volumes should be performed by a competent person.

Excavation Collapse

- a. The competent person on site must evaluate soil conditions and stability as new soil layers are encountered.
 - b. The competent person must also inspect the trench or excavation daily before any work occurs in trenches or excavations.
 - c. All excavations must be barricaded with appropriate barrier tape and other protective devices to protect against falls or other inadvertent entry.
 - d. All excavations that are 5 feet deep or deeper, and excavations shallower than 5 feet in unstable soil, must be sloped, braced, or shored to prevent cave-ins.
3. Regarding work outside, but in support of, excavation:
- a. No worker should work alone, at any time, in or near the excavation. Another worker must be stationed beyond the area considered to be subject to the possible effects of landfill gas. A sufficient number of personnel should always be present to remove an injured or endangered worker and to summon help.
 - b. No worker may handle excavated solid waste without wearing appropriate work gloves and clothing, selected in accordance with Section E, **Safety Equipment**.
 - c. Electrical and electronic equipment used in or near landfill excavations should be explosion-proof or intrinsically safe, and should meet requirements for Class I, Division 1, Group D, in accordance with the National Electric Code (NEC).
 - d. No welding is permitted in, on, or immediately near the excavation area, unless the on-site competent person determines that methane and other combustible gases are not present in high enough concentrations to be hazardous. Some sites may require a "hot permit" to perform this work.
 - e. Solvent cleaning, gluing, or bonding of pipe should be performed, to the extent possible, outside the trench. Use of organic vapor respirators and appropriate gloves is recommended for employees who use PVC solvents or cements. Personnel using solvent and cement must be familiar with the appropriate Materials Safety Data Sheets (MSDS) for those products.



- f. As construction progresses, all valves should be closed as installed, to prevent migration of gases through the pipeline and gas collection system.
- g. All installed pipe, and staged fused sections longer than 40 feet, must be capped when no employees are present, particularly at the end of each workday.



J. GENERAL CONSTRUCTION/MAINTENANCE

1. When drilling holes through pipe that contains landfill gas under positive pressure, or with methane in excess of the LEL, only explosion-proof electric, compressed air or hand-powered tools should be used.
2. When using alternating-current driven power tools, a portable ground-fault current interrupter (GFCI) should be used.
3. When welding near gas recovery processing equipment, suitable procedures and precautions should be employed, including:
 - a. Procuring a "hot work" permit (a self-issued serial numbered permit is required in many states).
 - b. Designating a specific, dedicated individual, by name, for fire watch.
 - c. Verifying that explosive concentrations of gas are not present (see Section K).
 - d. Providing adequate fire extinguishers (20:A-80:BC) and fire blankets.
 - e. Sandbagging all below-grade closed drainage system components.
 - f. Providing the appropriate purge and inert blanket on process equipment and piping.

Procedures for safe welding and purging of process equipment are available from the American Petroleum Institute (API).



K. FIELD SAMPLING FOR HEALTH AND SAFETY

1. The engineer or contractor has the responsibility to determine what toxic compounds are present in landfill gas so that the potential level of exposure can be determined and provisions prepared to prevent exposure.

Table K-1 lists suggested action levels for various types of monitoring instruments. Project-specific action levels should be determined for each site, based on tasks to be performed and hazards expected to be encountered.

**TABLE K-1
EXPOSURE ACTION LEVELS**

Concentration	PPE Upgrade Guidelines
Organic Vapor Meter Action Levels (PID)*	
0 - 5 ppm	Level D
5 - 25 ppm	Level C
25 - 500 ppm	SCBA
>500 ppm	Exit area and contact H&S Officer
* If you use this action level with an FID instrument, you may have problems resolving the positive artifact methane causes.	
Hydrogen Sulfide (H₂S) Action Levels	
0 - 1 ppm	Level D
1 - 5 ppm	Level D (minimize duration of exposure)
>5 ppm	Exit area and contact H&S Officer
Benzene (Single Vapor) Action Levels	
0 - 0.5 ppm	Level D
0.5 - 10 ppm	SCBA
>10 ppm	Exit area and contact H&S Officer
Vinyl Chloride (Single Vapor) Action Levels	
0 - 0.5 ppm	Level D
0.5 - 10 ppm	SCBA
>10 ppm	Exit area and contact H&S Officer
Dust Meter Action Levels	
0 - 150 ug/m ³	Level D
0.150 - 10 mg/m ³	Levels C
>10 mg/m ³	Exit area and contact H&S Officer



TABLE K-1

EXPOSURE ACTION LEVELS

Concentration	PPE Upgrade Guidelines
Multi-gas Meter Action Levels	
0 - 5% of LEL	Work continues
10 - 20% of LEL	Work continues while competent person investigates
>20% of LEL	Exit area and contact H&S officer

AIR MONITORING REQUIREMENTS FOR LANDFILL OPERATIONS

1. The following fully functional air monitoring instrumentation must be available at the site for evaluation and characterization of air quality during landfill operations:
 - a. Hydrogen sulfide chemical reagent diffusion tube indicator or direct reading instrument (preferred).
 - b. Oxygen analyzer.
 - c. Combustible gas analyzer (CGA [methane analyzer]).
 - d. Photo-ionization, flame ionization detector, or other reliable means of measuring total non-methane organic compounds (NMOC), such as benzene and vinyl chloride. This is optional when landfill gas analysis data indicate the possible presence of a specific gas above its respective exposure limit.
2. Employees whose tasks require performance of air monitoring activities must be trained in the use, limitations, calibration, and maintenance of air monitoring equipment. All air monitoring equipment must be calibrated and maintained in accordance with the manufacturer's instructions.
3. CGAs and other electronic portable monitoring instruments should be rated explosion-proof or intrinsically safe. They should bear labels showing approval by a national testing laboratory, such as Factory Mutual, UL or MSHA, to operate in hazardous atmospheres.
4. Air quality for site and landfill operations should be initially characterized using real-time ambient air monitoring equipment for hydrogen sulfide, volatile organics, and flammable gases. Excavations, trenches, confined spaces, and low-lying areas should be evaluated for oxygen content from outside or above the monitored area.
5. Gas samples should be collected from gas system wells for laboratory analysis to characterize H₂S content, especially at landfills with construction and demolition waste. Colorimetric H₂S detector tubes can also be a good indicator of H₂S content.
6. If ambient air monitoring results indicate significant levels of volatile organic compounds (VOCs >5 ppm above background), a gas sample should be collected prior to beginning



work, or as soon as possible, and should be analyzed for VOCs by an accredited laboratory (by EPA Methods 8260B/5035 or TO-15). Proper instructions and close coordination with the analytical laboratory are important to properly characterize the gas. Several composite samples will provide a more uniform representation of landfill gas at the site. Several discrete grab samples may, however, provide a better indication of peak concentrations, and show chemicals that would not be indicated in composite samples.

7. A written record of air monitoring activities, which includes calibration data, type, results, and location of monitoring, should be maintained daily.
8. For operations requiring the use of APRs, personal sampling for contaminants of concern should be performed to determine the contaminants of concern, the levels of exposure, and whether the APRs can provide adequate protection. Note that APRs are generally not appropriate for use with landfill gas.



L. RESPIRATORY PROTECTION

1. Landfill operators and contractors who require employees to wear respirators must develop a written respiratory protection program, in accordance with OSHA 29 CFR 1910.134. The only exception is the voluntary use of disposable dust masks. This mandate describes how the following elements of the program are implemented at a site or during a project:
 - a. Procedures for selecting respirators to be used in the workplace.
 - b. Medical evaluations of employees required to use respirators.
 - c. Fit testing procedures for respirators.
 - d. Procedures for proper use of respirators in routine and reasonably foreseeable emergency situations.
 - e. Procedures and schedules for cleaning, disinfecting, storing, inspecting, repairing, discarding, and otherwise maintaining respirators.
 - f. Procedures to ensure adequate air quality, quantity, and flow of breathing air for supplied air respirators (if used).
 - g. Training of employees regarding respiratory hazards to which they are potentially exposed during routine and emergency situations.
 - h. Training of employees regarding proper use of respirators, including putting on and removing the devices, any limitations on their use, and maintenance.
 - i. Procedures for regularly evaluating the effectiveness of the program.
2. All employees who may be required to wear respirators must be:
 - a. Trained in the proper use of respirators.
 - b. Approved by a qualified physician for respirator use, which will usually involve an appropriate physical examination.
 - c. Covered by and under the jurisdiction of their employer's written respiratory protection program.
 - d. Trained annually about respiratory program requirements.
 - e. Individually fit tested, wearing assigned respirators before starting work on projects or at landfill sites. Fit testing must be conducted annually, using OSHA-approved qualitative methods and employing isoamyl acetate with organic vapor cartridges, Bitrex with particulate filter cartridges (P-100), or irritant smoke (stannic chloride) with particulate filter cartridges (P-100). Quantitative methods are more sensitive. Documentation of compliance with these provisions should be maintained.
 - f. For operations requiring the use of APRs, personal sampling for contaminants of concern should be performed to determine the contaminants of concern, the levels of



exposure, and whether the APRs can provide adequate protection. Note that APRs are generally not appropriate for use with landfill gas.

3. Persons with interfering facial hair are not permitted in areas where respiratory protection equipment is required (beards are prohibited).
4. All NIOSH procedures and guidelines for respirator selection and use should be adhered to. Only equipment certified by NIOSH on its most recent certified equipment list may be used. APRs with chemical cartridges can only be used for acid gas/organic solvent vapors under the following conditions:
 - a. If the oxygen concentration is satisfactory.
 - b. If the chemical contaminants have been identified.
 - c. If the concentration levels have been characterized and are being monitored.
 - d. If the chemical filter cartridges are effective in removing contaminants.
 - e. If cartridges are approved for use by NIOSH.
 - f. If contaminants have good warning properties.

If all of the above-listed conditions cannot be satisfied, Level B protection, using pressure-demand SCBAs or supplied air, is required. APRs with chemical cartridges/canisters must not be used for protection in environments containing constituents that can reasonably be expected to be near, at, and/or above the limitation of the Protection Factor (PF) for the respirator. The maximum working environment is determined by multiplying the PF for the type of respirator by the TLV for the chemical substance under consideration (Maximum Use Concentration [MUC] = PF x TLV). A list of PFs is shown in **Table L-1**.

TABLE L-1

RESPIRATORY PROTECTION EQUIPMENT PROTECTION FACTORS

Type of Air-Purifying Respirator	Protection Factor
Half-Face APR	10
Full-Face APR	50
Powered APR, Half Mask	50
Powered APR, Full Face	1,000
Airline or Supplied-Air Respirator, Pressure-Demand, or Other Positive Pressure, Full Face	1,000
Pressure-Demand or Other Positive-Pressure SCBA	10,000

5. Pressure-demand SCBA, or pressure-demand supplied-air full-face masks with attached escape bottles, must be used when entering areas containing oxygen-deficient atmospheres, unknown atmospheres, or atmospheres considered to be at or above IDLH



levels. Personnel (with appropriate SCBA apparatus) will not enter IDLH environments without emergency justification by and approval of a site safety manager or responsible project manager. An emergency is constituted by and defined as an already existing life-threatening situation.

6. The length of time that an APR canister or cartridge is effective in removing hazardous material from ambient air will depend on the type and concentration of hazardous material in the air, the temperature and humidity of the working atmosphere, and the level of effort required for a worker to accomplish assigned tasks. The higher the breathing rate, temperature, or humidity, the more frequently canisters or cartridges will need to be replaced. These maximum operating periods vary according to manufacturer, so it will be necessary to monitor the total use of cartridges and canisters during all work requiring a respirator. Cartridge and canister manufacturers have tables or calculation methodologies available for users to determine required change-out schedules. Note that APRs (except for a few chest-mounted gas masks) are not appropriate for use with H₂S gas.

A written respiratory protection program is a legal requirement for the use of respiratory protection equipment. Requirements for a minimal acceptable program can be found at 29 CFR 1910.134(b). Programs would include the use of engineering controls wherever possible.

7. Employees with beards should not work in areas where tight-fitting face piece respirators may be necessary. To assure a proper face seal, employees must be fit tested on the respirator they will wear. Fit testing should recur at least annually.
8. For employees who wear glasses, respirator eyeglass inserts should be provided if full-face masks are used.



M. SPECIAL CONDITIONS

Certain types of work may present unusual problems at sites with special conditions. Examples include:

1. Sites containing construction and demolition (C&D) debris, especially those with crushed C&D waste and high-moisture environments. These have the potential to generate concentrations of H₂S (greater than 1,000 ppm) which are above the IDLH value of 100 ppm. Employees involved in operations where H₂S concentrations in the landfill gas system are above 100 ppm should be required to wear personal H₂S monitors at all times while working at the landfill.

Extreme care and positive-pressure supplied air or SCBA should be available for cutting or opening any gas or leachate and condensate lines at such landfills. Cheek-cartridge APRs are not appropriate protection from H₂S, CH₄, or CO₂, since (1) none are approved for hydrogen sulfide, and (2) APRs cannot protect against simple asphyxiants.

2. An ensemble of personal protection that works against infectious waste (not useful for immersion) would include a Tyvek suit, appropriate gloves and boots, and a NIOSH-approved respirator with a P-100 high-efficiency particulate filter (HEPA, P-100) incorporated into the mask canister or cartridge. Personnel should avoid or minimize contact with any waste, and should be cautioned about possible contact with sharp objects such as needles. The HEPA filter may be combined with an OV/AG cartridge or canister.
3. For protection against gas vapors while drilling or working around an open well casing, consider using a four-gas meter for continuous monitoring and supplied air SCBA. Saranex or Tyvek suits may also be required, along with appropriate gloves and boots. Adequate measures must be taken to prevent heat stress.
4. For protection from exposure to airborne asbestos fibers, the minimum requirement includes a respirator with a P-100 (HEPA) filter and a Tyvek suit. The suit may be coated or uncoated. Special regulations exist for asbestos (for complete requirements, see Asbestos Standard, 29 CFR 1910.1001).
5. Additional protection may be required if significant levels of vinyl chloride or benzene (or other more toxic chemicals) are found during characterization. Action levels for vinyl chloride and benzene are listed in the NIOSH guide. The maximum threshold limit value for benzene or vinyl chloride to which workers may be exposed over an 8-hour period is 1 ppm. The maximum concentration of vinyl chloride to which workers may be exposed in any given period is 5 ppm. If higher levels of vinyl chloride are found, respiratory protection levels may need to be adjusted to Level B (SCBA or supplied air), if engineering controls cannot reduce those levels. Because vinyl chloride and benzene are both regulated carcinogens, exposure should be limited whenever possible (wherever possible, exposure of vinyl chloride and benzene should be held to zero). Uncontrollable concentrations must be minimized through the use of appropriate respiratory protection.
6. Special compliance requirements apply for personnel whose work potentially exposes them to vinyl chloride, benzene, and asbestos concentrations above action levels. Regulations concerning vinyl chloride are found in the Vinyl Chloride Standard in 29 CFR



1910.1017; benzene is regulated through the Benzene Standard in 29 CFR 1910.1028. Compliance requirements may vary with each compound and by state, but will likely include:

- a. Mandatory training.
- b. Medical recordkeeping.
- c. Exposure monitoring and recordkeeping.
- d. Certifications.
- e. Specific protective equipment requirements.

APPENDIX B

DEPARTMENT OF LABOR WAGE RATES

**Available at:
State of New Jersey
Department of Labor and Workforce Development
Division of Wage and Hour Compliance – Public Contracts Section
PO Box 389
Trenton, NJ 08625-0389
609-659-9045**

**[http://lwd.dol.state.nj.us/labor/wagehour/wagerate/
prevailing_wage_determinations.html](http://lwd.dol.state.nj.us/labor/wagehour/wagerate/prevaling_wage_determinations.html)**

APPENDIX C

NEW FLARE CONTROL PANEL SUBMITTAL DRAWINGS



INSTRUMENT INDEX

SPEC. SHEET NO.

A
REV.

JOB NO. **21-262**

CUSTOMER **SCS ENGINEERS**

1

PAGE 1 OF 1

BY **AMB**

DATE **08/11/21**

APPR. **TW**

DATE **08/11/21**

TAG NO.	SPEC SHT NO	REV.NO.	LOCATION	STATUS	CURR. REV.*	REVISION COMMENTS
CE-101	2 Bill	A	BLOWER SKID/FLARE	FA		
PLC-101	2 Bill	A	CE-101	FA		
PNL-102	3 Bill	A	BLOWER SKID/FLARE	FA		
BV-6	6	A	BLOWER SKID/FLARE	FA		
TR/FR-101	16	A	CE-101	FA		
PIT-300	24	A	BLOWER SKID/FLARE	FA		
VFD-101, 102	42	A	PNL-102	FA		
TX-101	43	A	BLOWER SKID/FLARE	FA		



CE-101 BILL OF MATERIAL

SPEC. SHEET NO.

B
REV.

2 Bill

PAGE 1 OF 2

NO	BY	DATE	APPR.	REVISION DESCRIPTION
A	AMB	8/11/2021	TW	ISSUED FOR APPROVAL
B	AMB	8/30/2021	TW	Per Customer Comments

JOB NO. 21-262

BY	AMB	DATE	8/11/2021
APPR.	TW	DATE	8/11/2021

ITEM NO.	QTY	DESCRIPTION
CE-101		
1	1	HAMMOND WALL MOUNT ENCLOSURE TYPE 4X (w/ handle) 36" H x 30" W x 12" D EN4SD363012SSR
2	1	HAMMOND BACKPAN EP3630
3	1	HAMMOND PANEL HEATER with fan, 125 WATT 120 VOLT FLHTF125A115
4	1	STEGO PANEL LIGHT W/MANUAL SWITCH, 115VAC LIGHT CORD 025400-00 244357
5		BLANK
6	1	SQUARE D 2 POSITION SELECTOR SWITCH, KEYED XB4BG41
7	1	SQUARE D 120VAC LED PILOT LAMP - WHITE XB4BVG1
8	1	SQUARE D BLACK PUSHBUTTON SWITCH XB4BA21
9	1	SQUARE D RED MUSHROOM HEAD SWITCH XB4BT842
10	1	AUTOMATION DIRECT 7 CARD CHASSIS P2-07B
11	1	AUTOMATION DIRECT PLC CPU PRODUCTIVITY 2000 P2-550
12	1	AUTOMATION DIRECT 16 POINT DIGITAL IN 120VAC MODULE P2-16NA
13	1	AUTOMATION DIRECT 16 POINT DIGITAL OUT 120VAC MODULE P2-16TA
14	1	AUTOMATION DIRECT 8 IN / 4 OUT COMBO ANALOG MODULE P2-8AD4DA-1
15	1	AUTOMATION DIRECT 8 POINT OUT THERMOCOUPLE MODULE P2-08THM
16	3	AUTOMATION DIRECT ZIP LINK CABLE ZL-P2-CBL18-2P
17	1	AUTOMATION DIRECT 24VDC POWER SUPPLY P2-01AC
18		BLANK
19	1	AUTOMATION DIRECT 10" TOUCH SCREEN HMI EA9-T10CL
20	1	MEAN WELL 24 VDC 60 WATT POWER SUPPLY MDR-60-24
21		BLANK
22		BLANK
23	1	ALTECH FUSE TERMINAL END PLATES EPCAFL4U

NOTE: UL LISTING SYMBOL OR UL CLASSIFICATION SYMBOL REQUIRED



CE-101 BILL OF MATERIAL

SPEC. SHEET NO.

B

2 Bill

REV.

PAGE 2 OF 2

NO	BY	DATE	APPR.	REVISION DESCRIPTION
A	AMB	8/11/2021	TW	ISSUED FOR APPROVAL
B	AMB	8/30/2021	TW	Per Customer Comments
				JOB NO. 21-262
				BY AMB DATE 8/11/2021
				APPR. TW DATE 8/11/2021

ITEM NO.	QTY	DESCRIPTION			
24	1	ALLIED MOULDED	HINGED OUTDOOR COVER	HMI	AMHMI142L
25	1	ALLIED MOULDED	HINGED OUTDOOR COVER	RECORDER	AMHMI108L
26	1	TPS	SERIAL SURGE PROTECTION	RS-485	TK-CT2-24SLP4-DIN2
27	1	TPS	SURGE ARRESTOR		TK-LT120-15A
28	2	TAYMAC	OUTLET BOX		T11
29	1	TAYMAC	OUTLET COVER		MM410C
30	1	HUBBELL	GFCI DUPLEX OUTLET		GFRST15W
31	1	CBI	10 AMP BREAKER 1 POLE	CB-4	QL18KM10
32	3	CBI	15 AMP BREAKER 1 POLE	CB-7, 8, 10	QL18KM15
33	2	CBI	5 AMP CIRCUIT BREAKER 1 POLE	CB-6, CB-22	QL18KM05
34	5	PHOENIX CONTACT	1PDT 120 VAC RELAY	CR-12,84,86,94,96	2966197
34a	1	PHOENIX CONTACT	1PDT 24 VDC RELAY	CR-279	2909650
35	1	IDEC RELAY	4PDT 120VAC COIL AND BASE	CR-19	RH4BULAC120B / SH4B05
36	1	IDEC RELAY	2PDT 120VAC COIL AND BASE	CR-90	RH2BULAC120B / SH2B05
37	1	SQUARE D	2-POLE 600VAC POWER BLOCK		9080LBA262104
				COVER	9080LB22
38	200	PHOENIX	4 CONDUCTOR TERMINAL BLOCK		3044542
39	15	PHOENIX	END PLATE		3047196
40	4	PHOENIX	JUMPERS		3030190
41	8	PHOENIX	GND TERMINAL BLK		3044597
42	1	ALTECH	FUSE TERMINAL BLOCK		CAFL4U(L)/24
	1	MERSEN		5 AMP FUSE	GDL5
43	20	PHOENIX	END BARRIER CLAMP		800886
44	1	TRIPP LITE	120 VAC BATTERY BACKUP		AVR900U
45	1	HUBBEL	GFCI OUTLET (Black)		GFRST15BK
46	2	MOXA	8-PORT UNMANAGED DATA SWITCH		EDS-208

NOTE: UL LISTING SYMBOL OR UL CLASSIFICATION SYMBOL REQUIRED



PNL-102 BILL OF MATERIAL

SPEC. SHEET NO.

**B
REV.**

3

PAGE 1 OF 1

NO	BY	DATE	APPR.	REVISION DESCRIPTION
A	AMB	8/11/2021	TW	ISSUED FOR APPROVAL
B	AMB	8/30/2021	TW	Per Customer Comments

JOB NO. 21-262

BY	AMB	DATE	8/11/2021
APPR.	TW	DATE	8/11/2021

ITEM NO.	QTY	DESCRIPTION
PNL-102		
1	1	HAMMOND WALL MOUNT (WITH HANDLE) 36"X30"X12" NEMA 4X EN4SD363012SSR
2	1	HAMMOND BACK PAN EP3630
3	2	ABB CIRCUIT BREAKER 480 VAC 30 AMP MSCB-101, 102 XT1NU3030AAA000XXX
4	1	ABB CIRCUIT BREAKER 480 VAC 30 AMP MSCB-106 QZD38230
5	1	SQUARE D DISTRIBUTION BLOCK LBA362106 3 POLE, #4 TO 500 KMIL LINE (2), AWG 14 - 2/0 TO LOAD (8) 9080LB53
6	6	MARATHON DISTRIBUTION BLOCK EPB-AP42 1 POLE, #14-3/0 LINE (1), #14-3/0 LOAD(1)
7	1	HOFFMAN AIR CONDITIONING UNIT 2,000 BTU T200216G157 115VAC NEMA 4X Outdoor W/ HEAT PACKAGI Narrow design accommodates 12-in. (300-mm) deep cabinets
8	2	AUTOMATION DIRECT Line reactor for VFD (AC drives), 480V, 20 hp, 3% LR-4020
9	1	AUTOMATION DIRECT 3-POLE MOTOR CONTACTOR MS-100 SC-E1-110VAC
10	1	AUTOMATION DIRECT THERMAL OVERLOAD MS-100 TK-E2-3600
11	1	AUTOMATION DIRECT AUX CONTACT BLOCK MS-100 SZ-AS1T
12	1	CBI 20 AMP, 2-POLE BREAKER MSCB-3 (TX) QZD28220
13		BLANK
14	2	ALTIVAR SEE VFD SPEC SHEET SHEET #42
15		BLANK
16	1	MOTO SAVER 480VAC THREE-PHASE MONITOR 460
17	1	SQUARE D SURGE PROTECTOR 480VAC (DELTA) SDSA3650D

NOTE: UL LISTING SYMBOL OR UL CLASSIFICATION SYMBOL REQUIRED



HAND VALVE

SPEC. SHEET NO.

A
REV.

6

PAGE 1 OF 1

NO	BY	DATE	APPR.	REVISION DESCRIPTION
A	CG	4/29/2020	AR	ISSUED FOR CUSTOMER APPROVAL
0	AR	5/29/2020	AR	FOR CONSTRUCTION

JOB NO. 21-262

BY	AMB	DATE	8/11/2021
APPR.	TW	DATE	8/11/2021

GENERAL	SERVICE	LFG SERVICE		
	LINE NO./VESSEL NO.			
	LINE SIZE/SCHEDULE NO.			
	VALVE SIZE	1/2"		
	TYPE	3-WAY VALVE		
	ENDS CONNS. & RATING	1/2" NPT 1000PSI		
	LOCATION	PIPING		
MATERIALS OF CONSTRUCTION	BODY MATERIAL	SS		
	TRIM MATERIAL	SS		
	PACKING MATERIAL	TFE		
OPERATOR	OPERATOR TYPE	MANUAL		
	HANDLE TYPE	LEVER		
	LIMIT SWITCH	NIL		
	TAG NUMBER	BV-2		
SERVICE CONDITIONS	FLUID	GAS		
	SPECIFIC GRAVITY	1.00		
	TEMPERATURE	90 DEG. F		
	INLET PRESS.			
	VALVE CV			
	CALCULATED CV			
	FLOW: MIN. MAX.	NIL	NIL	
P&ID DWG. NO.	P&ID DWG. NO.	100		
	TAG NO.	BV-2		
	QUANTITY	1		
	MANUFACTURER	APOLLO		
	MODEL NO.	76-603-27A		

NOTES:



RECORDER

SPEC. SHEET NO.

A
REV.

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PAGE 1 OF 1

NO	BY	DATE	APPR.	REVISION DESCRIPTION
A	AMB	8/11/2021	TW	ISSUED FOR APPROVAL

JOB NO. 21-262

BY AMB DATE 8/11/2021
APPR. TW DATE 8/11/2021

GENERAL	FUNCTION	CONTROLLER: _____	OTHER: RECORDER
	MOUNTING	FLUSH: <input checked="" type="checkbox"/> SURFACE: _____	RACK: _____ OTHER: _____
	ENCLOSURE CLASS:	GENERAL PURPOSE: _____	WEATHER PROOF: NEMA 4
		EXPLOSION PROOF: _____	OTHER: _____
	POWER SUPPLY	R USE IN INTRINSICALLY SAFE SYSTEM: _____	
		120 VAC <input checked="" type="checkbox"/> OTHER: _____	
INPUTS	INPUT SIGNALS	4-20 M.A. _____ 10-50 M.A. _____	3-15 PSIG _____
		THERMOCOUPLE "J" _____ "K" _____	"R" _____ "T" _____
		OTHER: MODBUS TCP/IP	
	NO. OF INPUTS	2: _____ 6: <input checked="" type="checkbox"/>	12: _____ OTHER: _____
	SUPPLIES LOOP POWER	YES: _____	
ALARMS	ALARM SWITCHES	QTY: 4 FORM: C	RATING _____
	OPTIONS	MATHEMATICAL FUNCTION _____	
		ENGLISH LANGUAGE _____	
		ATA FLASH MEMORY CARD _____	
		4-2= Includes Compact Flash Memory Card	
		A1 Alarm Output Relays	
		F1= Fail/Memory End Detection & Output Opt	
		M1= Mathematical Function w/Report	
	P&ID DWG. NO.	100	
	TAG NO.	TR/FR-100	
	QUANTITY	1	
	MANUFACTURER	YOKOGAWA	
	MODEL NO.	DX1006-3-4-2 A1/F1/M1	

NOTES:
1. MOUNTED IN CE-101



PRESSURE TRANSMITTER

SPEC. SHEET NO.

A

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REV.

PAGE 1 OF 1

NO	BY	DATE	APPR.	REVISION DESCRIPTION
A	AMB	8/11/2021	TW	ISSUED FOR APPROVAL

JOB NO. 21-262

BY AMB DATE 8/11/2021
APPR. TW DATE 8/11/2021

GENERAL	TYPE		ELECTRONIC: <input checked="" type="checkbox"/>	PNEUMATIC: <input type="checkbox"/>	
	FORM		BLIND: <input type="checkbox"/>	INDICATING <input checked="" type="checkbox"/>	
	DESCRIPTION		GAUGE PRESS.: <input checked="" type="checkbox"/>	ABSOLUTE PRESS.: <input type="checkbox"/>	DIFFERENTIAL <input type="checkbox"/>
	SPAN		0- (-100)		
	RANGE LIMITS		" H20		
	RANGE LIMITS		.15 TO 14.5 PSI		
	OUTPUT		4-20mA		
DRAIN / VENT FLANGE		YES			
BODY	MATERIAL		CS: <input type="checkbox"/>	316 SS: <input type="checkbox"/>	ALUM: <input checked="" type="checkbox"/>
	CONNECTION		1/4" NPT: <input type="checkbox"/>	1/2" NPT: <input checked="" type="checkbox"/>	OTHER: <input type="checkbox"/>
	RATING		PRESSURE: <input type="checkbox"/>	TEMP: <input type="checkbox"/>	
ELECTRICAL CLASS NEMA 4 CLASS 1-DIVISION 1 CLASS 1-DIVISION 2	POWER / AIR SUPPLY	VOLTS:	10.5-55 VDC		
		SUPPLY PRES			
		COND. CONN.	1/2" NPT		
		AIR CONN.			
MEASURING ELEMENT	TYPE		BOURDON: <input type="checkbox"/>	DIAPHRAGM: <input checked="" type="checkbox"/>	OTHER: <input type="checkbox"/>
	MATERIAL		BRONZE: <input type="checkbox"/>	316SS: <input checked="" type="checkbox"/>	OTHER: <input type="checkbox"/>
	FILTER REG.				
ACCESS	AIR SUPPLY GAUGE				
	LOCAL INDICATOR		YES		
	PULSATION DAMPENER				
	SIPHON				
B4 MOUNT		<input checked="" type="checkbox"/>			
OPERATING CONDITIONS	FLUID		VAPOR		
	PRESSURE		-50" H20		
	TEMPERATURE		100 DEG. F		
P&ID DWG. NO.		100			
TAG NO.		PIT-300			
QUANTITY		1			
MANUFACTURER		SIEMENS			
MODEL NO.		7MF4033-1BA10-1NC7-Z+B21+C11+Y01+Y21			

NOTES:



VFD

SPEC. SHEET NO.

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A
REV.

JOB NO. 21-262

BY	AMB	DATE	8/11/2021
APPR.	TW	DATE	8/11/2021

NO	BY	DATE	APPR.	REVISION DESCRIPTION
A	AMB	8/11/2021	TW	ISSUED FOR APPROVAL
B	AMB	8/30/2021	TW	Per Customer Comments

GENERAL	TAG NUMBER	VFD-101
	HP	20
	MOUNT	WALL MOUNT
	ENCLOSURE	IP23
	VOLTS	460V
	DISPLAY	Graphic Display Terminal
	MOUNTING KIT DOOR	NONE
	MOUNTING DOOR COVER	NONE
	COMM CALBE	NONE
	POWER RATING	60HZ
	AMPS	
	TRANSMISSION RATE	10/100Mbit/s FOR ETHERNET IP/MODBUS TCP
	OPTIONAL	
	MODEL NUMBER: ATV630D11N4	



P&ID DWG. NO.	100
TAG NO.	VFD-101, 102
QUANTITY	2
MANUFACTURER	Altivar 630 (SCHNEIDER)
MODEL NO.	ATV630D15N4
LOCATION	PNL-102

NOTES:



TRANSFORMER

SPEC. SHEET NO.

A
REV.

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PAGE 1 OF 1

JOB NO. 21-262

BY	AMB	DATE	8/11/2021
APPR.	TW	DATE	8/11/2021

NO	BY	DATE	APPR.	REVISION DESCRIPTION
A	AMB	8/11/2021	TW	ISSUED FOR APPROVAL

GENERAL

TAG NUMBER	TX-101
QTY	1
SERVICE	480VAC 3 PHASE TO 120/240 VAC 1 PHASE
TYPE	STEP DOWN TRANSFORMER
POWER RATING	3 kVA



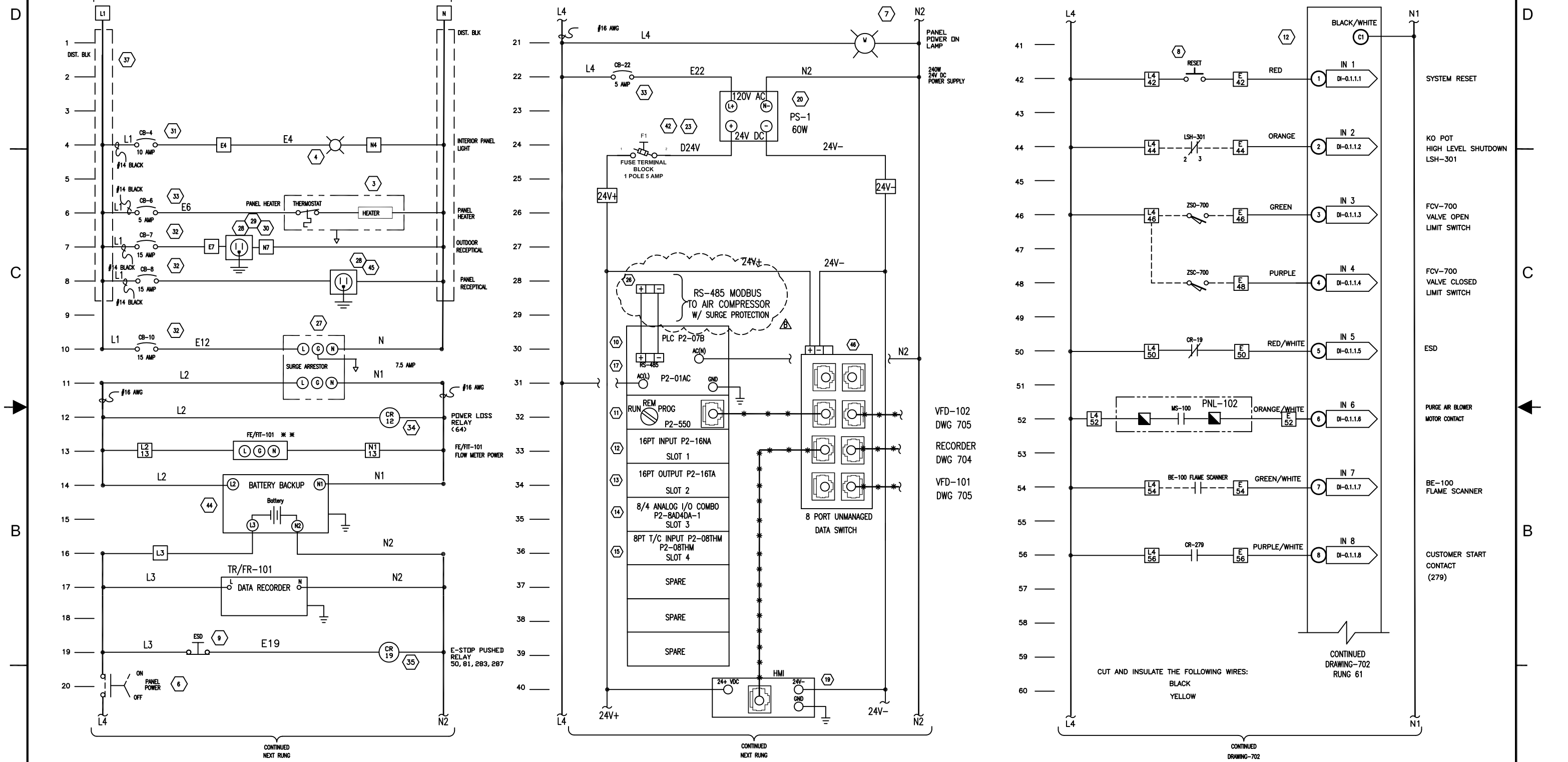
P&ID DWG. NO.	100
TAG NO.	TX-101
QUANTITY	1
MANUFACTURER	HEVI-DUTY
MODEL NO.	HS5F3AS

NOTES:

PROPRIETARY MATERIAL
The information contained within is the property of Parnel Biogas Inc and shall not be copied or used in any manner or disclosed to others except as expressly authorized.

120VAC, 60HZ, 1P
FROM CTRL. XFMR TX-101

P2-550 INPUT MODULE
16PT AC ISOLATED INPUT P2-16NA
RACK 0 SLOT 1



- LEGEND:**
- — CE-101 TERMINAL
 - — VFD TERMINAL
 - — PNL-102 TERMINAL
1. * * * DENOTES ITEMS SUPPLIED BY OTHERS, NOT PARNEL.
2. * DENOTES ITEMS TO BE SHIPPED LOOSE.
4. - - - - - ELECTRICAL SIGNAL

- NOTES:**
1. PANEL TO BE ASSEMBLED WITH UL RATED COMPONENTS, OR EQUAL.
 2. AC WIRING FOR 480VAC AND LOWER SHALL BE YELLOW 600 VOLT INSULATION, AND AC NEUTRAL WIRING SHALL BE WHITE 600 VOLT, TYPE THWN/THHN, 14 AWG MINIMUM.
 3. DC WIRING FOR 24 VDC AND LOWER SHALL BE BLUE 600 VOLT INSULATION, DC WIRING FOR -24 VDC COMMON SHALL BE BLUE/WHITE 600 VOLT INSULATION, TYPE THWN/THHN, 14 AWG MINIMUM.

CUSTOMER		SCS ENGINEERS		Parnel Biogas Inc	
PD NO.				13701 S. HWY. 75 Glenpool, OK 74033	
LOCATION		SALEM COUNTY, NJ		UTILITY FLARES ENCLOSED FLARES CONTROL SYSTEMS LEACHATE INJECTION	
USER		SALEM COUNTY LANDFILL		TITLE	
B PER CUSTOMER COMMENTS		08/27/21 AMB KDG		DRAWN DATE	
A ISSUED FOR APPROVAL		08/20/21 AMB KDG		AMB 08/20/21	
REV		DESCRIPTION		DATE	
				08/20/21	
SIZE		D		DWG NO.	
				21-262-701	
SCALE		NONE		REL. DATE	
SHEET		1 OF 1		B	

CUT AND INSULATE THE FOLLOWING WIRES:
BLACK
YELLOW

CONTINUED
DRAWING-702
RUNG 61

CONTINUED
NEXT RUNG

CONTINUED
NEXT RUNG

CONTINUED
DRAWING-702

VFD-102
DWG 705
RECORDER
DWG 704
VFD-101
DWG 705

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The information contained within is the property of Parnel Biogas Inc and shall not be copied or used in any manner or disclosed to others except as expressly authorized.

D
C
B
A

D
C
B
A

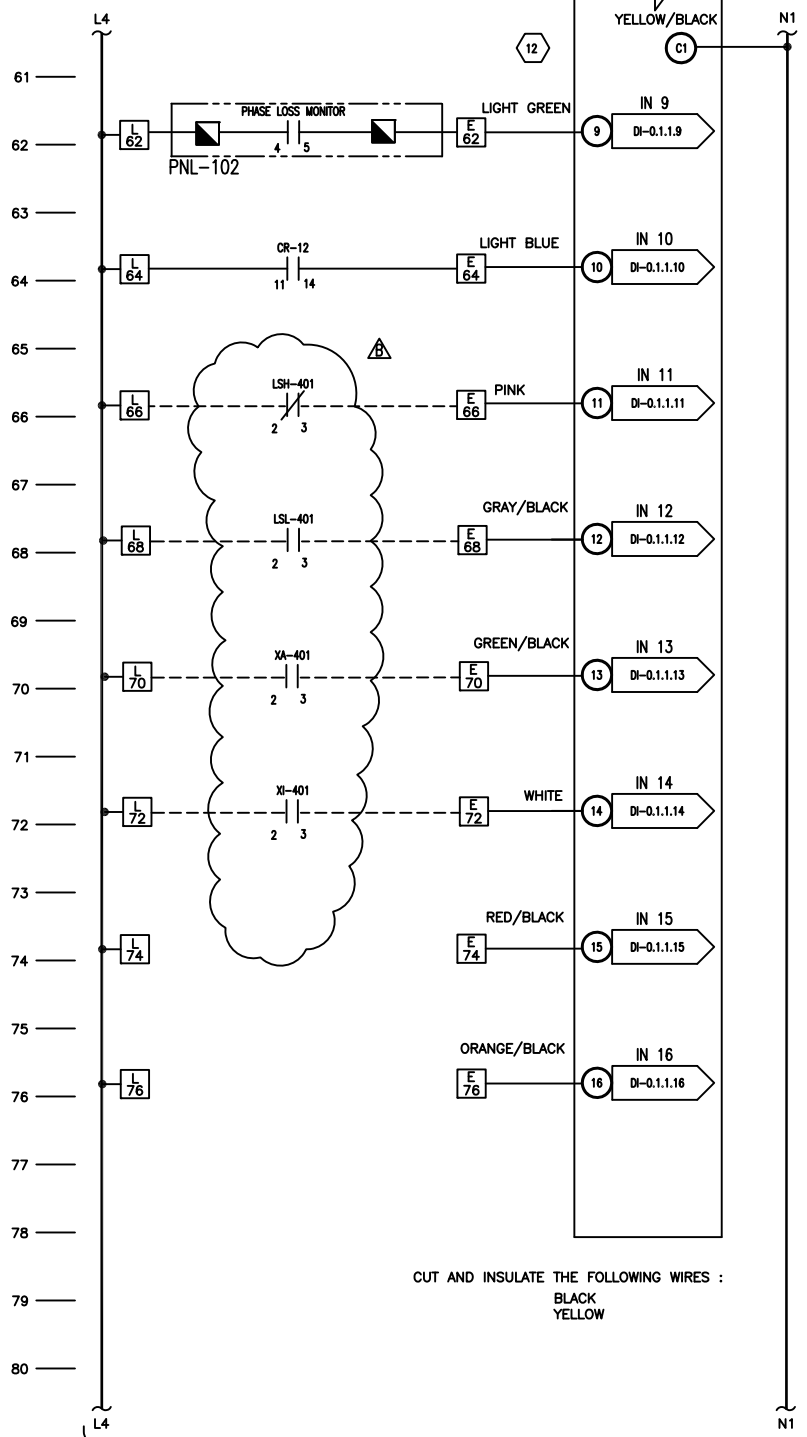
P2-550 INPUT MODULE
16PT AC ISOLATED INPUT P2-16NA
RACK 0 SLOT 1

CONTINUED FROM
DRAWING-701
RUNG 60

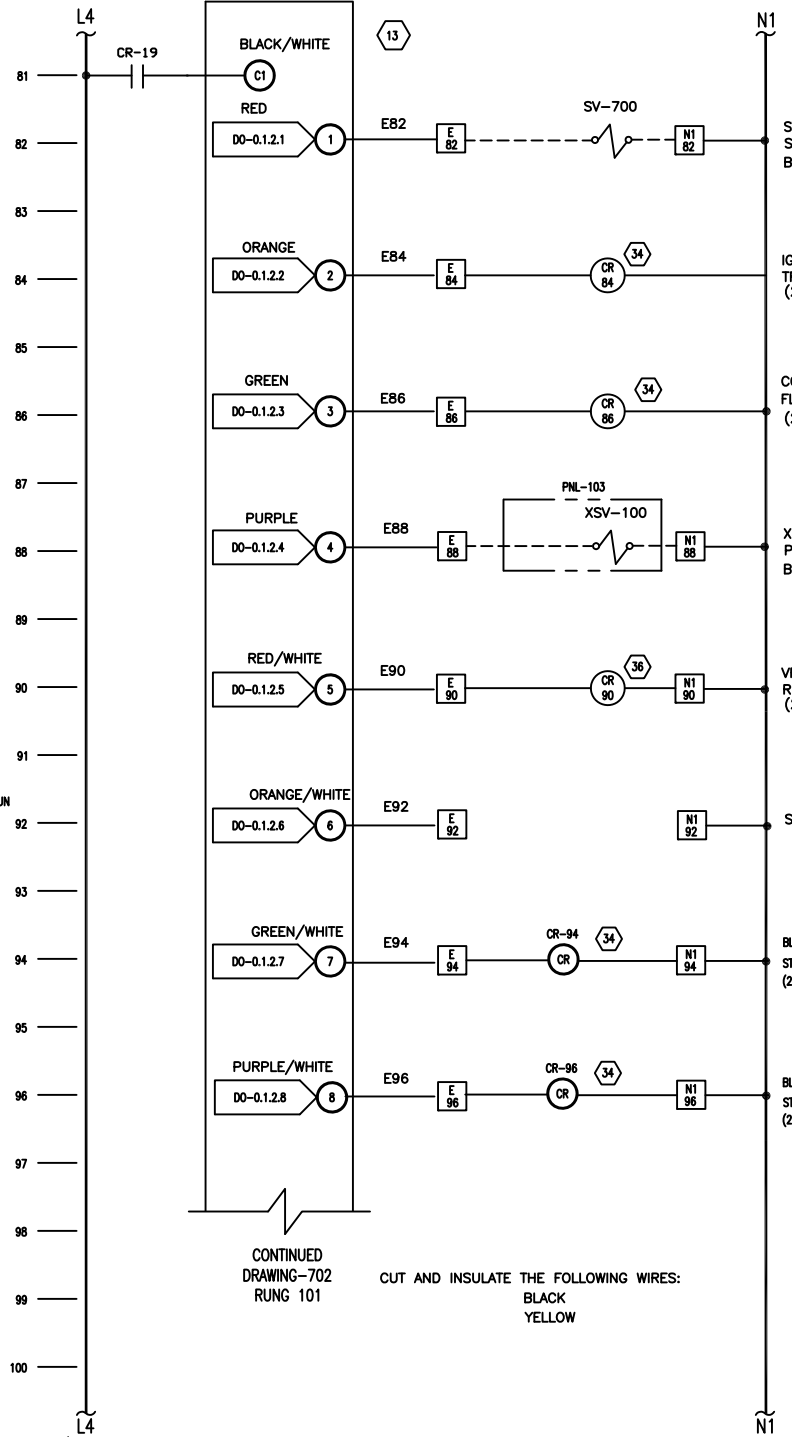
P2-550 OUTPUT MODULE
16 PT ISOLATED OUTPUT RELAY P2-16TA
RACK 0 SLOT 2

CONTINUED FROM DWG
702 LINE 100

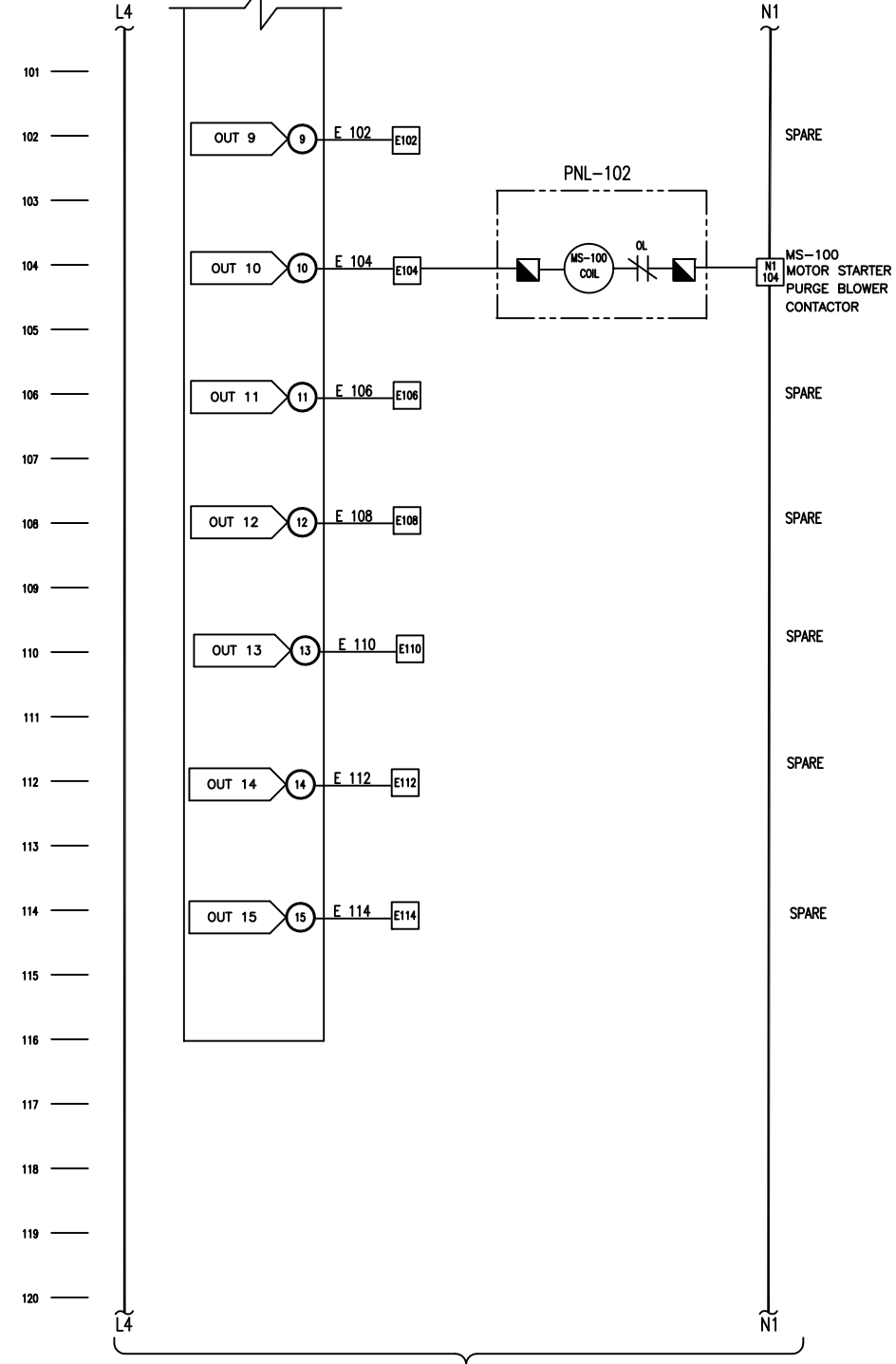
P2-550 OUTPUT MODULE
16 PT ISOLATED OUTPUT RELAY P2-16TA
RACK 0 SLOT 2



CUT AND INSULATE THE FOLLOWING WIRES :
BLACK
YELLOW



CUT AND INSULATE THE FOLLOWING WIRES:
BLACK
YELLOW



CONTINUED TO DWG 703

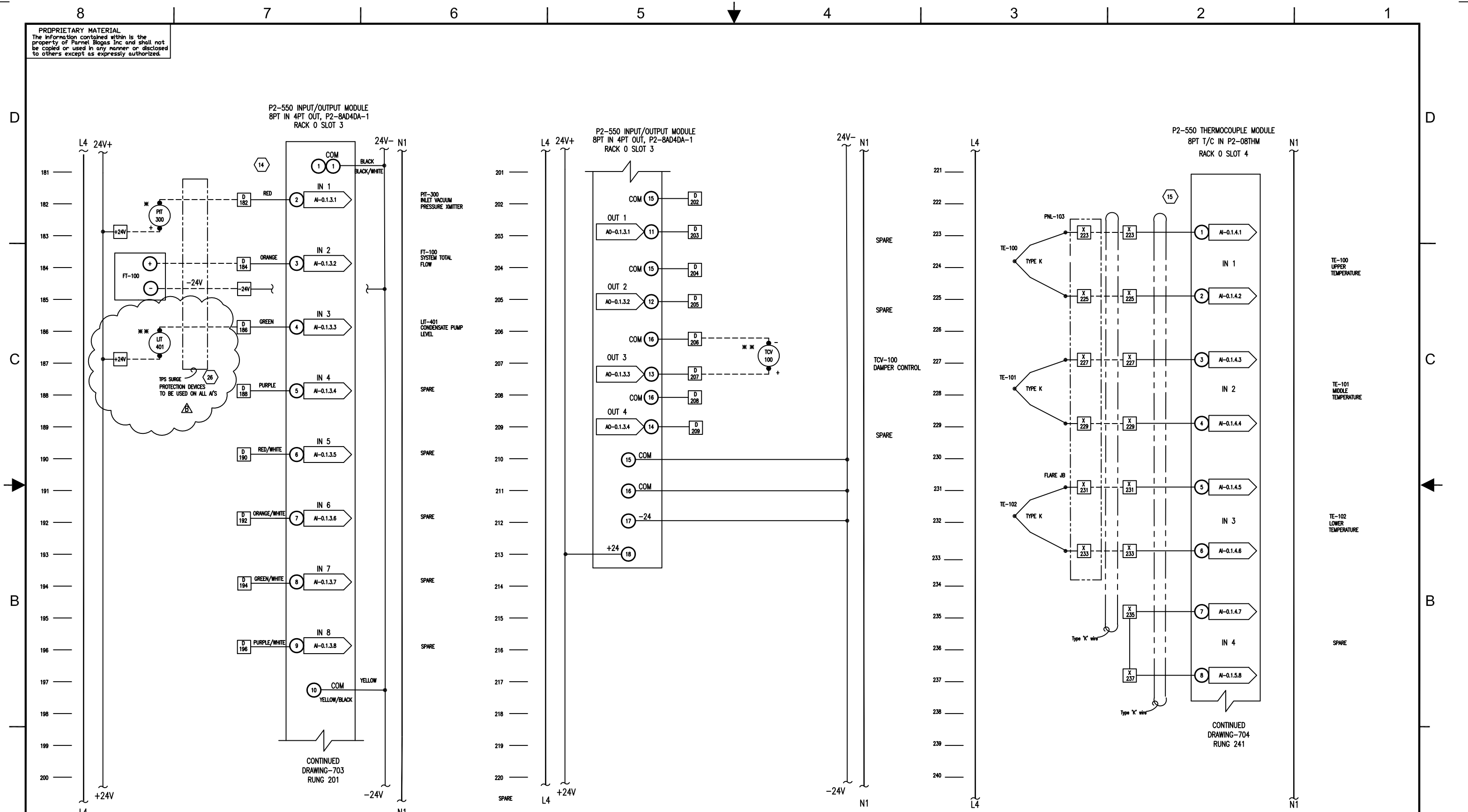


NOTES: ALL ANALOG SIGNALS TO BE TWISTED PAIR SHIELDED CABLE
1. ** DENOTES ITEMS SUPPLIED BY OTHERS, NOT PARNEL
2. * DENOTES ITEMS TO BE SHIPPED LOOSE.
3. ----- ELECTRICAL SIGNAL

CUSTOMER SCS ENGINEERS		Parnel Biogas Inc 13701 S. HWY. 75 Glenpool, OK 74033		UTILITY FLARES ENCLOSED FLARES		CONTROL SYSTEMS LEACHATE INJECTION	
PD NO.		LOCATION SALEM COUNTY, NJ		TITLE WIRING DIAGRAM CE-101 CONTROL PANEL			
USER SALEM COUNTY LANDFILL		DATE 08/30/21	APP. AMB	DATE 08/2021	SIZE D	DWG NO. 21-262-702	B
REV	DESCRIPTION	DATE	DR.	APP.	SCALE NONE	REL. DATE	SHEET 1 OF 1

8 7 6 5 4 3 2 1

PROPRIETARY MATERIAL
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LEGEND:
 □ — CE-101 TERMINAL
 □ — VFD TERMINAL
 △ — PNL-103 TERMINAL
 ■ — PNL-102 TERMINAL

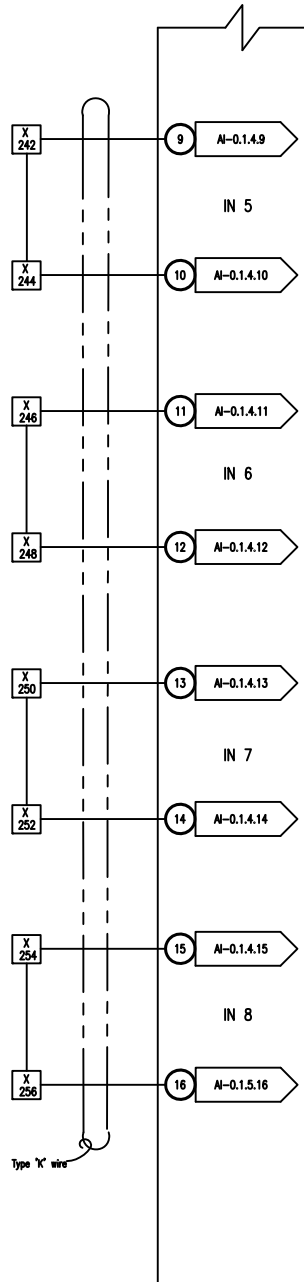
NOTES: ALL ANALOG SIGNALS TO BE TWISTED PAIR SHIELDED CABLE
 1. ** DENOTES ITEMS SUPPLIED BY OTHERS, NOT PARNEL
 2. * DENOTES ITEMS TO BE SHIPPED LOOSE.
 3. - - - - - ELECTRICAL SIGNAL

CUSTOMER		SCS ENGINEERS		Parnel Biogas Inc	
PD NO.				13701 S. HWY. 75 Glenpool, OK 74033	
LOCATION		SALEM COUNTY, NJ		UTILITY FLARES ENCLOSED FLARES	
USER		SALEM COUNTY LANDFILL		CONTROL SYSTEMS LEACHATE INJECTION	
TITLE		WIRING DIAGRAM CE-101 CONTROL PANEL			
DRAWN		DATE		SIZE	
AMB		08/2021		D	
DESIGN		DATE		DWG NO.	
AMB		08/2021		21-262-703	
REV		DESCRIPTION		SCALE	
				NONE	
				REL DATE	
				SHEET 1 OF 1	

PROPRIETARY MATERIAL
The information contained within is the property of Parnel Biogas Inc and shall not be copied or used in any manner or disclosed to others except as expressly authorized.

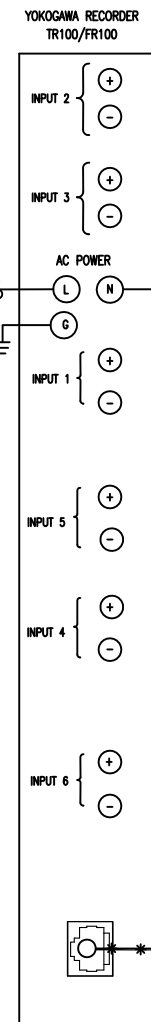
P2-550 THERMOCOUPLE MODULE
8PT T/C IN P2-08THM
RACK 0 SLOT 4

FROM DRAWING-703
RUNG 240



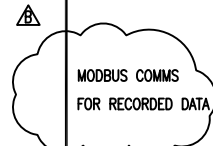
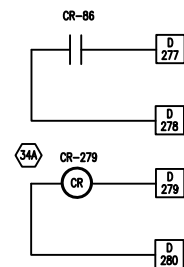
N1
SPARE
SPARE
SPARE
SPARE
SPARE
SPARE
SPARE
SPARE
SPARE
SPARE
N1

L4
261
262
263
264
265
266
267
268
269
270
271
272
273
274
275
276
277
278
279
280
L4



PLEASE HARDWIRE IN RECORDED DATA:
FLARE FLOW
FLARE CONTROL
TEMPERATURE
FLARE TC A
FLARE TC B
FLARE TC C
VALVE STATUS

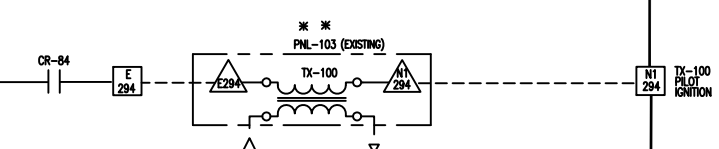
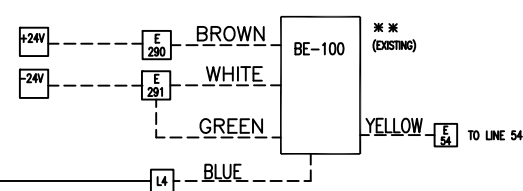
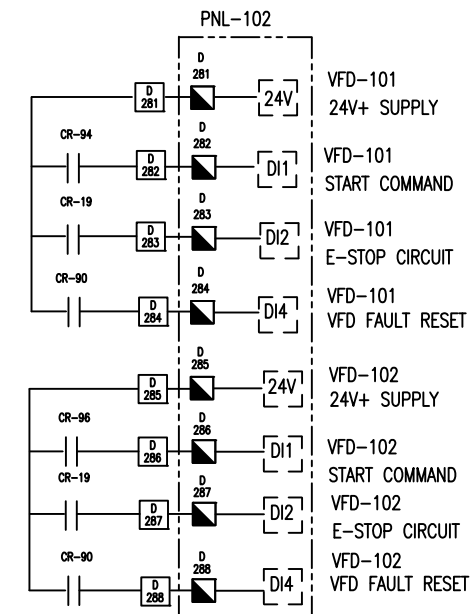
TO DATA SWITCH
DWG 701



COMMON ALARM
CUSTOMER CONTACT
CUSTOMER START
RELAY 24 VDC (56)

N1

L4
281
282
283
284
285
286
287
288
289
290
291
292
293
294
295
296
297
298
299
300
L4



N1
N1

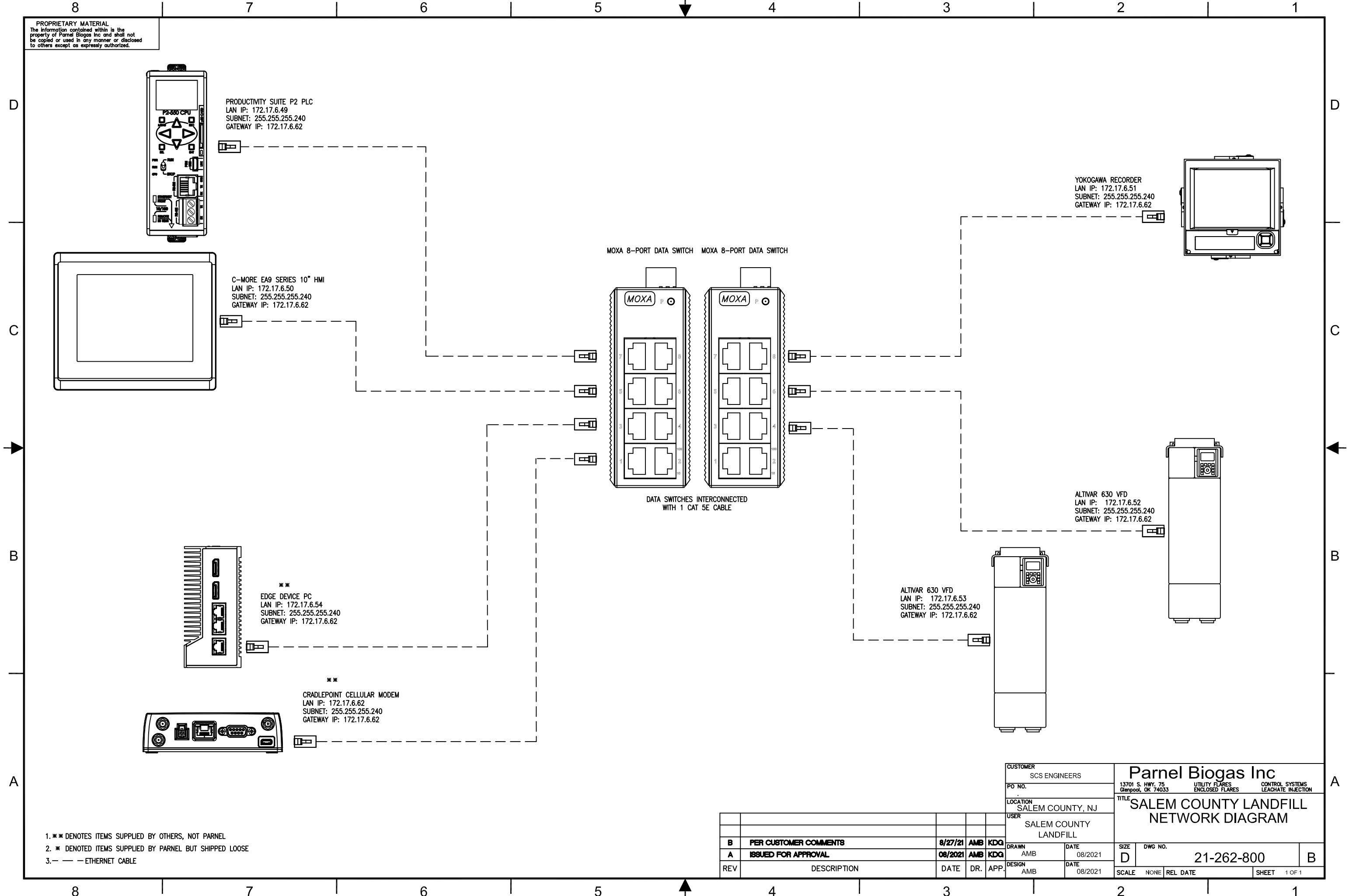
- LEGEND:
- — CE-101 TERMINAL
 - ▣ — PNL-102 TERMINAL
 - ▭ — VFD DRIVE TERMINAL
 - △ — PNL-103 TERMINAL

1. ** DENOTES ITEMS SUPPLIED BY OTHERS, NOT PARNEL.
2. * DENOTES ITEMS TO BE SHIPPED LOOSE.
3. - - - - - ELECTRICAL SIGNAL

REV	DESCRIPTION	DATE	DR.	APP.
B	PER CUSTOMER COMMENTS	8/30/21	AMB	KDG
A	ISSUED FOR APPROVAL	08/20/21	AMB	KDG

CUSTOMER SCS ENGINEERS		Parnel Biogas Inc	
PD NO.		13701 S. HWY. 75 Glenpool, OK 74033	
LOCATION SALEM COUNTY, NJ		UTILITY FLARES ENCLOSED FLARES	
USER SALEM COUNTY LANDFILL		CONTROL SYSTEMS LEACHATE INJECTION	
TITLE WIRING DIAGRAM CE-101 CONTROL PANEL		SIZE D	DWG NO. 21-262-704
DRAWN AMB		DATE 08/20/21	SHEET 1 OF 1
DESIGN AMB		DATE 08/20/21	

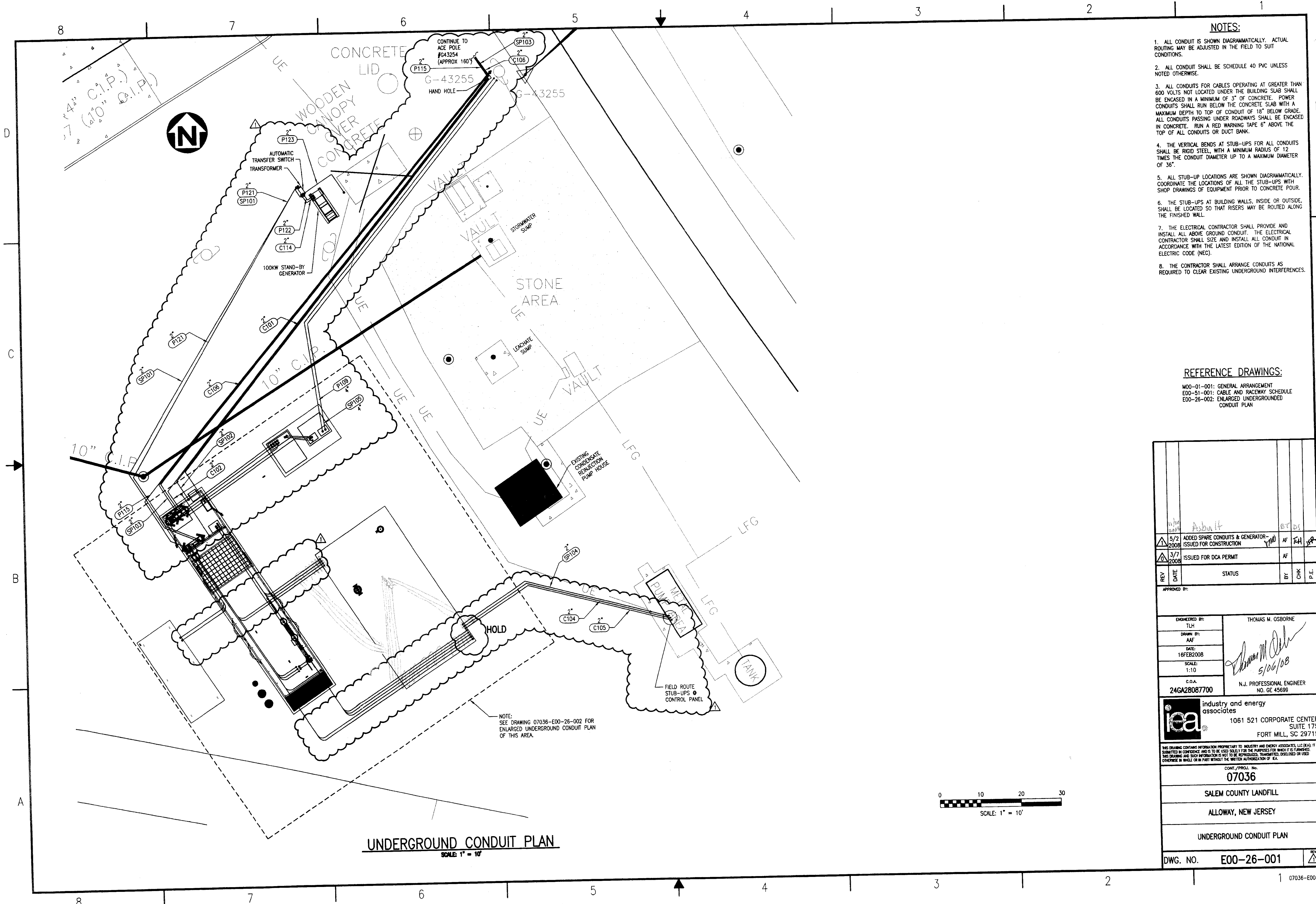
PROPRIETARY MATERIAL
The information contained within is the property of Parnel Biogas Inc and shall not be copied or used in any manner or disclosed to others except as expressly authorized.



CUSTOMER SCS ENGINEERS		Parnel Biogas Inc	
PO NO.		13701 S. HWY. 75 Glenpool, OK 74033	
LOCATION SALEM COUNTY, NJ		UTILITY FLARES ENCLOSED FLARES CONTROL SYSTEMS LEACHATE INJECTION	
USER SALEM COUNTY LANDFILL		TITLE SALEM COUNTY LANDFILL NETWORK DIAGRAM	
DATE 8/27/21	APP. AMB	DATE 08/2021	SIZE D
REV A	DESCRIPTION PER CUSTOMER COMMENTS	DATE 08/2021	DWG NO. 21-262-800
REV B	DESCRIPTION ISSUED FOR APPROVAL	DATE 08/2021	SCALE NONE
REV	DESCRIPTION	DATE	REL DATE
			SHEET 1 OF 1

APPENDIX D

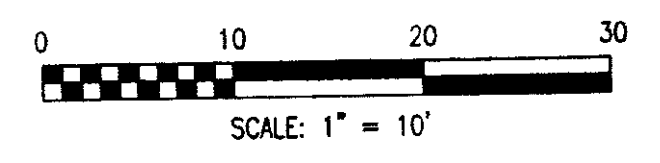
AS-BUILT CONDUIT LOCATION SKETCH



- NOTES:**
1. ALL CONDUIT IS SHOWN DIAGRAMMATICALLY. ACTUAL ROUTING MAY BE ADJUSTED IN THE FIELD TO SUIT CONDITIONS.
 2. ALL CONDUIT SHALL BE SCHEDULE 40 PVC UNLESS NOTED OTHERWISE.
 3. ALL CONDUITS FOR CABLES OPERATING AT GREATER THAN 600 VOLTS NOT LOCATED UNDER THE BUILDING SLAB SHALL BE ENCASED IN A MINIMUM OF 3" OF CONCRETE. POWER CONDUITS SHALL RUN BELOW THE CONCRETE SLAB WITH A MAXIMUM DEPTH TO TOP OF CONDUIT OF 18" BELOW GRADE. ALL CONDUITS PASSING UNDER ROADWAYS SHALL BE ENCASED IN CONCRETE. RUN A RED WARNING TAPE 6" ABOVE THE TOP OF ALL CONDUITS OR DUCT BANK.
 4. THE VERTICAL BENDS AT STUB-UPS FOR ALL CONDUITS SHALL BE RIGID STEEL, WITH A MINIMUM RADIUS OF 12 TIMES THE CONDUIT DIAMETER UP TO A MAXIMUM DIAMETER OF 36".
 5. ALL STUB-UP LOCATIONS ARE SHOWN DIAGRAMMATICALLY. COORDINATE THE LOCATIONS OF ALL THE STUB-UPS WITH SHOP DRAWINGS OF EQUIPMENT PRIOR TO CONCRETE POUR.
 6. THE STUB-UPS AT BUILDING WALLS, INSIDE OR OUTSIDE, SHALL BE LOCATED SO THAT RISERS MAY BE ROUTED ALONG THE FINISHED WALL.
 7. THE ELECTRICAL CONTRACTOR SHALL PROVIDE AND INSTALL ALL ABOVE GROUND CONDUIT. THE ELECTRICAL CONTRACTOR SHALL SIZE AND INSTALL ALL CONDUIT IN ACCORDANCE WITH THE LATEST EDITION OF THE NATIONAL ELECTRIC CODE (NEC).
 8. THE CONTRACTOR SHALL ARRANGE CONDUITS AS REQUIRED TO CLEAR EXISTING UNDERGROUND INTERFERENCES.

REFERENCE DRAWINGS:
 MOO-01-001: GENERAL ARRANGEMENT
 EOO-51-001: CABLE AND RACEWAY SCHEDULE
 EOO-26-002: ENLARGED UNDERGROUND CONDUIT PLAN

NOTE:
 SEE DRAWING 07036-E00-26-002 FOR ENLARGED UNDERGROUND CONDUIT PLAN OF THIS AREA.



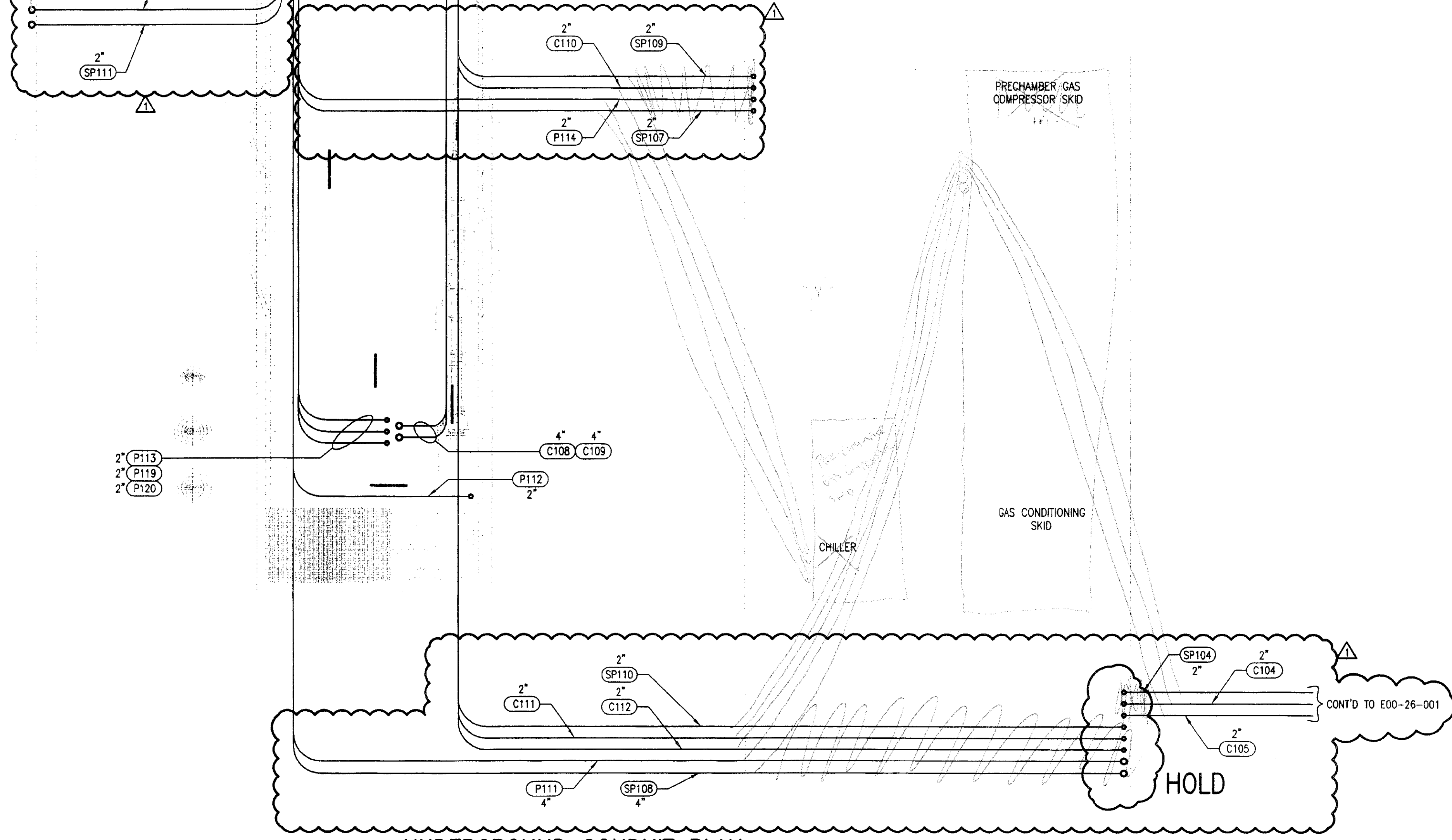
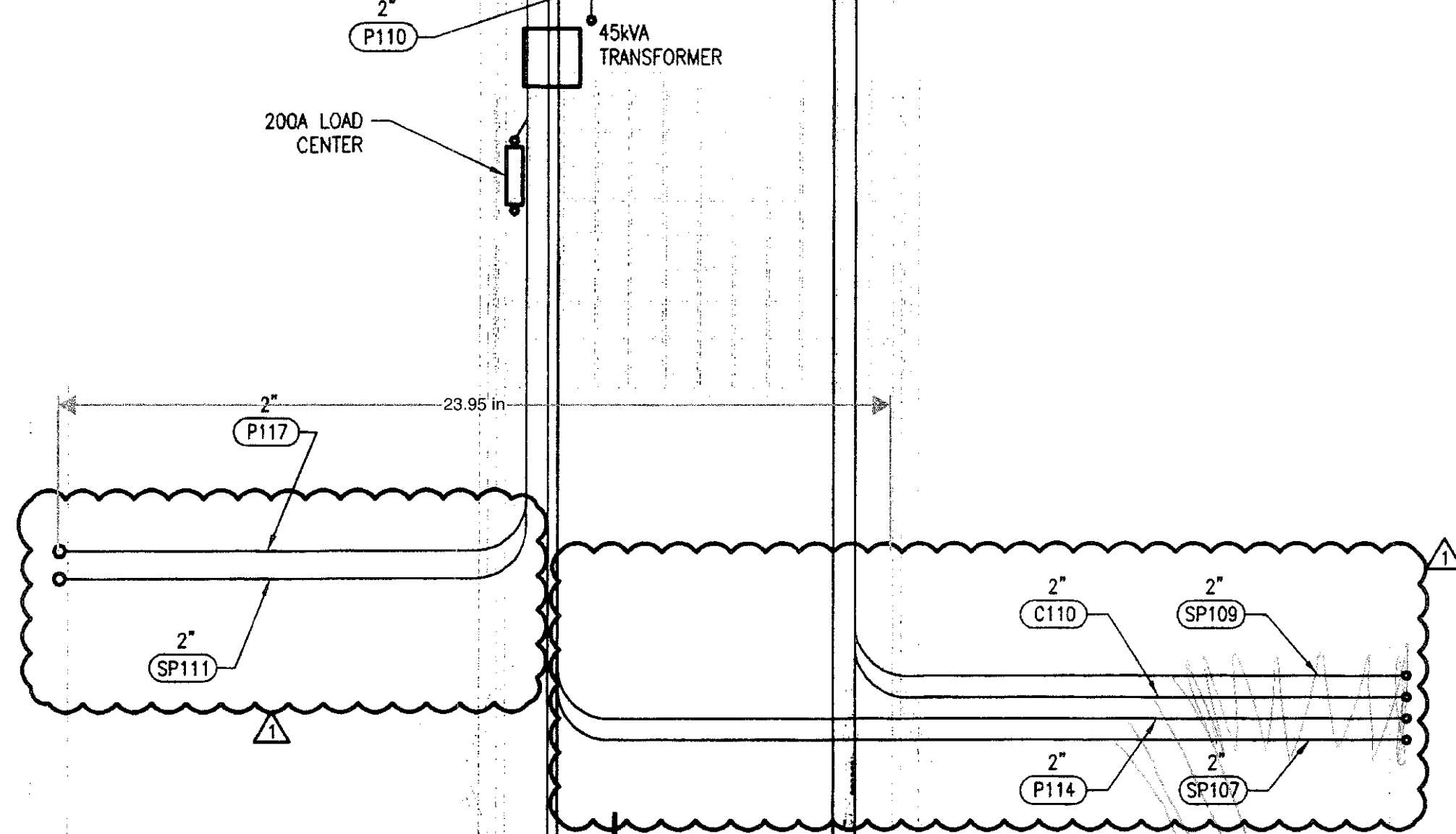
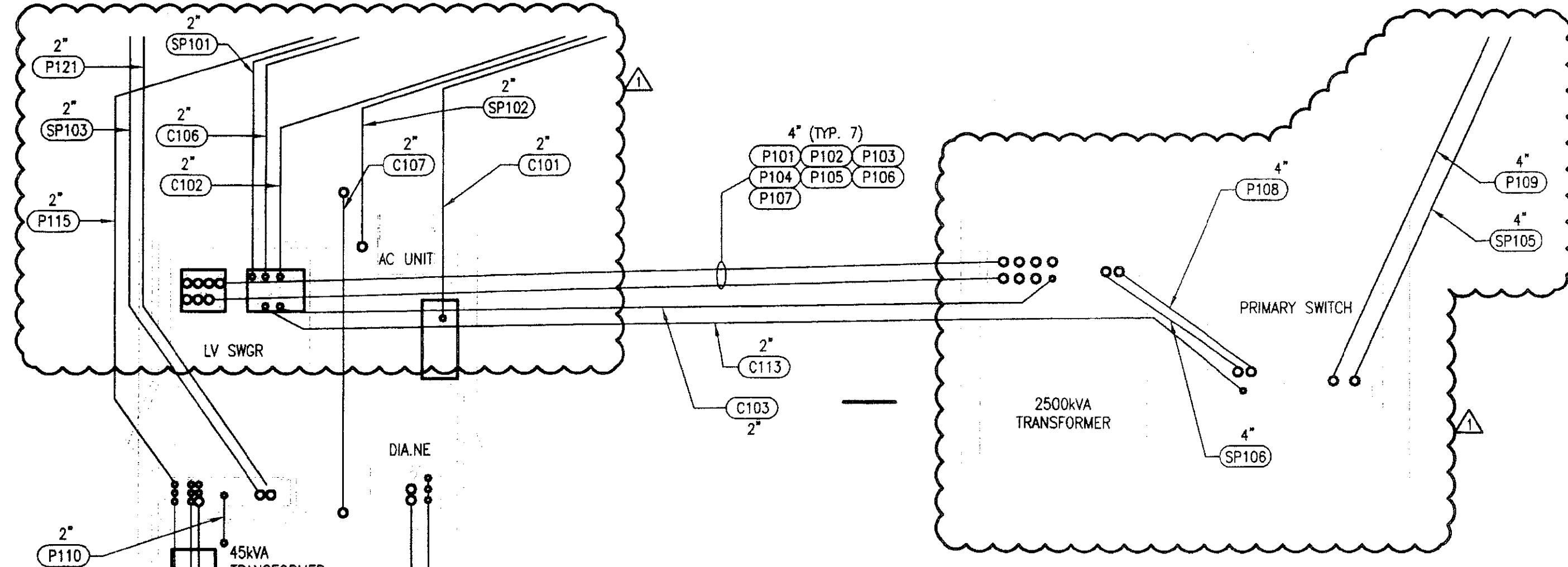
UNDERGROUND CONDUIT PLAN
 SCALE: 1" = 10'

REVISIONS		DATE	STATUS	BY	CHK	P.E.
1	5/2/2008	ADDED SPARE CONDUITS & GENERATOR - ISSUED FOR CONSTRUCTION		AF	TH	AF
2	3/7/2008	ISSUED FOR DCA PERMIT		AF		
APPROVED BY:						
ENGINEERED BY:	THOMAS M. OSBORNE					
DRAWN BY:	AAF					
DATE:	16FEB2008					
SCALE:	1:10					
C.O.A.	24GA28087700					
industry and energy associates		1061 521 CORPORATE CENTER SUITE 175 FORT MILL, SC 29715				
<small>THIS DRAWING CONTAINS INFORMATION PROPRIETARY TO INDUSTRY AND ENERGY ASSOCIATES, LLC (IEA). IT IS SUBMITTED IN CONFIDENCE AND IS TO BE USED SOLELY FOR THE PURPOSES FOR WHICH IT IS FURNISHED. THIS DRAWING AND SUCH INFORMATION IS NOT TO BE REPRODUCED, TRANSMITTED, DISCLOSED OR USED IN WHOLE OR IN PART WITHOUT THE WRITTEN AUTHORIZATION OF IEA.</small>						
CONTRACT/PROJ. No. 07036						
SALEM COUNTY LANDFILL						
ALLOWAY, NEW JERSEY						
UNDERGROUND CONDUIT PLAN						
DWG. NO.	E00-26-001					

8 7 6 5 4 3 2 1

NOTES:

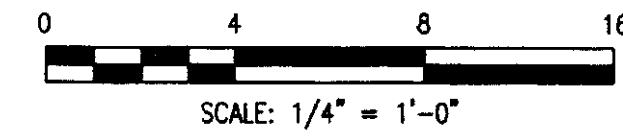
1. FOR UNDERGROUND ELECTRICAL NOTES, SEE DRAWING E00-26-001.



REFERENCE DRAWINGS:

M00-01-001: GENERAL ARRANGEMENT
 E00-51-001: CABLE AND RACEWAY SCHEDULE
 E00-26-001: UNDERGROUND CONDUIT PLAN

REV	DATE	STATUS	BY	CHK	P.E.
5/2	2008	ADDED SPARE CONDUITS - ISSUED FOR CONSTRUCTION	TLH	AF	TEH
3/07	2008	ISSUED FOR DCA PERMIT	AF		
APPROVED BY:					
ENGINEERED BY:			THOMAS M. OSBORNE		
DRAWN BY:			<i>Thomas M. Osborne</i>		
DATE:			5/06/08		
SCALE:			1:10		
C.O.A.:			N.J. PROFESSIONAL ENGINEER		
24GA28087700			NO. GE 45699		
industry and energy associates 1061 521 CORPORATE CENTER SUITE 175 FORT MILL, SC 29715					
THE DRAWING CONTAINS INFORMATION PROPRIETARY TO INDUSTRY AND ENERGY ASSOCIATES, LLC (IEA). IT IS SUBMITTED IN CONFIDENCE AND IS TO BE USED SOLELY FOR THE PURPOSES FOR WHICH IT IS FURNISHED. THIS DRAWING AND SUCH INFORMATION IS NOT TO BE REPRODUCED, TRANSMITTED, DISCLOSED OR USED OTHERWISE IN WHOLE OR IN PART WITHOUT THE WRITTEN AUTHORIZATION OF IEA.					
CONT./PROJ. No. 07036					
SALEM COUNTY LANDFILL					
ALLOWAY, NEW JERSEY					
ENLARGED UNDERGROUND CONDUIT PLAN					
DWG. NO. E00-26-002					



UNDERGROUND CONDUIT PLAN
 SCALE: 1/4" = 1'-0"

8 7 6 5 4 3 2 1