SOUTHWEST FLORIDA

Advertise Date: Friday, October 07, 2016

Lee County Board of County Commissioners DIVISION OF PROCUREMENT MANAGEMENT

Invitation to Bid (B)

Solicitation No.:	B160579LAC				
Solicitation Lee County Solid Waste Construction and Demolition Debris Site					
Name:	4.16KV Distribution Feeder Extension	1			
Open					
Date/Time:	11/2/2016	Time: 2:30 PM			
Location:	Lee County Procurement Management				
	1500 Monroe Street 4th Floor				
	Fort Myers, FL 33901				
Procurement					
Contact:	Lindsay Cepero	Title: Procurement Analyst			
Phone:	(239) 533-8881	Email: LCepero@LeeGov.com			
Requesting					
Dept.	Solid Waste				
Pre-Solicitat	ion Meeting:				
Tune	NON Mandatory				

Type: NON-Mandatory
Date/Time: 10/19/2016 9:00 AM
Location: Solid Waste Facility – 10500 Buckingham Rd, Fort Myers, FL 33905

All solicitation documents are available for download at <u>www.leegov.com/procurement</u>



ADVERTISEMENT DATE: 10/7/2016

Notice to Vendor

B160579LAC, Lee County Solid Waste Construction and Demolition Debris Site 4.16KV Distribution Feeder Extension Invitation to Bid (B)

Lee County, Fort Myers, Florida, is requesting bid from qualified individuals/firms for

B160579LAC, Lee County Solid Waste Construction and Demolition Debris Site 4.16KV Distribution Feeder Extension

Then and there to be publicly opened and read aloud for the purpose of selecting a vendor to furnish; all necessary labor, services, materials, equipment, tools, consumables, transportation, skills and incidentals required for Lee County, Fort Myers, Florida, in conformance with solicitation documents, which include technical specifications and/or a scope of work.

Those individuals/firms interested in being considered for this solicitation are instructed to submit, in accordance with specifications, their bids, pertinent to this project prior to

2:30 PM Wednesday, November 2, 2016

to the office of the **Procurement Management Director**, 1500 Monroe Street, 4th Floor, Fort Myers, Florida 33901. The Invitation to Bid shall be received in a sealed envelope, prior to the time scheduled to receive bid(s), and shall be clearly marked with the solicitation name, solicitation number, bidder name, and contact information as identified in these solicitation documents.

The Scope of Services for this solicitation is available from www.leegov.com/procurement

Bidders who obtain scope of services from sources other than <u>www.Leegov.com/procurement</u> are cautioned that the solicitation package may be incomplete. The County's official bidders list, addendum(s) and information must be obtained from <u>www.Leegov.com/procurement</u>. It is the bidder's responsibility to check for posted information. The County may not accept incomplete bids.

A Non-Mandatory Pre-Bid Conference has been scheduled for the following time and location:

9:00 AM October 19, 2016 Solid Waste Facility – 10500 Buckingham Rd, Fort Myers, FL 33905

for the purpose of discussing the proposed project. Prospective bidders are encouraged to attend. All prospective bidders are encouraged to obtain and review plans, specifications, and scope of work for this solicitation before the pre-bid so that they may be prepared to discuss any question or concerns they have concerning this project. A site visit may follow the pre-bid conference. Questions regarding this solicitation are to be directed, in writing, to the individual listed below using the email address list below or faxed to (239) 485-8383 during normal working hours.

Lindsay Cepero, <u>LCepero@leegov.com</u>

Sincerely,

Mary G. Tucker, CPPO, FCCM, FCCN Procurement Management Director *<u>WWW.LeeGov.Com/Procurement</u> is the County's official posting site

2

Terms and Conditions INVITATION TO BID (B)

1. DEFINTIONS

- 1.1. Addendum/Addenda: A written change, addition, alteration, correction or revision to a bid, proposal or contract agreement. Addendum/Addenda may be issued following a pre-bid/pre-proposal conference or as a result of a specification or work scope change to the solicitation.
- 1.2. **Approved Alternate**: Solicitation documents may make reference of specific manufacturer(s) or product(s). These references serve only as a recommendation and a guide to minimum quality and performance. The references are not intended to exclude approved alternatives of other manufacturer(s) or product(s).
- 1.3. **Bid/Proposal Package**: A bid/proposal is a document submitted by a vendor in response to some type of solicitation to be used as a basis for negotiations or for entering into a contract.
- 1.4. Bidder/Responder/Proposer: One who submits a response to a solicitation.
- 1.5. County: Refers to Lee County Board of County Commissioners.
- 1.6. **Due Date and Time/Opening**: Is defined as the date and time upon which a bid or proposal shall be submitted to the Lee County Procurement Management Division. Only bids or proposals received prior to the established date and time will be considered.
- 1.7. **Liquidated Damages**: Damages paid usually in the form of monetary payment, agreed by the parties to a contract which are due and payable as damages by the party who breaches all or part of the contract. May be applied on a daily basis for as long as the breach is in effect.
- 1.8. **Responsible**: A vendor, business entity or individual who is fully capable to meet all of the requirements of the bid/proposal solicitation documents and subsequent contract. Must possess the full capability including financial and technical, to perform as contractually required. Must be able to fully document the ability to provide good faith performance.
- 1.9. **Responsive**: A vendor, business entity or individual who has submitted a bid or request for proposal that fully conforms in all material respects to the bid/proposal solicitation documents and all of its requirements, including all form and substance.
- 1.10. **Solicitation**: An invitation to bid, a request for proposal, invitation to negotiate or any document used to obtain bids or proposals for the purpose of entering into a contract.

2. ORDER OF PRECEDENCE

- 2.1. If a conflict exists between the "Terms and Conditions" the following order of precedents will apply:
 - 2.1.1. Florida State Law as applied to Municipal Purchasing in accordance with Title XIX, "Public Business", Chapter 287 "Procurement of Personal Property and Services."
 - 2.1.2. Lee County Procurement Management Division Policy and Ordinances
 - 2.1.3. Special Conditions and Supplemental Instructions
 - 2.1.4. Detailed Scope of Work
 - 2.1.5. These Terms and Conditions

3. RULES, REGULATIONS, LAWS, ORDINANCES AND LICENSES

- 3.1. It shall be the responsibility of the bidder to assure compliance with all other federal, state, or county codes, rules, regulations or other requirements, as each may apply. Any involvement with the Lee County shall be in accordance with but not limited to:
 - 3.1.1. Lee County Procurement Policy Manual
 - 3.1.2. Pursuant to Florida Statutes Section 119.071, Public Records, General exemptions from inspection or copying of public records, sealed bids or proposals received by the County. <u>Pursuant to this, solicitation are exempt from public records request (s. 119.07(1) and s. 24(a), Art. I, of the Florida Constitution) until such time as the agency provides notice of a decision or intended decision (pursuant to s. 119.071(2)) or within 30 days after bid or proposal opening, whichever is earlier.</u>
 - 3.1.3. Florida Statute 337.168 Confidentiality of official estimates, identities of potential bidders, and bid analysis and monitoring.
 - 3.1.4. Florida Statutes Section 607.1501(1) states: A foreign corporation may not transact business in the State of Florida until it obtains a certificate of authority from the Department of State.
- 3.2. Local Business Tax: If applicable, provide with proposal.

Ver 08/19/2016

3.3. **License(s)**: Proposer should provide, at the time of the opening of the bid, all necessary permits and/or licenses required for this product and/or service.

4. BID – PREPARATION OF SUBMITTAL

- 4.1. **Sealed Bid:** Submission must be in a sealed envelope/box, and the outside of the envelope must be marked with the following information (Label Form is attached for your use):
 - 4.1.1. Marked with the words "Sealed Bid"
 - 4.1.2. Name of the firm submitting the bid
 - 4.1.3. Title of the bid
 - 4.1.4. Bid number

4.2. Bid submission shall include:

- 4.2.1. Provide Two (2) hard copies. Mark each: one "Original", one "Copy"
- 4.2.2. Provide One (1) electronic CD ROM or Flash drive set of the submission.
- 4.2.3. One single adobe PDF file in the same order as the original hard copy.
- 4.2.4. Limit the color and number of images to avoid unmanageable file sizes.
- 4.2.5. Use rewritable CD ROM and <u>do not lock files</u>.

4.3. Submission Format:

- 4.3.1. <u>Required Forms</u>: complete and return **all** required forms. If the form is not applicable please return with "Not Applicable" or "N/A" in large letters across the form.
- 4.3.2. Failure to submit required or requested information may result in the bidder being found non-responsive.
- 4.3.3. <u>Execution of Bid</u>: All documents must be properly signed by corporate authorized representative, witnessed, and where applicable corporate and/or notary seals affixed. All proposals shall be typed or printed in ink. The proposer may not use erasable ink. All corrections made to the proposal shall be initialed.
- 4.3.4. If a cost/bid schedule was provided in Microsoft Excel format, the returned completed schedule should be included as a Microsoft Excel File on the CD ROM or Flash drive.
- 4.3.5. Should not contain links to other Web pages.
- 4.3.6. Include any information (either required or in addition to that asked for by the specifications) necessary to analyze your bid, i.e., required submittals, literature, technical data, financial statements.
- 4.3.7. Bid Security/Bond(s), if applicable (Construction projects)
- 4.4. **Preparation Cost**: The Bidder is solely responsible for any and all costs associated with responding to this solicitation. No reimbursement will be made for any costs associated with the preparation and submittal of any bid, or for any travel and per diem costs that are incurred by any Bidder.

5. RESPONSES RECEIVED LATE

- 5.1. It shall be the Bidder's sole responsibility to deliver the bid submission to the Lee County Procurement Management Division prior to or on the time and date stated.
- 5.2. Any bids received after the stated time and date will not be considered. The bid shall not be opened at the public opening. Arrangements may be made for the unopened bid to be returned at the bidder's request and expense.
- 5.3. The Lee County Procurement Management Division shall not be responsible for delays caused by the method of delivery such as, but not limited to; Internet, United States Postal Service, overnight express mail service(s), or delays caused by any other occurrence.

6. BIDDER REQUIREMENTS (unless otherwise noted)

- 6.1. **Responsive and Responsible**: Only bids received from responsive and responsible bidders will be considered. The County reserves the right before recommending any award to inspect the facilities and organization; or to take any other necessary action, such as background checks, to determine ability to perform is satisfactory, and reserves the right to reject submission packages where evidence submitted or investigation and evaluation indicates an inability for the bidder to perform.
 - 6.1.1. Bids may be declared "non-responsive" due to omissions of "Negligence or Breach of Contract" on the disclosure form. Additionally, bids may be declared "not responsible" due to past or pending lawsuits that are relevant to the subject procurement such that they call into question the ability of the bidder to

assure good faith performance. This determination may be made by the Procurement Management Director, after consulting with the County Attorney.

- 6.1.2. Additional sources may be utilized to determine credit worthiness and ability to perform.
- 6.1.3. Any bidder or sub-contractor that will have access to County facilities or property may be required to be screened to a level that may include, but is not limited to; fingerprints, statewide criminal. There may be fees associated with these procedures. These costs are the responsibility of the bidder or sub-contractor.
- 6.2. **BID--Past Performance**: Bidders past performance and prior dealings with Lee County (i.e., failure to meet specifications, poor workmanship, late delivery, etc.) may be reviewed. Poor or unacceptable past performance may result in bidder disqualification.
- 6.3. Submission packages, unless otherwise noted, will be considered only from bidders normally engaged in the provision of the services specified here in. The bidder shall have adequate organization, facilities, equipment, and personnel to ensure prompt and efficient service to Lee County. The County reserves the right before recommending any award to inspect the facilities and organization; or to take any other action necessary to determine ability to perform satisfactory, and reserves the right to reject submission packages where evidence submitted or investigation and evaluation indicated an inability of the bidder to perform.

7. PRE-BID CONFERENCE

- 7.1. A pre-bid conference will be held in the location, date, and time specified on the cover of this solicitation. The cover will also note if the pre-bid conference is Non-Mandatory or Mandatory. All questions and answers are considered informal. All prospective bidders are encouraged to obtain and review the solicitation documents prior to the pre-bid so they may be prepared to discuss any questions or concerns they have concerning this project. All questions must be submitted formally in writing to the procurement staff noted on the first page of the bid document. A formal response will be provided in the form of an addendum (see "County Interpretation/Addendums" for additional information.) A site visit may follow the pre-proposal conference, if applicable.
- 7.2. **Non-Mandatory**: Pre-bid conferences are generally non-mandatory, but it is highly recommended that prospective bidders participate.
- 7.3. **Mandatory**: Failure to attend a mandatory pre-bid conference will result in the bid being considered **non-responsive**.

8. COUNTY INTERPRETATION/ADDENDUMS

- 8.1. Each bidder shall examine the solicitation documents and shall judge all matters relating to the adequacy and accuracy of such documents. Any inquiries, suggestions or requests concerning interpretation, clarification or additional information pertaining to the bid shall be made **in writing**, submitted at least eight (8) calendar days prior to the date when the bid is due.
- 8.2. Response(s) will be in the form of an Addendum posted on <u>www.leegov.com/procurement</u>. It is solely the bidder's responsibility to check the website for information. No notifications will be sent by Lee County Procurement Management Division.
- 8.3. All Addenda shall become part of the Contract Documents.
- 8.4. The County shall not be responsible for oral interpretations given by any County employee, representative, or others. Interpretation of the meaning of the plans, specifications or any other contract document, or for correction of any apparent ambiguity, inconsistency or error there in, shall be in writing. Issuance of a written addendum by the County's Procurement Management Division is the only official method whereby interpretation, clarification or additional information can be given.

9. QUALITY GUARANTEE/WARRANTY (as applicable)

- 9.1. Bidder will guarantee their work without disclaimers, unless otherwise specifically approved by the County, for a minimum of twelve (12) months from final completion.
- 9.2. Unless otherwise specifically provided in the specifications, all equipment and materials and articles incorporated in the work covered by this contract shall be new, unused and of the most suitable grade for the purpose intended. Refurbished parts or equipment are not acceptable unless otherwise specified in the specifications. All warrantees will begin from the date of final completion.
- 9.3. Unless otherwise specifically provided in the specifications, the equipment must be warranted for twelve (12) months, shipping, parts and labor. Should the equipment be taken out of service for more than forty-eight

(48) hours to have warranty work performed, a loaner machine of equal capability or better shall be provided for use until the repaired equipment is returned to service at no additional charge to the County.

9.4. If any product does not meet performance representation or other quality assurance representations as published by manufacturers, producers or distributors of such products or the specifications listed, the vendor shall pick up the product from the County at no expense to the County. The County reserves the right to reject any or all materials, if in its judgment the item reflects unsatisfactory workmanship or manufacturing or shipping damage. The vendor shall refund, to the County, any money which has been paid for same.

10. SUBSTITUTION(S)/APPROVED ALTERNATE(S)

- 10.1. Unless otherwise specifically provided in the specifications, reference to any equipment, material, article or patented process, by trade name, brand name, make or catalog number, shall be regarded as establishing a standard of quality and shall not be construed as limiting competition. If a bidder wishes to make a substitution in the specifications, the bidder shall furnish to the County, <u>no later than ten (10) business days</u> <u>prior to the bid opening date</u>, the name of the manufacturer, the model number, and other identifying data and information necessary to aid the County in evaluating the substitution. Such information is submitted through the Procurement Management Division. Any such substitution shall be subject to County approval through the issuance of a written addendum by the County's Procurement Management Division. Substitutions shall be approved only if determined by the County to be an <u>Approved Alternate</u> to the prescribed specifications.
- 10.2. A bid containing a substitution is subject to disqualification if the substitution is not approved by the County. Items bid must be identified by brand name, number, manufacturer and model, and shall include full descriptive information, brochures, and appropriate attachments. Brand names are used for descriptive purposes only. An **Approved Alternate** product or service may be used.

11. ADDITIONS, REVISONS AND DELETIONS

11.1. Additions, revisions, or deletions to the Terms and Conditions, specifications that change the intent of the solicitation will cause the solicitation to be non-responsive and the submission will not be considered. The Procurement Management Director shall be the sole judge as to whether or not any addition, revision, or deletion changes the intent of the solicitation.

12. NEGOTIATED ITEMS

6

- 12.1. Any item not outlined in the Scope of Services may be subject to negotiations between the County and the successful bidder.
- 12.2. After award of this proposal the County reserves the right to add or delete items/services at prices to be negotiated at the time of addition or deletion.
- 12.3. At contract renewal time(s) or in the event of significant industry wide market changes, the County may negotiate justified adjustments such as price, terms, etc., to this contract with the County, in its sole judgment, considers such adjustments to be in the best interest of the County

13. ERRORS, OMISSIONS, CALCULATION ERRORS (as applicable)

- 13.1. **Errors/Omissions:** Approval by County of the successful bidder's work product for the project shall not constitute nor be deemed a release of the responsibility and liability of the successful bidder for the accuracy and competency of the successful bidder's designs, drawings, specifications or other documents and work pertaining to the project. Additionally, approval by the County of the successful bidder's work product shall not be deemed to be an assumption of drawings, specifications or other documents prepared by the successful bidder for the project. After acceptance of the final plans by the County, the successful bidder agrees, prior to and during the construction of the project, to perform such successful bidder services, at no additional cost to the County, as may be required by the County to correct errors or omissions on the plans prepared by the successful bidder pertaining to the project.
- 13.2. **Calculation Errors:** In the event of multiplication/addition error(s), the unit price shall prevail. Written prices shall prevail over figures where applicable. All bids shall be reviewed mathematically and corrected, if necessary, using these standards, prior to additional evaluation.

Ver 08/19/2016

14. CONFIDENTIALITY

- 14.1. Bidders should be aware that all submissions provided are subject to public disclosure and will <u>not</u> be afforded confidentiality, unless provided by Chapter 119 Florida Statute.
- 14.2. If information is submitted with a bid that is deemed "Confidential" the bidder must stamp those pages of the submission that are considered confidential. The bidder must provide documentation as to validate why these documents should be declared confidential in accordance with Chapter 119, "Public Records," exemptions.
- 14.3. Lee County *will not* reveal engineering estimates or budget amounts for a project unless required by grant funding or unless it is in the best interest of the County. According to Florida State Statute 337.168: A document or electronic file revealing the official cost estimate of the department of a project is confidential and exempt from the provisions of s. 119.07(1) until the contract for the project has been executed or until the project is no longer under active consideration.

15. BID -- CONFLICT OF INTEREST

15.1. All bidders are hereby placed on formal notice that per Section 3 of Lee County Ordinance No. 92-22: The County is prohibited from solicitation of a professional services firm to perform project design and/or construction services if the firm has or had been retained to perform the project feasibility or study analysis.

And:

- 15.2. A professional services firm who has performed or participated in the project feasibility planning, study analysis, development of a program for future implementation or drafting of solicitation documents directly related to this County project, as the primary vendor/consulting team, cannot be selected or retained, as the primary consultant/vendor or named a member of the consulting/contracting team, to perform project design, engineering or construction services for subsequent phase(s) or scope of work for this project. Pursuant to FS. S287.057 (17) the firm will be deemed to have a prohibited conflict of interest that creates an unfair competitive advantage.
- 15.3. Should your submission be found in violation of the above stated provisions; the County will consider this previous involvement in the project to be a conflict of interest, which will be cause for immediate disqualification of the submission from consideration for this project.
- 15.4. **Business Relationship Disclosure Requirement**: The award hereunder is subject to the provisions of Chapter 112, Public Officers and Employees: General Provisions, Florida Statues. All bidders must disclose with their submission the name of any officer, director or agent who is also an employee of the Lee County or any of its agencies. Further, all bidders must disclose the name of any County employee who owns directly or indirectly, an interest of five percent (5%) or more in the bidder's firm or any of its branches.

16. ANTI-LOBBYING CLAUSE (Cone of Silence)

16.1. Following Florida Statute Section 287.057(23), Upon the issuance of the solicitation, prospective proposers/bidders or any agent, representative or person acting at the request of such proposer/bidder shall not have any contact, communicate with or discuss any matter relating in any way to the solicitation with any Commissioner, Evaluation Review Committee, agent or employee of the County other than the Procurement Management Director or their designee. This prohibition begins with the issuance of any solicitation, and ends upon execution of the final contract or when the solicitation has been cancelled. If it is determined that improper communications were conducted, the Proposer/Bidder maybe declared non- responsible.

17. DRUG FREE WORKPLACE

17.1. Lee County Board of County Commissioners encourages Drug Free Workplace programs as defined in accordance with Section 287.087, Florida Statutes.

18. DISADVANTAGED BUSINESS ENTERPRISE (DBE's)

- 18.1. The County encourages the use of Disadvantaged Business Enterprise Proposer(s) as defined and certified by the Florida Department of Transportation.
- 18.2. Proposer is required to indicate whether the Firm and/or any proposed sub-consultants are Disadvantaged Business Enterprises (DBE). Lee County encourages the utilization and participation of DBEs in procurements, and evaluation proceedings will be conducted within the established guidelines regarding equal employment opportunity and nondiscriminatory action based upon the grounds of race, color, sex or national origin. Interested certified Disadvantaged Business Enterprise (DBE) firms as well as other minority-owned and women-owned firms are encouraged to respond.

19. ANTI-DISCRIMINATION/EQUAL EMPLOYMENT OPPORTUNITY

- 19.1. The bidder agrees to comply, in accordance with Florida Statute 287.134, that furnishing services to the County hereunder, no person on the grounds of race, religion, color, age, sex, national origin, handicap or marital status shall be excluded from participation in, denied the benefits of, or otherwise be subjected to discrimination.
- 19.2. The bidder will not discriminate against any employee or applicant for employment because of race, religion, color, age, sex, national origin, handicap or marital status. The bidder will make affirmative efforts to ensure that applicants are employed and that employees are treated during employment without regard to their race, religion, color, age, sex, national origin, handicap or marital status.
- 19.3. The bidder will include the provisions of this section in every sub-contract under this contract to ensure its provisions will be binding upon each sub-contractor. The bidder will take such actions in respect to any sub-contractor, as the contracting agency may direct, as a means of enforcing such provisions, including sanctions for non-compliance.
- 19.4. An entity or affiliate who has been placed on the <u>State of Florida's Discriminatory Vendor List</u> (This list may be viewed by going to the Department of Management Services website at <u>http://www.dms.myflorida.com</u>) may not submit a bid on a contract to provide goods or services to a public entity, may not submit a bid on a contract with a public entity for the construction or repair of a public building or public work, may not submit bids on leases of real property to a public entity, may not award or perform work as a vendor, supplier, sub-contractor, or consultant under contract with any public entity, and may not transact business with any public entity.

20. LOCAL BIDDER'S PREFERENCE

- 20.1. The Lee County Local Bidder's Preference Ordinance No. 08-26 is being included as part of the award process for this project. As such, Lee County at its sole discretion may chose to award a preference to any qualified "Local Contractor/Vendor" in a amount not to exceed 3% of the total amount quoted by that firm.
- 20.2. "Local Contractor/Vendor" as noted in Ordinance No. 08-26, or revision thereof, shall be defined as:
 20.2.1. Any person, firm, partnership, company or corporation whose principal place of business in the sole opinion of the County, is located within the boundaries of Lee/Collier County, Florida

OR

20.2.2. Any person, firm, partnership, company or corporation that has provided goods or services to Lee County on a regular basis for the preceding consecutive three (3) years, and that has the personnel, equipment and materials located within the boundaries of Lee/Collier County sufficient to constitute a present ability to perform the service or provide the goods.

21. BIDDER/SUB-CONTRACTOR RELATIONSHIP

21.1. The prime bidder/contractor on a project may <u>not</u> also be listed as a sub-contractor to another firm submitting a bid for the same solicitation. Should this occur, all responses from the involved/named firms will be considered non-compliant and rejected for award. Sub-contractors may be listed on multiple proposals for the same solicitation.

22. SUB-CONTRACTOR

22.1. The use of sub-contractors under this solicitation is not allowed without prior written authorization from the County representative.

23. BID - PROJECT GUIDELINES

- 23.1. The County has established the following Guidelines, Criteria, Goals, Objectives, Constraints, Schedule, Budget and or Requirements which shall service as a guide to the bidder(s) in conforming to the provision of goods and/or services to be provided pursuant to this Agreement/Contract:
 - 23.1.1. No amount of work is guaranteed upon the execution of an agreement/contract.
 - 23.1.2. Rates and all other negotiated expenses will remain in effect throughout the duration of the agreement/contract period.
 - 23.1.3. This contract does not entitle any bidder to exclusive rights to County agreements/contracts. The County reserves the right to perform any and all available required work in-house or by any other means it so desires.

- 23.1.4. In reference to vehicle travel, mileage and man-hours spent in travel time, is considered incidental to the work and not an extra compensable expense.
- 23.1.5. Lee County reserves the right to add or delete, at any time, and or all material, tasks or services associated with this agreement.
- 23.1.6. <u>Any Single Large Project</u>: The County, in its sole discretion, reserves the right to separately solicit any project that is outside the scope of this solicitation, whether through size, complexity or the dollar value.

24. BID – TIEBREAKER

- 24.1. Whenever two or more bids, which are equal with respect to price, quality and service, are received for procurement of commodities or contractual services, from responsive and responsible bidders the following steps will be taken to establish the award to the lowest bidder. This method shall be used for all ties.
 - 24.1.1. <u>Step 1 Local Bidder</u>: Between a local business, and a non-local business, a contract award, or the first opportunity to negotiate, as applicable, shall be made to the local business. Local shall be defined by Lee County Ordinance 08-26 or current revision thereof.
 - 24.1.2. <u>Step 2 Drug Free Workplace</u>: At the conclusion of step 1 if all is equal, the vendor with a Drug Free Workplace program shall be given preference, over a vendor with no Drug Free Workplace program. The contract award, or the first opportunity to negotiate, as applicable, shall be made to the bidder with the Drug Free Workplace program. In order to have a drug free workplace program, a business shall comply with the requirements of Florida Statutes 287.087.
 - 24.1.3. <u>Step 3 Coin Flip</u>: At the conclusion of Step 1, and Step 2 if all is equal, the contract award, or the first opportunity to negotiate, as applicable, shall be determined by the flip of a coin to determine final outcome.
- 24.2. When the tie has been determined the contract award, or the first opportunity to negotiate, as applicable, shall be made.
- 24.3. If an award or negotiation is unsuccessful with the initial bidder, award or negotiations may commence with the next highest bidder, utilizing the tiebreaker steps above to make the determination of next lowest bidder.

25. WITHDRAWL OF BID

- 25.1. No bid may be withdrawn for a period of **180 calendar days** after the scheduled time for receiving submissions. A bid may be withdrawn prior to the solicitation opening date and time. Withdrawal requests must be made in writing to the Procurement Management Director, who will approve or disapprove the request.
- 25.2. A bidder may withdraw a submission any time prior to the opening of the solicitation.
- 25.3. After submissions are opened, but prior to award of the contract by the County Commission, the Procurement Management Director may allow the withdrawal of a bid because of the mistake of the bidder in the preparation of the submission document. In such circumstance, the decision of the Procurement Management Director to allow the submission withdrawal, although discretionary, shall be based upon a finding that the bidder, by clear and convincing evidence, has met each of the following four tests:
 - 25.3.1. The bidder acted in good faith in submitting the bid,
 - 25.3.2. The mistake in bid preparation that was of such magnitude that to enforce compliance by the bidder would cause a severe hardship on the bidder,
 - 25.3.3. The mistake was not the result of gross negligence or willful inattention by the bidder; and
 - 25.3.4. The mistake was discovered and was communicated to the County prior to the County Commission having formally awarded the contract/agreement.

26. PROTEST RIGHTS

- 26.1. Any bidder that has submitted a formal response to Lee County, and who is adversely affected by an intended decision with respect to the award, has the right to protest an intended decision posted by the County as part of the solicitation process.
- 26.2. "Decisions" are posted on the Lee County Procurement Management Division website. Bidders are solely responsible to check for information regarding the solicitation. (www.leegov.com/procurement)
- 26.3. Refer to the "Bid/Proposal Protest Procedure" section of the Lee County "Contracts Manual" for the complete protest process and requirements. The Manual is posted on the Lee County website or you may contact the Procurement Management Director.

Ver 08/19/2016

- 26.4. In order to preserve your right to protest, you must file a written "*Notice Of Intent To File A Protest*" with the Lee County Procurement Management Director by 4:00 PM on the 3rd working day after the decision affecting your rights is posted on the Lee County website.
 - 26.4.1. The notice must clearly state the basis ad reasons for the protest.
 - 26.4.2. The notice must be physically received by the Procurement Management Director with in the required time frame. No additional time is granted for mailing.
- 26.5. To secure your right to protest you will also be required to post a "**Protest Bond**" and **file a written** "*Formal Protest***" document within 10 calendar days** after the date of "*Notice of Intent to File a Protest*" is received by the Procurement Management Director.
- 26.6. Failure to follow the protest procedures requirement within the time frames as prescribed herein and established by the Lee County Board of County Commissioners, Florida, shall constitute a waiver of your protest and any resulting claims.

27. AUTHORITY TO UTILIZE BY OTHER GOVERNMENT ENTITIES

27.1. This opportunity is also made available to any government entity. Pursuant to their own governing laws, and subject to the agreement of the vendor, other entities may be permitted to make purchases at the terms and conditions contained herein. Lee County Board of County Commissioners will not be financially responsible for the purchases of other entities from this solicitation.

28. CONTRACT ADMINISTRATION

28.1. Designated Contact:

- 28.1.1. The awarded bidder shall appoint a person(s) to act as a primary contact for all County departments. This person or back-up shall be readily available during normal working hours by phone or in person, and shall be knowledgeable of the terms and procedures involved.
- 28.1.2. Lee County requires that the awarded bidder to provide the name of a contact person(s) and phone number(s) which will afford Lee County access 24 hours per day, 365 days per year, of this service in the event of major breakdowns or natural disasters.

28.2. **BID – Term:**

- 28.2.1. The County reserves the right to renew this agreement (or any portion thereof).
- 28.2.2. The County's performance and obligation to pay under this contact, and any applicable renewal options, is contingent upon annual appropriation of funds.

28.3. **BID** – Award:

- 28.3.1. The bid is awarded under a system of sealed, competitive bidding to the lowest responsive and responsible bidder.
- 28.3.2. In the event the lowest responsible and responsive bid for a project exceeds the available funds, the County, may negotiate an adjustment of the bid price with the lowest responsible and responsive bidder, in order to bring the total cost of the project within the amount of available funds.
- 28.3.3. The County reserves the right to make award(s) by and individual item, group of items, all or none, or a combination thereof. The County reserves the right to reject any and all bids or to waive any minor irregularity or technicality in the bid received. Award will be made to the lowest responsible and responsive bidder(s) within the category chosen for basis of award.
- 28.3.4. The County reserves the right to award to one or multiple bidders at the discretion of the requesting authority and approval of the Procurement Management Director.

28.4. Agreements/Contracts:

28.4.1. The awarded bidder will be required to execute an Agreement/Contract as a condition of award. A sample of this document may be viewed on-line at http://www.leegov.com/procurement/forms.

28.5. **Records:**

- 28.5.1. <u>Retention</u>: The bidder shall maintain such financial records and other records as may be prescribed by Lee County or by applicable federal and state laws, rules and regulations. Unless otherwise stated in the specifications, the bidder shall retain these records for a period of five years after final payment, or until they are audited by Lee County, whichever event occurs first.
- 28.5.2. <u>Right to Audit/Disclosure</u>: These records shall be made available during the term of the contract as well as the retention period. These records shall be made readily available to County personnel with reasonable notice and other persons in accordance with the Florida General Records Schedule.

28.5.3. Maintain:

- 28.5.3.1. Awarded Contractor(s) are hereby informed of their requirement to comply with FL §119 specifically to:
 - 1) Keep and maintain public records required by the County to perform the service.

2) Upon request from the County's custodian of public records, provide the County with a copy of the requested records or allow the records to be inspected or copied within a reasonable time at a cost that does not exceed the cost provided or as otherwise provided by law.

3) Ensure that public records that are exempt or confidential and exempt from public records disclosure requirements are not disclosed except as authorized by law for the duration of the contract term and following completion of the contract if the contractor does not transfer the records to the County.

4) Upon completion of the contract, transfer, at no cost, to the County all public records in possession of the contractor or keep and maintain public records required by the County to perform the service. If the contractor transfers all public records to the County upon completion of the contract, the contractor shall destroy any duplicate public records that are exempt or confidential and exempt from public records disclosure requirements. If the contractor keeps and maintains public records upon completion of the contract, the contractor shall meet all applicable requirements for retaining public records. All records stored electronically must be provided to the County, upon request from the County's custodian of public records, in a format that is compatible with the information technology systems of the County.

- 28.5.4. <u>Public Record</u>: **IF THE VENDOR HAS QUESTIONS REGARDING THE APPLICATION OF CHAPTER 119, FLORIDA STATUTES, TO THE VENDOR'S DUTY TO PROVIDE PUBLIC RECORDS RELATING TO THE CONTRACT, CONTACT THE CUSTODIAN OF PUBLIC RECORDS AT 239-533-2221, 2115 SECOND STREET, FORT MYERS, FL 33901, <u>http://www.leegov.com/publicrecords</u>.**
- 28.5.5. <u>Ownership</u>: It is understood and agreed that all documents, including detailed reports, plans, original tracings, specifications and all data prepared or obtained by the successful bidder in connection with its services hereunder, include all documents bearing the professional seal of the successful bidder, and shall be delivered to and become the property of Lee County, prior to final payment to the successful bidder or the termination of the agreement. This includes any electronic versions, such as CAD or other computer aided drafting programs.

28.6. **Termination:**

- 28.6.1. Any agreement as a result of this solicitation may be terminated by either party giving **thirty (30)** calendar days advance written notice. The County reserves the right to accept or not accept a termination notice submitted by the vendor, and no such termination notice submitted by the vendor shall become effective unless and until the vendor is notified in writing by the County of its acceptance.
- 28.6.2. The Procurement Management Director may immediately terminate any agreement as a result of this solicitation for emergency purposes, as defined by the Lee County Purchasing and Payment Procedures Manual (Purchasing Manual), (also known as Appendix "D" "AC-4-1.pdf".)
- 28.6.3. Any bidder who has voluntarily withdrawn from a solicitation without the County's mutual consent during the contract period shall be barred from further County procurement for a **period of 180 days**. The vendor may apply to the Board for a waiver of this debarment. Such application for waiver of debarment must be coordinated with and processed by the Procurement Management Department.
- 28.6.4. The County reserves the right to terminate award or contract following any of the below for goods or services over \$1,000,000:
 - 28.6.5. Contractor is found to have submitted a false certification as provided under FL § 287.135 (5);
 - 28.6.6. Contractor has been placed on the Scrutinized Companies with Activities in Sudan List or the Scrutinized Companies with Activities in the Iran Petroleum Energy Sector List;
 - 28.6.7. Contractor has engaged in business operations in Cuba or Syria;
 - 28.6.8. Contractor has been placed on the Scrutinized Companies that Boycott Israel List, or is engaged in a boycott of Israel beginning October 1, 2016;

29. WAIVER OF CLAIMS

29.1. Once this contract expires, or final payment has been requested and made, the awarded vendor shall have no more than thirty (30) calendar days to present or file any claims against the County concerning this contract. After that period, the County will consider the vendor to have waived any right to claims against the County concerning this agreement.

30. LEE COUNTY PAYMENT PROCEDURES

- 30.1. All vendors are requested to mail an original invoice to: Lee County Finance Department Post Office Box 2238 Fort Myers, FL 33902-2238
- 30.2. All invoices will be paid as directed by the Lee County payment procedure unless otherwise stated in the detailed specification portion of this project.
- 30.3. Lee County will not be liable for requests for payment deriving from aid, assistance, or help by any individual, vendor, proposer, or bidder for the preparation of these specifications.
- 30.4. Lee County is generally a tax exempt entity subject to the provisions of the 1987 legislation regarding sales tax on services. Lee County will pay those taxes for which it is obligated, or it will provide a Certificate of Exemption furnished by the Department of Revenue. All bidders should include in their proposal, all sales or use taxes, which they will pay when making purchases of material or sub-contractor's services.

31. MATERIAL SAFETY DATA SHEETS (MSDS)

31.1. In accordance with Chapter 443 of the Florida Statutes, it is the vendor's responsibility to provide Lee County with Material Safety Data Sheets on bid materials, as may apply to this procurement.

32. DEBRIS DISPOSAL

32.1. Unless otherwise stated, the bidder shall be fully responsible for the lawful removal and disposal of any materials, debris, garbage, vehicles or other such items which would interfere with the undertaking and completion of the project. There shall not be an increase in time or price associated with such removal.

33. SHIPPING

- 33.1. Cost of all shipping to the site, including any inside delivery charges and all unusual storage requirements shall be borne by the bidder unless otherwise agreed upon in writing prior to service. It shall be the bidders responsibility to make appropriate arrangements, and to coordinate with authorized personnel at the site, for proper acceptance, handling, protection and storage (if available) of equipment and material delivered. All pricing to be F.O. B. destination.
- 33.2. The materials and/or services delivered under the proposal shall remain the property of the seller until a physical inspection and actual usage of these materials and/or services is accepted by the County and is deemed to be in compliance with the terms herein, fully in accord with the specifications and of the highest quality.

34. INSURANCE

34.1. Insurance shall be provided by the awarded bidder/vendor. Upon request, a certificate of insurance (COI) complying with the attached guide shall be provided by the bidder/vendor.

35. BOND/SURETY

- 35.1. Bonding/Surety is required for construction projects over \$100,000.00 unless otherwise noted.
- 35.2. **Bid Bond/Security:** The bidder/vendor shall submit **not less than 5% of proposed dollar amount** (including applicable alternates) as bid security. One **ORIGINAL** Bid Bond/Security is to be submitted to the County with Proposal Submission. The Bid Security of the bidder/vendor will be retained until the bidder/vendor has executed the contract, whereupon the Bid security may be returned. The bid Security of the bidder/vendor whom the County believes to have a reasonable chance of receiving the award may be retained by the County until the effective date of the Agreement/Contract, whereupon Bid Securities furnished by the bidder/vendor may be returned. The following types of Bid Security are acceptable:
 - 35.2.1. A Certified Check or a Cashier's Check in the stated dollar amount of not less than 5% of proposed dollar amount. Any Certified Check or Cashier Check submitted in lieu of a Bid Bond

Shall be drawn on a solvent bank or trust company, made payable to Lee County Board of County Commissioners and shall have all necessary documentary revenue stamps attached (if required by law); or

- 35.2.2. **A Bid Bond** may be submitted on a Lee County paper Bid Bond Form. Must be signed by all required parties, of not less than 5% of proposed dollar amount (including Alternate(s) if applicable) shall accompany each Proposal. The Bid Bond shall be issued by a duly authorized surety authorized to d business and in good standing with the Florida Department of state
- 35.3. **Payment and Performance Bond**: In accordance with F.S. 255.05 and Lee County Ordinance 95-2-102, a Public Payment and Performance Bond is to be issued in a sum equal to one-hundred (100%) percent of the total awarded contract amount by a surety company considered satisfactory by Lee County and otherwise authorized to transact business in the State of Florida shall be required from the successful bidder/vendor. This shall insure the faithful performance of the obligations imposed by the resulting contract and protect the County from lawsuits for non-payment of debts incurred during the successful bidder/vendor performance under such Contract.
 - 35.3.1. A public Payment and Performance bond must be properly executed, by the Surety Company and successful bidder/vendor, and recorded with the Lee County Clerk of Court, within **seven** calendar days after notification by Lee County of the approval to award the Contract.
 - 35.3.2. A **Clean Irrevocable Letter of Credit or Cash Bond** may be accepted by the County in lieu of the Public Payment and Performance Bond.
- 35.4. Only Lee County form(s) may be accepted. Forms are available at <u>www.leegov.com/procurement/forms</u>.
- 35.5. Personal Checks are not acceptable to Lee County as a Bid Security.
- 35.6. **Surety**: In order to be acceptable to the County, a Surety Company issuing Evidence of Bondability, Bid Guaranty Bonds or 100% Public Payment and Performance Bonds or Letters of Credit called for herein shall meet and comply with the minimum standards set forth in as part of the Contract Documents. The surety company shall be authorized to do business and in good standing with the Florida Department of

The surety company shall be authorized to do business and in good standing with the Florida Department of State. All such bonds shall be issued or countersigned by a local producing agent who is a Florida resident with satisfactory evidence of its authority to execute the bond being submitted.

36. LIQUIDATED DAMAGES

- 36.1. Bidder/vendor here by agrees, if this proposal is accepted, to commence work under this project on or before ten (10) calendar days from the receipt of the Notice to Proceed and to fully complete all work on the project within the contract time stipulated. The bidder/vendor further agrees to pay the determined dollar amount in the liquidated damages for each consecutive calendar day beyond final completion of work is delayed.
 - 36.1.1. Liquidated Damages to be determined by means of one of the following methods to be determined (TBD.)
 - 36.1.1.1. Liquidated damages will be based on the entire project amount per calendar day using the table below:

Estimated Project Cost	Estimated Project Cost	Daily Charge	Per
Over	But Less than	Calendar Day	
\$0.00	\$50,000.00	\$645.00	
\$50,000.00	\$250,000.00	\$760.00	
\$250,000.00	\$500,000.00	\$970.00	
\$500,000.00	\$2,500,000.00	\$1,500.00	
\$2,500,000.00	\$5,000,000.00	\$2,400.00	
\$5,000,000.00	\$10,000,000.00	\$3,300.00	
\$10,000,000.00	\$15,000,000.00	\$4,600.00	
\$15,000,000.00	\$20,000,000.00	\$4,300.00	
\$20,000,000.00 over		\$5,700.00 plus .00005	5

OR

36.1.1.2. Liquidated Damages amount to be based on the following formula:

"Contract Price or GMP/Days to Substantial Completion * 15-20% (TBD)"

The successful bidder/vendor shall be liable to the County for per diem liquidated damages in the amount of \$TBD, for each calendar day of delay in achieving substantial completion as set forth herein. The per diem liquidated damages will be subject to change based upon the establishment of the actual contract price.

37. **<u>PERMITS</u>**

- 37.1. Unless otherwise specified herein, the Contractor will secure and pay for all permits, impact fees, and licenses and will pay for all governmental charges and inspection fees necessary for the prosecution of the work.
- 37.2. The Contractor will also pay all public utility charges and connection fees, except as provided for in the Contract Documents.
- 37.3. Permits and licenses of regulatory agencies, which are necessary to be maintained after completion of the guarantee period, shall be secured and paid for by the County.
- 37.4. Pursuant to the requirements of Florida Statute 218.80, this is a disclosure of permits and fees to be paid by the Contractor to complete the scope of work as described herein. This list does not relieve the successful bidder/vendor of its responsibility to obtain and pay for permits required by other governmental entities as specified elsewhere in this document.

Permit	Permit Cost (Amount/Percentage Method/Unit Method of Computation)
DEP CGP Notice of Intent (NOI) *DEP Form 62-621.300(4)(b)	\$150.00

Major Insurance Requirements

Minimum Insurance Requirements:

Risk Management in no way represents that the insurance required is sufficient or adequate to protect the vendors' interest or liabilities. The following are the required minimums the vendor must maintain throughout the duration of this contract. The County reserves the right to request additional documentation regarding insurance provided

a. <u>Commercial General Liability</u> - Coverage shall apply to premises and/or operations, products and completed operations, independent contractors, contractual liability exposures with minimum limits of:

\$1,000,000 per occurrence\$2,000,000 general aggregate\$1,000,000 products and completed operations\$1,000,000 personal and advertising injury

b. <u>Business Auto Liability</u> - The following Automobile Liability will be required and coverage shall apply to all owned, hired and non-owned vehicles use with minimum limits of:

\$1,000,000 combined single limit (CSL)
\$500,000 bodily injury per person
\$1,000,000 bodily injury per accident
\$500,000 property damage per accident

c. <u>Workers' Compensation</u> - Statutory benefits as defined by FS 440 encompassing all operations contemplated by this contract or agreement to apply to all owners, officers, and employees regardless of the number of employees. Workers Compensation exemptions may be accepted with written proof of the State of Florida's approval of such exemption. Employers' liability will have minimum limits of:

\$500,000 per accident \$500,000 disease limit \$500,000 disease – policy limit

*The required minimum limit of liability shown in a and b may be provided in the form of "Excess Insurance" or "Commercial Umbrella Policies." In which case, a "Following Form Endorsement" will be required on the "Excess Insurance Policy" or "Commercial Umbrella Policy."

Verification of Coverage:

- 1. Coverage shall be in place prior to the commencement of any work and throughout the duration of the contract. A certificate of insurance will be provided to the Risk Manager for review and approval. The certificate shall provide for the following:
 - The certificate holder shall read as follows: Lee County Board of County Commissioners P.O. Box 398 Fort Myers, Florida 33902
 - 2. Description of Operations Box shall state:

"Lee County, a political subdivision and Charter County of the State of Florida, its agents, employees, and public officials" will be named as an <u>"Additional Insured"</u> on the General Liability policy, including Products and Completed Operations coverage.

Special Requirements:

- 1. An appropriate <u>"Indemnification"</u> clause shall be made a provision of the contract.
- **2.** It is the responsibility of the general contractor to insure that all subcontractors comply with all insurance requirements.

LEE COUNTY, FLORIDA SCOPE OF SERVICE & PROJECT AWARD DESCRIPTION FOR B160579LAC, LEE COUNTY SOLID WASTE CONSTRUCTION AND DEMOLITION DEBRIS SITE 4.16KV DISTRIBUTION FEEDER EXTENSION

1. GENERAL SCOPE OF WORK

1.1 The Lee County Solid Waste Energy Recovery Facility (SWERF) desires to complete the installation of a 4.16KV distribution feeder extension project at their facilities located at 10500 Buckingham Road, Fort Myers, FL 33905. This scope of work shall include, but not be limited to the complete installation of: a new sectionalizing cabinet at the tap point with a new feeder tap of 5kv insulated cable in concrete installed underground, installation of a new 4.16kv-480 V 3-phase pad mounted distribution transformer with secondary disconnect switch and 480 V/277 V3-phase load center. Work additionally includes: supply and install of a new 300 A, 3-phase 480 V circuit with 500 MCM cables/conduits, retrofit installation of an existing sectionalizing cabinet, construction of concrete pads, supply and install of switchgear, raceway, panels, conduits, boxes, etc., and all associated tasks as necessary to complete the scope of work as detailed herein. All work shall follow specifications, terms, conditions, and plan details as contained within this solicitation.

2. BASIS OF AWARD

2.1 The basis of award shall be determined by the lowest (*Project Grand Total*) most responsive responsible, and qualified Bidder meeting all bid specifications. The County reserves the right to award to the contractor whose prices, in its sole judgement, are the most realistic in terms of provision of the best services and in the best interest of the County.

3. <u>TERM</u>

3.1 From the Notice to Proceed or the Purchase Order date, whichever applies: <u>160</u> calendar days to substantial completion, <u>210</u> calendar days to final completion.

LEE COUNTY, FLORIDA DETAILED CONSTRUCTION SPECIFICATIONS FOR

B160579LAC, LEE COUNTY SOLID WASTE CONSTRUCTION AND DEMOLITION DEBRIS SITE 4.16KV DISTRIBUTION FEEDER EXTENSION

1. Background

- 1.1 The proposed work is located on the site of the Lee County Solid Waste Energy Recovery Facility (SWERF), 10500 Buckingham Road, Fort Myers, Florida 33905. Currently on the property of the Lee County (SWERF), an existing 4.16 kV underground feeder from the (SWERF) distribution system serves outlying loads at the:
 - 1) Material Recovery Facility (MRF) and
 - 2) The Transfer Station/Fleet Shop/Construction/Demolition Debris Recycling Facility (CDDRF).
- 1.2 The intent of this project is to provide a new feeder tap off of the latter to serve a new 500 kVA transformer and additional load center in the CDDRF area.

2. Supply and Installation - New

2.1 A new sectionalizing cabinet shall be supplied and installed at the location of the tap point, immediately adjacent to an underground pullbox of the existing feeder. The new tap of 5 kV insulated cable in concrete embedded conduit ductbank shall be supplied and installed (approximately 700 L.F.) underground to the new transformer/loadcenter location. The 4.16 kV-480 V 3-phase pad mounted distribution transformer, secondary disconnect switch and 480 V/277 V 3-phase load center on a new pedestal rack shall be supplied and installed.

3. <u>Supply and Installation - Modifications</u>

3.1 From the new load center (see Item II), a 300 A, 3-phase 480 V circuit with 500 MCM cables/conduit shall be supplied and installed to the adjacent existing CDDRF load center service disconnect switch. The existing 500 MCM service cables to the CDDRF load center disconnect switch shall be disconnected. Similarly, at the other end of the existing service cables for the CDDRF, located at the 500 kVA transformer for the Transfer Station/Maintenance Building, the same existing 500 MCM service cables shall be disconnected at the disconnect switch and pulled out for scrap value credit back to owner. Bid schedule **must** reflect **full credit due** back to owner (County). Credit to County shall be inclusive of any costs and labor associated with removal of materials.

4. Bidding of Work

- 3.1 Bids for this new construction are to include complete proposals and follow the requirements of the Project Documents, Permit conditions, and shall be inclusive of but not limited to the following work items:
- 3.2 Site work / Earthwork / Restoration: Excavation of duct bank trench, grading, compaction and restoration, establishing elevations, survey and layout, material storage, storm water control, utility trench dewatering and silt fencing BMP's.
- 3.3 **Concrete/Masonry:** Foundation pads for transformer and cabinets, concrete duct bank, housekeeping pads, grouting holes in structures, flowable fill roadway restoration, precast structures, precast concrete poles.
- 3.4 **Medium Voltage Cabling:** Cables for conductors, grounding and bonding, accessories, terminations, connectors, splices, installed and tested according to project documents.
- 3.5 **Raceways, Boxes and Panelboards:** Conduits, fittings, supports, pull and junction boxes, power distribution panelboards and overcurrent/short circuit protection devices, installed and tested according to project documents.
- 3.6 Sectionalizing Equipment and Distribution Transformers: Pad mounted sectionalizing cabinets (one new and one existing to be retrofitted), and a new 500 kVA distribution pad-mounted transformer, installed and tested according to project documents.

- 3.7 Acceptance Testing: Phasing diagrams, continuity test photos, factory and field testing per project documents, pre-energization test phase, equipment energized no load/load, taps set within 2.5% of nominal load, phase to phase, phase to neutral, neutral to ground recordings at no load/load conditions.
- 3.8 Exterior Underground: Manholes, pullboxes, handholes, underground conduits and ductbanks.
- 3.9 **Phasing of Work:** Create a project schedule and phase work similar to the below:
 - a. Add time in the schedule to create, submit, and have submittals reviewed and returned.
 - b. Account for long lead items ordering.
 - c. Work phase completion of as much of the new feeder and equipment construction and pre-energization testing as possible.
 - d. Bring existing feeder energized down for making connections, retrofitting existing enclosure,
 - e. Energized no load testing, and
 - f. Energized testing with load.
 - g. Reach substantial completion.
 - h. Reach final completion phase.
- 3.10 Lee County recommends visiting the project site by attending the scheduled pre-bid meeting. No site visits prior to bidding without coordination through Lee County Procurement Management Office.
- 3.11 Lee County will be hosting an on-site Pre-Bid that will conclude with a walkthrough of the facility areas affected by the proposed work. This is the ONLY planned site visit during the solicitation period. Any requests received for site visit(s) after the Pre-Bid may not be guaranteed and must be processed and approved the Lee County Procurement Management Office. Lee County reserves the right to deny any requests for site visits. Any Bidder found to have completed additional site visits involving questions to present facility staff or other Lee County personnel without authorization received through the Procurement Management department may be deemed ineligible for award.
- 3.12 Access to the Facility is controlled in the evening and open to the public during daytime operating hours. Contractor is to coordinate all deliveries and have personnel and equipment on hand for coordination and offloading. All rental equipment and material deliveries are to be coordinated by the contractor and with Lee County Solid Waste. Equipment parked overnight is to be secured (keys removed / immobilized) in a secure location out of the way of County operations.
- 3.13 Phasing of the work shall involve all contractors coordinating work activities as to minimize downtime of County facilities and scheduled shutdowns of feeder circuit. To maintain a level of safety for the public customers and to maintain Solid Waste operations, some work activities possibly will have to be performed after facility operating hours or weekend days. Coordination with the County Project manager and Covanta Energy (power plant operations) is a must for any shutdown/ startup of circuits. Safety equipment, safety meeting with Covanta Energy, log in and out of all project worker personnel, lockout and tag out of circuit are required and shall be strictly adhered to by all workers.

5. Scope of Work:

- 5.1 Work to be performed under the proposed construction contract shall consist of providing all necessary permits, labor, materials, equipment and misc. incidentals etc. required to construct the proposed work in accordance with the project documents which includes this scope of work. The below listed work items shall be included in contractor's bid, but not limited to the following as additional services may be required to complete the intent of this work scope:
- 5.2 Site work / Earthwork / Restoration: Excavation of duct bank trench, grading, compaction and restoration, establishing elevations, survey and layout, material storage, storm water control, utility trench dewatering and silt fencing BMP's.

- a. All site and earthwork is to be constructed, and all materials are to be in accordance with project documents and referenced specifications latest edition. Soil Proctors and Density testing provided by Lee County to be coordinated by contractor.
- b. County daily operations and its customers shall safely function around the proposed work zones.
- c. The ductbank trench pathway and work zone is an existing grassed and landscaped area with one paved and one non-paved roadway crossing and some underground utilities to cross.
- d. A pay item will be provided in the contract to excavate and replace any unclassified / unsuitable materials according to project specs. Replace unclassified material with suitable backfill material compacted (AASHTO A-1 and A-3 Soils) for foundations and pipe bedding for buried pipe lines and duct banks. Import fill as required, placement and compacting of appropriate structural fill in support of the proposed formed concrete foundation for the proposed equipment. Quantities and verification of unclassified/unsuitable materials will be verified by Lee County and Geotechnical Engineer. Contractor is to invoice only quantities approved by County.
- e. Clear and grub any vegetation roots to a depth of 12" below proposed grades.
- "No-Notice" Dewatering Permits "No-Notice" short-term dewatering permits apply to dewatering projects of less than 90 days with maximum daily pumpage of less than 5 million gallons per day and maximum total project pumpage of less than 100 million gallons, where all dewatering water is retained on the project site and there is no potential for resource harm. If a project does not qualify for a "No-Notice" permit, a Dewatering General Water Use Permit (Section 2.5.2) or a Dewatering Individual Permit (Section 2.5.3) must be obtained for the BASIS OF REVIEW FOR WATER USE Effective: July 21, 2013 WU BOR -36 dewatering project. These permits are intended for projects of longer duration or larger dewatering pumpage, or for those projects where the potential for resource impact needs to be evaluated by District staff or off-site discharge of dewatering water is requested. Proposed dewatering activities under the "No-Notice" permit must satisfy the following criteria, in addition to the Conditions of Issuance in 40E-20.301, F.A.C., and the "NoNotice" requirements in 40E-20.302(3), F.A.C.: 1. will retain all discharge on the project site. No off-site discharge is authorized under "No-Notice" dewatering. 2. will not dewater to a depth below 0.0 feet NGVD within 1000 feet of saline water, except when dewatering saline water, as defined in Chapter 1 of this Basis of Review. 3. will not occur within 100 feet of a wastewater treatment plant rapid-rate land application system permitted under Part IV of Chapter 62-610, F.A.C. 4. will not occur within one mile of a known landfill or contamination. 5. will not occur within 1000 feet of a wetland. The applicant is not required to submit a permit application for dewatering activities, if the "No-Notice" criteria are met. In proceeding with "No-Notice" dewatering, the applicant acknowledges that the dewatering operation is subject to the Standard Permit Conditions in Section 5.1 of the BOR, including responsibility for mitigating any harm that may occur as a result of the dewatering to existing legal uses, off-site land uses, or natural resources. Linear projects, such as roads, utilities, or pipelines, may qualify for multiple "No-Notice" permits. The dewatering activity for these projects may have a rolling 90-day duration, in which the dewatering operation at the end of each 90-day period occurs more than 1 mile from the location at the beginning of each 90-day period.
- g. Storm water BMP's and site storm water management, permitting and reporting shall be accounted for by the contractor within the work zone.
- h. Restore open cut paved roadways, prime and pave w/ asphalt per project documents, striping, restore any signage.
- i. Surveying for layout, elevation control, construction, and record drawings.
- j. Establish safe work zones working with and around the project site. Establishing and maintaining onsite stabilized lay down area for the subcontractors and building vendor, and lay down for any stockpiled earth materials.
- k. Restore all areas disturbed by construction; utilize materials of like kind to restore all disturbed areas of the project site. Sod all disturbed grassed areas. All site restoration shall be accounted for in the bid and shall be made part of the Contractor's responsibility as part of his contract.
- 5.3 **Concrete/Masonry**: Foundation pads for transformer and cabinets, concrete duct bank, housekeeping pads, grouting holes in structures, flowable fill roadway restoration, precast structures, precast concrete poles.

- a. Form pour and finish reinforced concrete foundations, housekeeping pads slabs at proposed grades per the project documents. Provide control joints, curing compound, construction/cold joints as called for on plans. Provide all necessary forms, bracing and supports.
- b. Furnish and Install precast concrete manholes with crushed rock foundation, two cable racks each, ground rods, frames and covers per specifications and plans.
- c. Furnish and Install concrete or flowable fill encased ductbank 36" below grade, conduits, conduit supports, seperators.
- d. Demolish any walls, walks, concrete paving, housekeeping pads, light pole foundations, as required per the project documents.
- e. Restore paved roadway open cut crossing using flowable fill as backfill for trench and ductbank.
- 5.4 **Medium Voltage Cabling**: Cables for conductors, grounding and bonding, accessories, terminations, connectors, splices, installed and tested according to project documents.
 - a. Furnish, deliver and install Medium voltage cable, compact stranded copper, voltage class, rating, insulation, shielding and jackets as indicated on project documents.
 - b. Furnish, deliver and install cable accessories, lugs, splice connectors, termination end caps, elbow connectors, splices, grounding adapters as indicated on project documents.
 - c. Provide for submittals, cable pulling plan, install cable with tension measurement in dry conditions, cable slack loops and arc proofing in manholes, testing as indicated on project documents.
- 5.5 **Raceways, Boxes, and Panelboards**: Conduits, fittings, supports, pull and junction boxes, power distribution panelboards and overcurrent/short circuit protection devices, installed and tested according to project documents
 - a. Shop Drawings
 - b. Furnish and Install new conduits fittings and accessories, pull and junction boxes, and support systems, route, bend cut in accordance with NEC anf all other applicable codes in a neat appearance free from interference with other equipment.
 - c. Furnish and Install electrical fixtures, conduits, wiring, devices, luminaries, junction boxes, in sizes, materials and NEMA ratings as called for in the project documents
 - d. Spare conduits with pull strings as called for in the project documents
- 5.6 **Sectionalizing Equipment and Distribution Transformers**: Pad mounted sectionalizing cabinets (one new and one existing to be retrofitted), and a new 500 kVA distribution pad-mounted transformer, installed and tested according to project documents.
 - a. Furnish and install one new pad mounted sectionalizing cabinet w/stainless steel enclosure, removable doors, storage rack for fuses, to meet specified ratings factory tested. Installed and tested according to project documents.
 - b. Retrofit existing sectionalizing cabinet (needs replacement due to corrosion) with new stainless steel cabinet already onsite in storage provided by Covanta Energy. Internal parts and pieces within the existing cabinet may be required to be installed in new stainless cabinet.
 - c. Furnish, deliver and install pad mounted three phase Distribution Transformer. Provide Submittals for transformer, to include technical data, fabrication drawings, certifications, operation and maintenance data, outline as-built drawing, nameplate drawing impedance data, factory test report, and acceptance report. Three Phase Transformer to meet the project specifications, mounted on a concrete reinforced pad with a finished floor elevation of 25.0 NGVD.
- 5.7 Acceptance Testing: Phasing diagrams, continuity test photos, factory and field testing per project documents, pre-energization testing, equipment energized no load/load, taps set within 2.5% of nominal load, phase to phase, phase to neutral, neutral to ground recordings at no load/load conditions.
 - a. Create phasing diagram showing coordinated phase rotations. Photograph and provide copies of field continuity tests.

- b. Factory and Field Testing, pre-energization testing phase, equipment energized no load and under load, specified testing on switchgear and switchboards, transformers and components, excitation current and oil testing. Adjust tap changer and record as-left tap changer setting. Low, medium voltage and grounding tests in accordance with the referenced specifications in the project documents.
- 5.8 **Exterior Underground**: Manholes, pullboxes, handholes, underground conduits and ductbanks.
 - a. Furnish and Install H-20 load rated precast concrete manholes set on level crushed rock foundation, cable racks (min 2 per manhole), mounting hardware, grounding rods, cable pull iron, frames and covers per specifications and plans.
 - b. Furnish and install underground conduits and accessories. Follow the raceway applications specification in the project documents. Slope ductbank conduits with lowpoints to manholes, min 30" below grade. Stagger conduit joints, watertight, long sweeps, nylon pull strings in spare conduits.
 - c. Furnish and install concrete ductbank, concrete or flowable fill. (See specifications for mix design.) Top of concrete ductbank must be a min 36" below grade. Conduit supports and separators as specified.

6. Special Conditions:

6.1 Initial safety meeting, and daily lock out tag out protocols under Covanta Energy protocols.

- 6.2 Contractor and crew will be required to attend a short approx. 1 hour Safety Meeting with Covanta Energy (Lee County's WTE power plant operators) onsite prior to working on any energized or existing conductors or sectionalizing equipment.
- 6.3 Lock out tag out with Covanta Energy being the requestor will occur daily with all crew onsite signing in and out after a safety check by Covanta at the beginning and end of each work day.
- 6.4 Close coordination with Lee County Project Manager and Covanta Energy prior to opening or requesting energizing or de-energizing of feeders is mandatory. As safety is paramount and facility operations will be affected. All activities as such should go through the Project Manager to Covanta Energy.

LEE COUNTY, FLORIDA SUPPLEMENTARY CONDITIONS FOR

B160579LAC, LEE COUNTY SOLID WASTE CONSTRUCTION AND DEMOLITION DEBRIS SITE 4.16KV DISTRIBUTION FEEDER EXTENSION

The following Supplementary Conditions modify the Supplemental Information of the Lee County Construction Contract. Where a portion of the Supplemental Information is modified or deleted by the Supplementary Conditions, the unaltered portions of the Supplemental Information shall remain in effect.

- Definitions
 - 1.1 The following is an addition to Definitions to assist in defining the roles of the project parties:

OWNER is Lee County and the PROJECT MANAGER. PROJECT MANAGER is Mike Avoglia an employee of the OWNER. CONSULTANT is HDR Engineering, Inc.

Any other roles will be defined as the project progresses.

- The following is an addition to Article 3. -Interpretation Intent, Amending, and Reuse of Contract Documents 2.1 <u>Article 3.8 Summary of Construction Contract Documents</u>
 - i. The following is a list of the documents which comprise the complete Construction Documents:
 - Solicitation Package
 - o Inclusive of: Advertisement, Forms, Proposal(s), Supplementary Conditions, Plans, etc. contained within package.
 - Addenda
 - Proposal Page(s) and all documentation submitted by Bidder prior to award
 - Construction Contract Agreement Form
 - Construction Contract Supplemental Information
 - Plans and Drawings
 - Specifications
- Technical Specifications By HDR Engineering, Inc.:
 - 3.1 Technical Specifications dated 6-22-2016 include the following:
 - Table of Contents
 - Division 10 Specialties
 - o 10 14 00 Identification Devices
 - Division 26 Electrical
 - o 26 05 00 Electrical: Basic Requirments
 - o 25 05 13 Medium Voltage Cable
 - 26 05 19 Wire and Cable: 600 volt and below
 - 26 05 26 Grounding and Bonding
 - 26 05 33 Raceways and Boxes
 - 26 05 43 Electrical: Exterior Underground
 - 26 08 13 Acceptance Testing
 - o 26 12 19 Distribution Transformers
 - 26 13 23 Sectionalizing Equipment
 - o 26 24 16 Panel boards
 - 26 28 00 Over current and short circuit protective devices
 - o 26 28 16 Safety switches
 - Division 31 Earthwork
 - o 31 23 33 Trenching, Backfilling, and Compacting for Utilities

- Site 4.16kV Distribution Feeder Extension Drawings By HDR Engineering, Inc.:
 - 4.1 All Plan Sheets "Issued for bid" dated 6/21/16 in Revision Block
 - <u>General</u>
 - o G-01 Cover Sheet
 - Electrical Site Work
 - ES-01 Electrical Legend and General Notes
 - ES-02 Utility Plan 1 of 2
 - o ES-03 Utility Plan 2 of 2
 - ES-04 C&DD Demolition Site Power Plan
 - ES-05 One Line Diagram
 - ES-06 Electrical Panelboard & Details
 - ES-07 Electrical Details 1 of 2
 - ES-08 Electrical Details 2 of 2
- Article 4. Availability of Lands: Physical Conditions; Reference Points
 - 5.1 Identification of reports of explorations and tests of subsurface conditions at the site are as follows:
 - Geotechnical Exploration
 - Lee County Waste to Energy Plant Expansion
 - Report No. 53173-001-01 / 103994
 - Prepared by: Universal Engineering Sciences April 20, 2005
 - Available upon request: Lee County Solid Waste Contact: Mike Avoglia 239 533-8915
- Article 6.2. Bonds and Insurance
 - 6.1 Add the following new paragraph immediately after paragraph 5.4:
 - Supplemental Condition -6.2.9: Additional Insured's include the respective officers, partners, directors, employees, agents, consultants, and sub consultants of the firms and municipal governments(s):
 - o Lee County
 - HDR Engineering, Inc.
- Contractor's Responsibilities
 - 7.1 Add to Article 14
 - Permits
 - The CONTRACTOR is to pick up the approved Building, (All Permits with Lee County paid for by Lee County). Any other trade type Permits not initially approved under the Building Permit are to be promptly submitted for and picked up by the appropriate Sub Contractor.
 - Contractor shall be Responsible to Submit A **CGP** *Notice of Intent* (NOI) (DEP Form 62-621.300(4)(b)) must be submitted to DEP.
 - Develop and implement your SWPPP.
 - Complete an NOI in its entirety.
 - Submit the NOI along with an application fee of \$150 to the Notices Center. Authorization is granted 48 hours after the date the complete NOI is post-marked to DEP. However, if an ERP or a permit under Chapter 62-25, F.A.C., is not required for the project, authorization is granted 30 days after the complete NOI post-mark date (in such cases, a copy of the SWPPP must be submitted for review along with the NOI, as directed under Section I.C.2. of the CGP). The Notices Center will send an acknowledgment letter after receiving and processing your complete NOI and fee, and, in certain cases, as indicated above, after receiving and reviewing your SWPPP. NPDES Stormwater Notices Center Florida Department of Environmental Protection 2600 Blair Stone Road, MS #2510 Tallahassee, FL 32399-2400 (866) 336-6312 (toll-free) or (850) 297-1232
 - 7.2 Add to paragraph 17.1 the following: Record Drawings

- The CONTRACTOR is to include clear photographs depicting all underground utilities prior to being buried as work progresses as part of the Record Drawing submittals.
- 7.3 Add to Article 18 the following:
 - Safety and Protection
 - The CONTRACTOR will be working on the Lee County owned Waste to Energy Facility Site and will be required to follow all safety procedures required by our contracted facility operator, Covanta Energy. Lee County has many operations occurring on and around the proposed Construction Zone, which may be observed prior to bid/commencement of construction. These operations must not be hindered by the proposed construction. Close coordination between Lee County / Covanta Energy and the CONTRACTOR will assure minimum delays for all parties, and a Safe working zone.

LEE COUNTY DOCUMENT MANAGEMENT FORM Invitation to Bid

These forms are required as indicated below and should be submitted with all submissions. If it is determined that forms in this selection are not applicable to your company or solicitation they should be marked "N/A or Not Applicable" across the form in large letters and <u>returned with your submission</u> package. The original must be a manually signed original. Include additional copies, if specified, in the Solicitation documents.

FORM #	TITLE / DESCRITPION	REQUIRED STATUS (Required, Not Required, If Applicable)	VENDOR CHECK-OFF
1	Solicitation Response Form	Required	
1a	Proposal Form	Required	
1b	Business Relationship Disclosure Requirement	If Applicable	
2	Affidavit Certification Immigration Laws	Required	
3	Reference Survey	Required	
4	Negligence or Breach of Contract Disclosure Form	Required	
5	Affidavit Principal Place of Business	Required	
6	Sub-Contractor List	Required	
7	Public Entity Crime Form	Required	
8	Trench Safety	Required	
9	Bid Bond	Required	
*	Proposal Label	Required	

It is the Bidder's responsibility to review the submittal request in its entirety and ensure that all submittal requirements are included within you submission package.

It is the Bidder's responsibility to ensure the Solicitation Response is mailed or delivered in time to be received no later than the specified <u>opening date and time</u>. (If solicitation is not received prior to deadline it cannot be considered or accepted.)

Form 1 – Solicitation Response F	Form					
Southwest florid	Y	SOLICITATION RESPONSE FORM				
Date Submitted:			Deadline Date:	11/2	2/2016	
SOLICITATION IDENTIFICATION:	B150579	9LAC				
SOLICITATION NAME:	Lee Cour Distributi	nty Solid Waste C ion Feeder Extens	onstruction and Der ion	nolition De	ebris Site 4.16KV	
COMPANY NAME:						
NAME and TITLE: (TYPED OR PRINTED))					
BUSINESS ADDRESS: (PHYSICAL)						
CORPORATE OR MAILING ADDRESS	S:					
ADDRESS MUST MATCH SUNBIZ.ORC	I					
E-MAIL ADDRESS:						
PHONE NUMBER:		FA	X NUMBER:			
NOTE REQUIREMENT : IT IS TH PROCUREMENT MANAGEMEN COUNTY WILL POST ADDENDA In submitting this proposal, Proposer	E SOLE R T WEB SI TO THIS V makes all 1	ESPONSIBILIT (TE FOR ANY A) VEB PAGE, BUT representations rec	Y OF THE <u>VENDO</u> DDENDA ISSUED WILL <u>NOT NOTI</u> juired by the instruc	DR TO CH FOR THIS FY. etions to Pr	IECK LEE COUNTY S PROJECT. THE oposer and further warrants	
No Dated:	No	Dated:	No	na the tone	Dated:	
No. Dated:	No	Dated:	No.		Dated:	
Tax Payer Identification Number: (1) Empl	oyer Identifi	cation Number -O	(- (2) Social Securit	y Number:		

Please submit a copy of your registration from the website www.sunbiz.org establishing the Proposer/firm as authorized (including authorized representatives) to conduct business in the State of Florida, as provided by the *Florida Department of State, Division of Corporations*.

- 1 <u>Collusion Statement:</u> Lee County, Fort Myers, Florida The undersigned, as Proposer, hereby declares that no person or other persons, other than the undersigned, are interested in this solicitation as Principal, and that this solicitation is submitted without collusion with others; and that we have carefully read and examined the specifications or scope of work, and with full knowledge of all conditions under which the services herein is contemplated must be furnished, hereby propose and agree to furnish this service according to the requirements set out in the solicitation documents, specifications or scope of work for said service for the prices as listed on the county provided price sheet or (CCNA) agree to negotiate prices in good faith if a contract is awarded.
- 2 <u>Scrutinized Companies Certification:</u>

Section 287.135, Florida Statutes, prohibits agencies from contracting with companies, for goods or services over \$1,000,000, that are on either the Scrutinized Companies with Activities in Sudan List, the Scrutinized Companies with Activities in the Iran Petroleum Energy Sector List, the Scrutinized Companies that Boycott Israel List or engaged in a Boycott of Israel (Beginning October 1, 2016), or been engaged in business operations in Cuba or Syria. Lists are created pursuant to section 215.473, Florida Statutes.

As the person authorized to sign on behalf of Respondent, I hereby certify that the company identified above not listed on either the Scrutinized Companies with Activities in Sudan List or the Scrutinized Companies with Activities in the Iran Petroleum Energy Sector List. I understand that pursuant to section 287.135, Florida Statutes, the submission of a false certification may subject company to civil penalties, attorney's fees, and/or costs.

Ver 08/19/2016

Form#1 – Solicitation Form, Page 2

3 <u>Business Relationship Disclosure Requirement:</u> Sections 112.313(3) and 112.313(7), Florida Statutes, prohibit certain business relationships on the part of public officers and employees, their spouses, and their children. See Part III, Chapter 112, Florida Statutes and/or the brochure entitled "A Guide to the Sunshine Amendment and Code of Ethics for Public Officers, Candidates and Employees" for more details on these prohibitions. However, Section 112.313(12), Florida Statutes (1983), provides certain limited exemptions to the above-referenced prohibitions, including one where the business is awarded under a system of sealed, competitive bidding; the public official has exerted no influence on bid negotiations or specifications; and where disclosure is made, prior to or at the time of the submission of the bid, of the official's or his spouse's or child's interest and the nature of the intended business. The Commission on Ethics has promulgated this form for such disclosure, if and when applicable to a public officer or employee.

If this <u>disclosure is applicable request form</u> "INTEREST IN COMPETITIVE BID FOR PUBLIC BUSINESS" (*Required by 112.313(12)(b), Florida Statute (1983)*) to be completed and <u>returned with solicitation response</u>. It is the proposer's responsibility to disclose this relationship, failure to do so could result in being declared non-responsive.

Business Relationship Applicable (request form)

Business Relationship NOT Applicable

4 Disadvantaged Business Enterprise (DBE) proposer? If yes, please attach a current certificate. Yes No

- 5 The proposer should carefully read all the solicitation documents. Any deviation or modification must be identified. Failure to clearly identify any modifications in the space below may be grounds for the proposal being declared non-responsive, or to have the award of the solicitation to be rescinded by the County. Attach separate page if necessary.
- 6 Are there any modifications to the solicitation or specifications? Yes X No Modifications:

Modifications:

**No modifications are permitted for this project. Any request for modifications must be submitted 8 days prior to closing. The County reserves the right to accept or reject any modifications at its sole discretion.

<u>ALL PROPOSALS MUST BE EXECUTED BY AN AUTHORIZED AUTHORITY OF THE PROPOSER.</u> <u>WITNESSED AND_SEALED (IF APPLICABLE)</u>

ompany Name (Name printed or typed)		
Authorized Representative Name (printed or typed)		(Affix Corporate Seal, if applicable)
uthorized Representative's Title (printed or typed)	Witnessed/Attested by:	(Witness/Secretary name and title
	·	

Authorized Representative's Signature

Witness/Secretary Signature

Any blank spaces on the form(s), qualifying notes or exceptions, counter offers, lack of required submittals, or signatures, on County's Form may result in the submission being declared non-responsive by the County.



Lee County Procurement Management <u>BID/PROPOSAL FORM</u>

Company Name:

			Lee County Solid Waste Construction and Demolition
Solicitation #	B160579LAC	Solicitation Name	Debris Site 4.16KV Distribution Feeder Extension

Having carefully examined the "Terms and Conditions", and the "Detailed Specifications", all of which are contained herein, propose to furnish the following which meet these specifications.

This page serves as a header/placeholder only. Please refer to the Excel document provided with the solicitation for the complete Bid Schedule. The Excel document contains formulas for convenience, however it is the Contractor's responsibility to verify all pricing and calculations are CORRECT. Lee County is not responsible for errors in formulas or calculations contained within Excel document(s).

REMINDER: In the event there is a discrepancy between the total quoted amount or the extended amounts and the unit prices quoted, the unit prices will prevail and the corrected sum will be considered the quoted price.

The County will only accept bids submitted on bid forms provided by the County. Bids submitted on other forms, other than those provided by the County, will deem Bidder as non-responsive and ineligible for award.

<u>Term</u>

From the Notice to Proceed or the Purchase Order date, whichever applies: <u>160</u> calendar days to substantial completion, <u>210</u> calendar days to final completion.

Pricing

Pricing shall be inclusive of all labor, equipment, supplies, overhead, profit, material, and any other incidental costs required to perform and complete all work as specified herein.

Form 2 – Affidavit Certification of Immigration Laws



AFFIDAVIT CERTIFICATION IMMIGRATION LAWS

SOLICITATION NO.: B160579LAC. SOLICITATION NAME: Lee County Solid Waste Construction and Demolition Debris Site 4.16KV Distribution Feeder Extension

LEE COUNTY WILL NOT INTENTIONALLY AWARD COUNTY CONTRACTS TO ANY CONTRACTOR WHO KNOWINGLY EMPLOYS UNAUTHORIZED ALIEN WORKERS, CONSTITUTING A VIOLATION OF THE EMPLOYMENT PROVISIONS CONTAINED IN 8 U.S.C. SECTION 1324 a(e) {SECTION 274A(e) OF THE IMMIGRATION AND NATIONALITY ACT ("INA").

LEE COUNTY MAY CONSIDER THE EMPLOYMENT BY ANY CONTRACTOR OF UNAUTHORIZED ALIENS A VIOLATION OF SECTION 274A(e) OF THE INA. SUCH VIOLATION BY THE RECIPIENT OF THE EMPLOYMENT PROVISIONS CONTAINED IN SECTION 274A(e) OF THE INA SHALL BE GROUNDS FOR UNILATERAL CANCELLATION OF THE CONTRACT BY LEE COUNTY.

PROPOSER ATTESTS THAT THEY ARE FULLY COMPLIANT WITH ALL APPLICABLE IMMIGRATION LAWS (SPECIFICALLY TO THE 1986 IMMIGRATION ACT AND SUBSEQUENT AMENDMENTS).

Company Name:_____

Title

Signature

Date

STATE OF _____ COUNTY OF _____

The foregoing instrument was signed and acknowledged before me this _____ day of _____ 20____, by ______ who has produced

(Print or Type Name)

as identification.

(Type of Identification and Number)

Notary Public Signature

Printed Name of Notary Public

Notary Commission Number/Expiration

The signee of this Affidavit guarantee, as evidenced by the sworn affidavit required herein, the truth and accuracy of this affidavit to interrogatories hereinafter made. *LEE COUNTY RESERVES THE RIGHT TO REQUEST SUPPORTING DOCUMENTATION, AS EVIDENCE OF SERVICES PROVIDED, AT ANY TIME.*

Form 3 Reference Survey



Lee County Procurement Management

<u>REFERENCE SURVEY</u> B160579LAC, Lee County Solid Waste Construction and Demolition Debris Site 4.16KV Distribution Feeder Extension *A minimum of 3 is requested*

Section	1	Reference Respondent Information			Pleas	<mark>e return c</mark> o	mpleted form	<mark>n to:</mark>	
FROM	Л:			Bidde	:/Proposer:				
COM	PANY:			Due D	ate:				
PHON	PHONE #:			Total #	# Pages:	1			
FAX #:			Phone	•		Fax:			
EMAIL: Bidder/P		Proposer E-N	Mail:						
Section	2	Enter Bidder/Proposer Information , if applicab	le Similar Performed Proj	ect (Bidder/Pr	oposer to enter details	of a project perfor	med for above reference	ce responder	nt)
Propose	er Name:								
Reference Pr	oject Name:		Project Address:			I	Project Cost:		
Summarize	cone:								
Summarize 5	cope.								
You as	an indivi	dual or vour company ha	as been given	as a ref	erence on tl	he project	identified a	bove.	Please
provid	e your res	ponses in section 3 below	/.			P1 •J•••			
- Section (3	-						Indicat	e: "Yes" or "No"
1.	Did this	company have the proper	resources and	personn	el by which	to get the	job done?		
2.	Were an	y problems encountered w	vith the compar	ny's wo	rk performa	nce?			
3.	Were an	y change orders or contrac	et amendments	s issued,	other than o	wner initia	ated?		
4.	Was the	job completed on time?							
5.	Was the	job completed within bud	get?						
6.	On a sca	le of one to ten, ten being	best, how wou	ıld vou i	ate the over	allwork			
	performa	nce, considering professio	nalism; final p	product;	personnel; r	resources.			
	1		, 1		Rate from	n 1 to 10. (10	being highest)		
7.	If the opp	portunity were to present in	tself, would yo	ou rehire	this compa	.ny?			
8.	Please pr	ovide any additional comr	nents pertinen	t to this	company an	nd the worl	k performed	for yo	u:
	_								
Section -	4								

Reference Name (Print Name)

30

Please submit non-Lee County employees as references

Reference Signature

Ver 08/19/2016

Form 4 -Negligence or Breach of Contract Disclosure Form

REVISED 07/12/2016



ALLEGED NEGLIGENCE OR BREACH OF CONTRACT DISCLOSURE FORM

Please fill in the form below. Provide each incident in regard to alleged negligence or breach of contract that has occurred over the past 10 years. Please compete in chronological order with the most recent incident on starting on page 1. Please do not modify this form (expansion of spacing allowed) or submit your own variation.

Company Name:

Type of Incident Alleged Negligence or Breach of Contract	Incident Date And Date Filed	Plaintiff (Who took action against your company)	Case Number	Court County/State	Project	Claim Reason (initial circumstances)	Final Outcome (who prevailed)

Make as many copies of this sheet as necessary in order to **provide a 10 year history** of the requested information. If there is no action pending or action taken in the last 10 years, complete the **company name and write "NONE" in the first "Type of Incident" box** of this page and return with your proposal package. This form should also include the primary partners listed in your proposal. Do not include litigation with your company as the plaintiff. Final outcome should include who prevailed and what method of settlement was made. If a monetary settlement was made the amount may remain anonymous.

Page Number: Of Total pages

Update the page number to reflect the current page and the total number of pages. Example: Page 3, of 5 total submitted pages of this form.

Form 5 - Affidavit Principal Place of Business



AFFIDAVIT PRINCIPAL PLACE OF BUSINESS

Local Vendor Preference (Non-CCNA) (Lee County Ordinance No. 08-26) Location Identification (CCNA)

Instructions: Please complete all information that is applicable to your firm

Coi	mpany Name:			
Printe	ed name of authorized signer Title			
\Rightarrow	arized Signature Date			
The affi	e signee of this Affidavit guarantee, as evidenced by the sworn davit to interrogatories hereinafter made. <u>LEE COUNTY RES</u>	affidavit required SERVES THE R	d herein AGHT 1	, the truth and accuracy of this TO REQUEST SUPPORTING
<u>D0</u>	CUMENTATION, AS EVIDENCE OF SERVICES PROVID	DED, AT ANY TA	<u>IME.</u>	-
Not	ary:			
Stat Cot	inty of			
The	foregoing instrument was signed and acknowledged before m	e this		day of
20	1			who has produced
_•	·			
	Type of ID and number	á	as identi	fication (or personally known)
\Rightarrow				
Notar	y Public Signature	Notary Commission Nu	umber and e	xpiration
1.	Principal place of business is located within the boundaries		Lee C	ounty
	of:		Collie	r County
			Non-L	Local
	Local Business Tax License #			
2.	Address of Principal Place of Business:			
3.	Number of years at this location	years		
4.	Have you provided goods or services to Lee County on a regular basis within the past 3 consecutive years	Yes*	No	*If yes, attach contractual history for past 3 consecutive years
5.	Size of Facility (i.e. office, sales area, warehouse, storage ya	ard, etc.)		
6.	Number of available employees for this contract			

Form 6-Sub-contractor List



SUB-CONTRACTOR LIST

Sub-contractor Name	Area Of Work	Point Of Contact Or Project Supervisor	Phone Number and Email	Qualified DBE Yes/No	Amount or Percentage of Total

Please include sub-contractors name, area of work (i.e. mechanical, electrical, etc.) and a **valid** phone number and email. Also include the dollar value or percentage that the sub-contractor will be performing. If sub-contractors qualify as Disadvantaged Business Enterprise (**DBE**) contractors, please attach a current certificate.

Form 7: Public Entity Crime Form

PUBLIC ENTITY CRIME FORM

This form must be signed and sworn to in the presence of a notary public or other officer authorized to administer oaths.

1.	This sworn statement is submitted to
	(Print name of the public entity)
	by
	(Print individual's name and title)
	for
	(Print name of entity submitting sworn statement)
	whose business address is
	(If applicable) its Federal Employer Identification Number (FEIN) is
	(If the entity has no FEIN, include the Social Security Number of the individual signing this sworn statement: On the attached sheet.) Required as per IRS Form W-9.
2.	I understand that a "public entity crime" as defined in Paragraph 287.133(1) (g), <u>Florida Statutes</u> , means a violation of any state or federal law by a person with respect to and directly related to the transaction of business with any public entity or with an agency or political subdivision of any other state or with the United States, including but not limited to, and bid or contract for goods or services to be provided to any public entity or agency or political subdivision or any other state or of the Unites States, and involving antitrust, fraud, theft, bribery, collusion, racketeering, conspiracy, or material misrepresentation.
3.	I understate that "convicted" or "conviction" as defined in Paragraph 287.133(1) (b), <u>Florida Statutes</u> , means a finding of guilt or a conviction of a public entity crime, with or without an adjudication of guilt, in any federal or state trial court of record relating to charges brought by indictment or information after July 1, 1989, as a result of a jury verdict, nonjury trial, or entry of a plea of guilty or nolo contendere.
4.	I understand that "affiliate" as defined in Paragraph 287.133(1)(a), <u>Florida Statutes</u> , means: 1. A predecessor or successor of a person convicted of a public entity crime:
	 Or: An entity under the control of any natural person who is active in the management of the entity and who has been convicted of a public entity crime. The term "affiliate" includes those offices, directors, executives, partners, shareholders, employees, members and agents who are active in the management of the affiliate. The ownership by one person of shares constituting a controlling interest in another person, or a pooling of equipment or income among persons when not fair market value under an arm's length agreement, shall be a facie case that one person controls another person. A person who knowingly enters into a joint venture with a person who has been convicted of a public entity crime in Florida during the preceding 36 months shall be considered an affiliate.
5.	I understand that a "person" as defined in Paragraph 287.133(1) (c), <u>Florida Statutes</u> , means any natural person or entity organized under the laws of any state or of the United States with the legal power to enter a binding contract and which bids or applies to bid on contracts for the provision of goods or services let by a public entity, or which otherwise transacts or applies to transact business with a public entity. The term "person" includes those officers, directors, executives, partners, shareholders, employees, members, and agents who are active in management of the entity.

6. Based on information and belief, the statement which I have marked below is true in relation to the entity submitting those sworn statement. (*Please indicate which statement applies*.)

_____ Neither the entity submitted this sworn statement, nor any officers, directors, executives, partners, shareholders, employees, members, and agents who are active in management of an entity nor affiliate of the entity have been charged with and convicted of a public entity crime subsequent to July 1, 1989.

Public Entity Crime Form

_____ The entity submitting this sworn statement, or one or more of the officers, directors, executives, partners, shareholders, employees, member, or agents who are active in management of the entity, or an affiliate of the entity have been charged with and convicted of a public entity crime subsequent to July 1, 1989.

_____ The entity submitting this sworn statement, or one or more of its officers, directors, executives, partners, shareholders, employees, member, or agents who are active in management of the entity, or an affiliate of the entity has been charged with and convicted of a public entity crime subsequent to July 1, 1989. However, there has been subsequent proceeding before a Hearing Officer of the State of Florida, Division of Administrative Hearing and the Final Order entered by the Hearing Officer determined that it was not in the public interest to place the entity submitting this sworn statement on the convicted vendor list. (Attach a copy of the final order)

I UNDERSTAND THAT THE SUBMISSION OF THIS FORM TO THE CONTRACTING OFFICER FOR THE PUBLIC ENTITY IDENTIFIED IN PARAGRAPH 1 (ONE) ABOVE IS FOR THAT PUBLIC ENTITY ONLY AND, THAT THIS FORM IS VALID THROUGH DECEMBER 31 OF THE CALENDAR YEAR IN WHICH IS FILED. I ALSO UNDERSTAND THAT I AM REQUIRED TO INFORM THE PUBLIC ENTITY PRIOR TO ENTERING INTO A CONTRACT IN EXCESS OF THE THRESHOLD AMOUNT PROVIDED IN SECTION 287.017, FLORIDA STATUTES, FOR CATEGORY TWO OR ANY CHANGE IN THE INFORMATION CONTAINED IN THIS FORM.

(Signature)

(Date)

STATE OF_____ COUNTY OF_____

(NOTARY PUBLIC)

My Commission Expires: _____

Ver 08/19/2016

Form 8: Trench Safety

TRENCH SAFETY

Contractor/Vendor acknowledges that included in the appropriate solicitation items of the solicitation and in the Total solicitation price are costs for complying with the Florida Trench Safety Act (90-96, Laws of Florida) effective October 1, 1990. The contractor/vendor further identifies the costs of such compliance to be summarized below:

	Trench Safety Measure (Description)	Units of Measure (LF, SF)	Unit (Quantity)	Unit Cost	Extended Cost
A.					
B.					
C.					
D.					
		TOTAL \$			

If applicable, the contractor/vendor certifies that all trench excavation done within his control in excess of five (5') feet in depth shall be in accordance with the Florida Department of Transportation's Special Provisions Article 125-1 and Sub-article 125-4.1 (TRENCH EXCAVATION SAFETY SYSTEM AND SHORING, SPECIAL-TRENCH EXCAVATION).

Failure to complete the above may result in the solicitation being declared non-responsive.

(Signature)

(Company Name)

STATE OF

COUNTY OF ____

The foregoing instrument was acknowledged before me this _____ day of ______ by _____ (name and title of corporate officer) of ______ (name of corporation), a ______ (state or place of incorporation) corporation, on behalf of the corporation. He/she is personally known to me or has produced ______ (type of identification) as identification.

(signature line for notary public)

(name of notary typed, printed or stamped)

(title or rank)

My commission expires:

(*serial number, if any*)
Form 9: Bid Bond

BID BOND

Complete EITHER Lee County Paper Bid Bond OR provide cashier's check

KNOW ALL MEN BY THESE PRESENTS, that we

as Principal, and

(BIDDER'S Name)

a Corporation licensed to do

(Surety's Name) business under the laws of the State of Florida as a Surety, are held and firmly bound unto <u>LEE COUNTY</u> <u>BOARD OF COUNTY COMMISSIONERS, LEE COUNTY, FLORIDA,</u> a Political Subdivision of the State of Florida,

in the SUM OF

for the payment whereof, well and truly to be made, we bind ourselves, our heirs, successors, personal representatives and assigns, jointly and severally, firmly, by these presents.

SIGNED AND SEALED this _____ day of ______

WHEREAS, said Principal is herewith submitting a Proposal for the construction of:

NOW, THEREFORE, the condition of the above obligation is such that if said Principal shall be awarded the Contract upon said Proposal within the specified time and shall enter into a written Contract, satisfactory in form, provide an acceptable Public Payment and Performance Bond from a Surety acceptable to the COUNTY and provide other Insurance as may be required to the COUNTY within seven (7) calendar days after the written Notice of Award date, or within such extended period as the COUNTY may grant, then this obligation shall be null and void; otherwise said Principal and Surety shall pay to said COUNTY in money the difference between the amount of the Bid of said Principal and the amount for which said COUNTY may legally contract with another party to perform said work, if the latter amount be in excess of the former, together with any expenses and reasonable attorney's fees incurred by said COUNTY if suit be brought here on, but in no event shall said Surety's liability exceed the penal sum hereof plus such expenses and attorney's fees. For purposes of unsuccessful bid protests filed by the Principal herein, this obligation shall bind the Surety to pay costs and damages associated with the bid protest or delays to the project upon a finding from the Board of County Commissioners for Lee County that the bid protest was frivolous and/or lacked merit. The liability of the Surety shall not exceed the penal sum of the bid bond.

Witness as to Principal:

(By)

Witness as to Surety:

(SEAL) (Principal) Printed Name (SEAL) (Surety's Name)

(By-As Attorney-in-Fact, Surety)

Affix Corporate Seals and attach proper Power of Attorney for Surety.

Cut along the outer border and affix this label to your sealed solicitation envelope to identify it as a "Sealed Submission/Proposal".

PROPOSA	L DOCUMENTS • DO NOT OPEN		
Solicitation No.:	B160579LAC		
SOLICITATION TITLE:	Lee County Solid Waste Construction and Demolition Debris Site 4.16KV Distribution Feeder Extension Wednesday, November 2, 2016		
TIME DUE:	Prior to: 2:30 PM		
SUBMITTED BY:			
	(Name of Company)		
e-mail address	Telephone		
DELIVER TO:	Lee County Procurement Management		
	1500 Monroe Street, 4 th Floor		
	Fort Myers, FL 33901		
Note: proposals received after the time and date above will not be accepted.			

A

Lee County Procurement Management 1500 Monroe Street, 4th Floor Fort Myers, FL 33901 (239) 533-8881 www.leegov.com/procurement

FSS

LEE COUNTY SOLID WASTE DIVISION

FORT MYERS, FL



SITE 4.16KV DISTRIBUTION FEEDER EXTENSION – Issued for Bid

Technical Specifications

06-22-2016

HDR Project No. 10030203

Table of Contents

DIVISION 10 - SPECIALTIES

10 14 00 IDENTIFICATION DEVICES

DIVISION 26 - ELECTRICAL

- 26 05 00 ELECTRICAL: BASIC REQUIREMENTS
- 26 05 13 MEDIUM VOLTAGE CABLE
- 26 05 19 WIRE AND CABLE: 600 VOLT AND BELOW
- 26 05 26 GROUNDING AND BONDING
- 26 05 33 RACEWAYS AND BOXES
- 26 05 43 ELECTRICAL: EXTERIOR UNDERGROUND
- 26 08 13 ACCEPTANCE TESTING
- 26 12 19 DISTRIBUTION TRANSFORMERS
- 26 13 23 SECTIONALIZING EQUIPMENT
- 26 24 16 PANELBOARDS
- 26 28 00 OVERCURRENT AND SHORT CIRCUIT PROTECTIVE DEVICES
- 26 28 16 SAFETY SWITCHES

DIVISION 31 - EARTHWORK

31 23 33 TRENCHING, BACKFILLING, AND COMPACTING FOR UTILITIES

SECTION 10 14 00 IDENTIFICATION DEVICES

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Tag, tape and stenciling systems for equipment, piping, valves, pumps, ductwork and similar items, and hazard and safety signs.
- B. Related Specification Sections include but are not necessarily limited to:
 - 1. Division 00 Procurement and Contracting Requirements.
 - 2. Division 01 General Requirements.

1.2 QUALITY ASSURANCE

Referenced Standards:

- 1. American Society of Mechanical Engineers (ASME):
- a. A13.1, Scheme for the Identification of Piping Systems.
- 2. The International Society of Automation (ISA).
- 3. National Electrical Manufacturers Association/American National Standards Institute (NEMA/ANSI):
 - a. Z535.1, Safety Color Code.
 - b. Z535.2, Environmental and Facility Safety Signs.
 - c. Z535.3, Criteria for Safety Symbols.
 - d. Z535.4, Product Safety Signs and Labels.
- 4. National Fire Protection Association (NFPA):
 - a. 70, National Electrical Code (NEC).
- 5. Occupational Safety and Health Administration (OSHA):
 - a. 29 CFR 1910.145, Specification for Accident Prevention Signs and Tags.

1.3 SUBMITTALS

- A. Shop Drawings:
 - 1. Product technical data including:
 - a. Catalog information for all identification systems.
 - b. Acknowledgement that products submitted meet requirements of standards referenced.
 - 2. Identification register, listing all items in PART 3 of this Specification Section to be identified, type of identification system to be used, lettering, location and color.

PART 2 - PRODUCTS

ACCEPTABLE MANUFACTURERS

- A. Subject to compliance with the Contract Documents, the following manufacturers are acceptable:
 - 1. W.H. Brady Co.
 - 2. Panduit.
 - 3. Seton.
 - 4. National Band and Tag Co.
 - 5. Carlton Industries, Inc.

2.2 MANUFACTURED UNITS

- A. Type A1 Round Metal Tags:
 - 1. Materials:
 - a. Aluminum or stainless steel.

- b. Stainless steel shall be used in corrosive environments.
- 2. Size:
 - a. Diameter: 1-1/2 IN minimum.
 - b. Thickness: 0.035 IN (20 GA) minimum.
- 3. Fabrication:
 - a. 3/16 IN minimum mounting hole.
 - b. Legend: Stamped and filled with black coloring.
- 4. Color: Natural.
- B. Type A2 Rectangle Metal Tags:
 - 1. Materials: Stainless steel.
 - 2. Size:
 - a. 3-1/2 IN x 1-1/2 IN minimum.
 - b. Thickness: 0.036 IN (20 GA) minimum.
 - 3. Fabrication:
 - a. 3/16 IN minimum mounting hole.
 - b. Legend: Stamped and filled with black coloring.
 - 4. Color: Natural.
- C. Type A3 Metal Tape Tags:
 - 1. Materials: Aluminum or stainless steel.
 - 2. Size:
 - a. Width 1/2 IN minimum.
 - b. Length as required by text.
 - 3. Fabrication:
 - a. 3/16 IN minimum mounting hole.
 - b. Legend: Embossed.
 - 4. Color: Natural.
- D. Type B1- Square Nonmetallic Tags:
 - 1. Materials: Fiberglass reinforced plastic.
 - 2. Size:
 - a. Surface: 2 x 2 IN minimum.
 - b. Thickness: 100 mils.
 - 3. Fabrication:
 - a. 3/16 IN mounting hole with metal eyelet.
 - b. Legend: Preprinted and permanently embedded and fade resistant.
 - 4. Color:
 - a. Background: Manufacturer standard or as specified.
 - b. Lettering: Black.
- E. Type B2 Nonmetallic Signs:
 - 1. Materials: Fiberglass reinforced or durable plastic.
 - 2. Size:
 - a. Surface: As required by text.
 - b. Thickness: 60 mils minimum.
 - 3. Fabrication:
 - a. Rounded corners.
 - b. Drilled holes in corners with grommets.
 - c. Legend: Preprinted, permanently embedded and fade resistant for a 10 year minimum outdoor durability.
 - 4. Color:
 - a. Background: Manufacturer standard or as specified.
 - b. Lettering: Black.
 - 5. Standards for OSHA signs: NEMA/ANSI Z535.1, NEMA/ANSI Z535.2, NEMA/ANSI Z535.3, NEMA/ANSI Z535.4, OSHA 29 CFR 1910.145.
- F. Type C Laminated Name Plates:

- 1. Materials: Phenolic or DR (high impact) acrylic.
- 2. Size:
 - a. Surface: As required by text.
 - b. Thickness: 1/16 IN.
- 3. Fabrication:
 - a. Outdoor rated and UV resistant when installed outdoors.
 - b. Two (2) layers laminated.
 - c. Legend: Engraved through top lamination into bottom lamination.
 - d. Two (2) drilled side holes, for screw mounting.
- 4. Color: Black top surface, white core, unless otherwise indicated.

G. Type D - Self-Adhesive Tape Tags and Signs:

- 1. Materials: Vinyl tape or vinyl cloth.
- 2. Size:
 - a. Surface: As required by text.
 - b. Thickness: 5 mils minimum.
- 3. Fabrication:
 - a. Indoor/Outdoor grade.
 - b. Weather and UV resistant inks.
 - c. Permanent adhesive.
 - d. Legend: Preprinted.
 - e. Wire markers to be self-laminating.
- 4. Color: White with black lettering or as specified.
- 5. Standards for OSHA signs: NEMA/ANSI Z535.1, NEMA/ANSI Z535.2, NEMA/ANSI Z535.3, NEMA/ANSI Z535.4, OSHA 29 CFR 1910.145.
- H. Type E Heat Shrinkable Tape Tags:
 - 1. Materials: Polyolefin.
 - 2. Size: As required by text.
 - 3. Fabrication:
 - a. Legend: Preprinted.
 - 4. Color: White background, black printing.
- I. Type F Underground Warning Tape:
 - 1. Materials: Polyethylene.
 - 2. Size:
 - a. 6 IN wide (minimum).
 - b. Thickness: 3.5 mils.
 - 3. Fabrication:
 - a. Legend: Preprinted and permanently imbedded.
 - b. Message continuous printed.
 - c. Tensile strength: 1750 psi.
 - 4. Color: As specified.
- J. Type G Stenciling System:
 - 1. Materials:
 - a. Exterior type stenciling enamel.
 - b. Either brushing grade or pressurized spray can form and grade.
 - 2. Size: As required.
 - 3. Fabrication:
 - a. Legend: As required.
 - 4. Color: Black or white for best contrast.
- K. Underground Tracer Wire:
 - 1. Materials:
 - a. Wire:
 - 1) 12 GA AWG.
 - 2) Solid.

10030203

LEE COUNTY SOLID WASTE DIVISION SITE 4.16KV DISTRIBUTION FEEDER EXTENSION - Issued for Bid IDENTIFICATION DEVICES 10 14 00 - 3

- b. Wire nuts: Waterproof type.
- c. Split bolts: Brass.

2.3 ACCESSORIES

- A. Fasteners:
 - 1. Bead chain: #6 brass, aluminum or stainless steel.
 - 2. Plastic strap: Nylon, urethane or polypropylene.
 - 3. Screws: Self-tapping, stainless steel.
 - 4. Adhesive, solvent activated.

2.4 MAINTENANCE MATERIALS

A. Where stenciled markers are provided, clean and retain stencils after completion and include in extra stock, along with required stock of paints and applicators.

PART 3 - EXECUTION

3.1 GENERAL INSTALLATION

- A. Install identification devices at specified locations.
- B. All identification devices to be printed by mechanical process, hand printing is not acceptable.
- C. Attach tags to equipment with sufficient surface or body area with solvent activated adhesive applied to back of each tag.
- D. Attach tags with 1/8 IN round or flat head screws to equipment without sufficient surface or body area, or porous surfaces.
 - 1. Where attachment with screws should not or cannot penetrate substrate, attach with plastic strap.
- E. Single items of equipment enclosed in a housing or compartment to be tagged on outside of housing.
 - 1. Several items of equipment mounted in housing to be individually tagged inside the compartment.

3.2 SCHEDULES

- A. Electrical Systems:
 - 1. Trenches with ductbanks, direct-buried conduit, or direct-buried wire and cable.
 - a. Tag type: Type F Underground Warning Tape.
 - b. Letter height: 1-1/4 IN minimum.
 - c. Location:
 - 1) Where trench is 12 IN or more below finished grade: In trench 6 IN below finished grade.
 - 2) Where trench is less than 12 IN below finished grade: In trench 3 IN below finished grade.
 - d. Electrical power (e.g., low and medium voltage):
 - 1) Color: Red with black letters.
 - 2) Legend:
 - a) First line: "CAUTION CAUTION CAUTION".
 - b) Second line: "BURIED ELECTRIC LINE BELOW".
 - e. Communications (e.g., telephone, instrumentation, LAN, SCADA):
 - 1) Color: Orange with black letters.
 - 2) Legend:
 - a) First line: "CAUTION CAUTION CAUTION".
 - b) Second line: "BURIED COMMUNICATION LINE BELOW".
 - 2. Exterior pad mounted equipment (e.g., transformers, switchgear):
 - a. Tag type: Type D Self-Adhesive Tape Tags.
 - b. Fastener: Self.

- c. General legend:
 - 1) Letter height:
 - a) First line: 1-1/2 IN minimum.
 - b) Subsequent lines: 1/2 IN minimum.
 - 2) First line: Equipment name (e.g., "TRANSFORMER Txxx").
 - 3) Second line: System voltage (e.g., "13,800 V: 480/277 V").
 - 4) Third line: Date installed (e.g., "INSTALLED JULY 20xx").
- d. Each section/cubical legend:
 - 1) Letter height: 1-1/2 IN minimum.
 - Description of source or load (e.g., "MAIN DISCONNECT" or "TO SWITCHGEAR SGxxx" or "TO TRANSFORMER Txxx").
- 3. Panelboards and transformers:
 - a. Tag type: Type C Phenolic Name Plates.
 - b. Fastener: Screws.
 - c. Legend:
 - 1) Letter height:
 - a) First line: 3/8 IN minimum.
 - b) Subsequent lines: 3/16 IN minimum.
 - 2) First line: Equipment name (e.g., "PANELBOARD LPxxx" or "TRANSFORMER Txxx").
 - Second line (panelboards only): System voltage and phase (e.g., "208/120V, 3PH").
 - 4) Third line:
 - a) Source of power (e.g., "FED FROM MCCxxx LOCATED IN ROOM xxx").
 - b) Include the building name or number if the source is in another building.
 - 5) Fourth line: Date installed (e.g., "INSTALLED JULY 20xx").
- 4. Safety switches, separately mounted circuit breakers and motor starters, VFD's, etc.:
 - a. Tag type: Type C Phenolic Name Plates.
 - b. Fastener: Screws.
 - c. Legend:
 - 1) Letter height: 1/4 IN minimum.
 - 2) First line: Description of load equipment is connected to (e.g., "PUMP Pxxx").
 - 3) Second line:
 - a) Source of power (e.g., "FED FROM MCCxxx LOCATED IN ROOM xxx").
- 5. Conductors in handholes and manholes.
 - a. Tag type: Type A3 Metal Tape Tags.
 - b. Fastener: Nylon strap.
 - c. Tag conductor at both ends.
 - d. Legend:
 - 1) Letter height: 1/8 IN minimum.
 - 2) Circuit number or wire number as scheduled on the Drawings.
- 6. Grounding conductors associated with grounding electrode system in accordance with the following:
 - a. Tag type: Type D Self-Adhesive Tape Tags.
 - b. Fastener: Self.
 - c. Legend:
 - 1) Letter height: 1/8 IN minimum.
 - 2) Function of conductor (e.g., "MAIN BONDING JUMPER", "TO GROUND RING", "TO MAIN WATER PIPE").
- 7. Flash protection for switchboards, panelboards, industrial control panels and motor control centers:
 - a. Tag type: Type D Self-Adhesive Tape Signs.
 - b. Fastener: Self.
 - c. Legend: Per NFPA 70.
- 8.

END OF SECTION

SECTION 26 05 00 ELECTRICAL: BASIC REQUIREMENTS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Basic requirements for electrical systems.
- B. Related Specification Sections include but are not necessarily limited to:
 - 1. Division 00 Procurement and Contracting Requirements.
 - 2. Division 01 General Requirements.
 - 3. Section 01 61 03 Equipment: Basic Requirements.
 - 4. Section 05 50 00 Metal Fabrications.
 - 5. Section 10 14 00 Identification Devices.
 - 6. Section 26 05 19 Wire and Cable 600 Volt and Below.
 - 7. Section 26 05 33 Raceways and Boxes.

1.2 QUALITY ASSURANCE

Referenced Standards:

- 1. Aluminum Association (AA).
- 2. American Iron and Steel Institute (AISI).
- 3. ASTM International (ASTM):
 - a. A123/A123M, Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
 - b. A153/A153M, Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware.
- 4. ETL Testing Laboratories (ETL).
- 5. Institute of Electrical and Electronics Engineers, Inc. (IEEE): a. C2, National Electrical Safety Code (NESC).
- 6. National Electrical Manufacturers Association (NEMA):
 - a. 250, Enclosures for Electrical Equipment (1000 Volts Maximum).
- 7. National Fire Protection Association (NFPA):
- a. 70, National Electrical Code (NEC).
- 8. Underwriters Laboratories, Inc. (UL).
- B. Where UL test procedures have been established for the product type, use UL or ETL approved electrical equipment and provide with the UL or ETL label.

1.3 DEFINITIONS

- A. For the purposes of providing materials and installing electrical work the following definitions shall be used.
 - 1. Outdoor area: Exterior locations where the equipment is normally exposed to the weather and including below grade structures, such as vaults, manholes, handholes and in-ground pump stations.
 - 2. Architecturally finished interior area: Offices, laboratories, conference rooms, restrooms, corridors and other similar occupied spaces.
 - 3. Non-architecturally finished interior area: Pump, chemical, mechanical, electrical rooms and other similar process type rooms.
 - 4. Highly corrosive and corrosive area: Areas identified on the Drawings where there is a varying degree of spillage or splashing of corrosive materials such as water, wastewater or chemical solutions; or chronic exposure to corrosive, caustic or acidic agents, chemicals, chemical fumes or chemical mixtures.
 - 5. Hazardous areas: Class I, II or III areas as defined in NFPA 70.

6. Shop fabricated: Manufactured or assembled equipment for which a UL test procedure has not been established.

1.4 SUBMITTALS

- A. Shop Drawings:
 - 1. General requirements:
 - a. Provide manufacturer's technical information on products to be used, including product descriptive bulletin.
 - b. Include data sheets that include manufacturer's name and product model number.
 1) Clearly identify all optional accessories.
 - c. Acknowledgement that products are UL or ETL listed or are constructed utilizing UL or ETL recognized components.
 - d. Manufacturer's delivery, storage, handling and installation instructions.
 - e. Product installation details.
 - f. See individual specification sections for any additional requirements.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Protect nameplates on electrical equipment to prevent defacing.

1.6 AREA DESIGNATIONS

- A. Designation of an area will determine the NEMA rating of the electrical equipment enclosures, types of conduits and installation methods to be used in that area.
 - 1. Outdoor areas:
 - a. Wet.
 - b. Also, corrosive and/or hazardous when specifically designated on the Drawings or in the Specifications.
 - 2. Indoor areas:
 - a. Dry.
 - b. Also, wet, corrosive and/or hazardous when specifically designated on the Drawings or in the Specifications.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

- A. Subject to compliance with the Contract Documents, refer to specific Electrical Specification Sections and specific material paragraphs below for acceptable manufacturers.
- B. Provide all components of a similar type by one (1) manufacturer.

2.2 MATERIALS

- A. Electrical Equipment Support Pedestals and/or Racks:
 - 1. Approved manufacturers:
 - a. Modular strut:
 - 1) Unistrut Building Systems.
 - 2) Eaton B-Line.
 - 3) Globe Strut.
 - 4) Thomas & Betts Superstrut.
 - 2. Material requirements:
 - a. Modular strut:
 - 1) Galvanized steel: ASTM A123/123M or ASTM A153/A153M.
 - 2) Stainless steel: AISI Type 316.
 - 3) PVC coated galvanized steel: ASTM A123/A123M or ASTM A153/A153M and 20 mil PVC coating.
 - 4) Aluminum: AA Type 6063-T6.
 - b. Mounting hardware:

- 1) Galvanized steel.
- 2) Stainless steel.
- B. Field touch-up of galvanized surfaces.
 - 1. Zinc-rich primer.
 - a. One (1) coat, 3.0 mils, ZRC by ZRC Products.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install and wire all equipment, including prepurchased equipment, and perform all tests necessary to assure conformance to the Drawings and Specification Sections and ensure that equipment is ready and safe for energization.
- B. Install equipment in accordance with the requirements of:
 - 1. NFPA 70.
 - 2. IEEE C2.
 - 3. The manufacturer's instructions.
- C. In general, conduit routing is not shown on the Drawings.
 - 1. The Contractor is responsible for routing all conduits including those shown on one-line and control block diagrams.
 - 2. Conduit routings and stub-up locations that are shown are approximate; exact routing to be as required for equipment furnished and field conditions.
- D. Install equipment plumb, square and true with construction features and securely fastened.
- E. Install electrical equipment, including pull and junction boxes, minimum of 6 IN from process, gas, air and water piping and equipment.
- F. Install equipment so it is readily accessible for operation and maintenance, is not blocked or concealed and does not interfere with normal operation and maintenance requirements of other equipment.
- G. Device Mounting Schedule:
 - 1. Unless indicated otherwise on the Drawings, mounting heights are as indicated below:
 - a. Safety switch (to center of operating handle): 54 IN.
 - b. Panelboard (to top): 72 IN.
- H. Avoid interference of electrical equipment operation and maintenance with structural members, building features and equipment of other trades.
 - 1. When it is necessary to adjust the intended location of electrical equipment, unless specifically dimensioned or detailed, the Contractor may make adjustments of up to 6 IN in equipment location with the Engineer's approval.
- I. Provide electrical equipment support system per the following area designations:
 - 1. Dry areas:
 - a. Galvanized system consisting of galvanized steel channels and fittings, nuts and hardware.
 - b. Field touch-up cut ends and scratches of galvanized components with the specified primer during the installation, before rust appears.
 - 2. Wet areas:
 - a. Galvanized system consisting of galvanized steel channels and fittings, nuts and hardware.
 - b. Field touch-up cut ends and scratches of galvanized components with the specified primer during the installation, before rust appears.
 - 3. Corrosive areas:
 - a. Aluminum system consisting of aluminum channels and fittings with stainless steel nuts and hardware.

- 4. Highly corrosive areas:
 - a. PVC coated steel system consisting of PVC coated steel channels and fittings with stainless steel nuts and hardware.
- J. Provide all necessary anchoring devices and supports rated for the equipment load based on dimensions and weights verified from approved submittals, or as recommended by the manufacturer.
 - 1. Do not cut, or weld to, building structural members.
 - 2. Do not mount safety switches or other equipment to equipment enclosures, unless enclosure mounting surface is properly braced to accept mounting of external equipment.
- K. Provide corrosion resistant spacers to maintain 1/4 IN separation between metallic equipment and/or metallic equipment supports and mounting surface in wet areas, on below grade walls and on walls of liquid containment or processing areas such as Basins, Clarifiers, Digesters, Reservoirs, etc.
- L. Do not place equipment fabricated from aluminum in direct contact with earth or concrete.
- M. Screen or seal all openings into equipment mounted outdoors to prevent the entrance of rodents and insects.
- N. Identify electrical equipment and components in accordance with Specification Section 10 14 00.

FIELD QUALITY CONTROL

- A. Verify exact rough-in location and dimensions for connection to electrified equipment, provided by others.
- B. Replace equipment and systems found inoperative or defective and re-test.
- C. The protective coating integrity of support structures and equipment enclosures shall be maintained.
 - 1. Repair galvanized components utilizing a zinc rich paint.
 - 2. Repair painted components utilizing touch up paint provided by or approved by the manufacturer.
 - 3. Repair PVC coated components utilizing a patching compound, of the same material as the coating, provided by the manufacturer of the component.
 - 4. Repair surfaces which will be inaccessible after installation prior to installation.
 - 5. See Specification Section 26 05 33 for requirements for conduits and associated accessories.
- D. Replace nameplates damaged during installation.
- E. Perform tests in the presence of the Engineer.
 - 1. Schedule tests with the Engineer.
 - 2. Present required certificates of testing or review to the Engineer upon completion of the tests.
- F. Demonstrate equipment in accordance with Specification Section 01 75 00.

END OF SECTION

SECTION 26 05 13 MEDIUM VOLTAGE CABLE

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Material and installation requirements for:
 - a. Medium voltage cable (601 V and above).
 - b. Cable terminations and splices.
- B. Related Specification Sections include but are not necessarily limited to:
 - 1. Division 00 Procurement and Contracting Requirements.
 - 2. Division 01 General Requirements.
 - 3. Section 26 05 00 Electrical: Basic Requirements.
 - 4. Section 26 05 19 Wire and Cable: 600 Volt and Below.
 - 5. Section 26 08 13 Acceptance Testing.

1.2 QUALITY ASSURANCE

Referenced Standards:

- 1. Association of Edison Illuminating Companies (AEIC).
 - a. CS8, Specification for Extruded Dielectric Shielded Power Cables Rated 5 Through 46kV.
- 2. Institute of Electrical and Electronics Engineers, Inc. (IEEE):
 - a. 48, Standard for Test Procedures and Requirements for Alternating-Current Cable Terminations Used on Shielded Cables Having Laminated Insulation Rated 2.5kV Through 756kV or Extruded Insulation Rated 2.5 kV through 500 kV.
 - b. 386, Standard for Separable Insulated Connector Systems for Power Distribution Systems Above 600V.
 - c. 404, Standard for Extruded and Laminated Dielectric Shielded Cable Joints Rated 2500 V to 500,000 V.
- National Electrical Manufacturers Association/Insulated Cable Engineers Association (NEMA/ICEA):
 - a. WC 74/S-93-639, 5-46 kV Shielded Power Cable for Use in the Transmission and Distribution of Electric Energy.
- 4. National Fire Protection Association (NFPA):
 - a. 70, National Electrical Code (NEC).
 - Underwriters Laboratories, Inc. (UL):
 - a. 486A, Wire Connectors.}
 - b. 1072, Standard for Safety Medium Voltage Power Cables.
- B. Qualifications:

5.

- 1. Cable technician:
 - a. Three (3) years experience in handling, terminating and splicing medium voltage cables.
 - b. Specifically trained by a factory representative on the terminations and splices to be used on the project.
 - 1) If not trained on the products to be used, on-site training by the factory representative shall be performed before any terminations or splices are made.

1.3 SUBMITTALS

- A. Shop Drawings:
 - 1. Product data:

- a. Provide submittal data for all products specified in PART 2 of this Specification Section.
- b. See Specification Section 26 05 00 for additional requirements.
- Fabrication and/or layout drawings:
- a. Cable pulling plan.
- B. Informational Submittals:
 - 1. Cable pulling tension measurements.
 - Submit the following before terminating cables:
 a. Cable Technician qualifications.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Ship cable with removable watertight end seals, and store in dry place.

PART 2 - PRODUCTS

2.

2.1 ACCEPTABLE MANUFACTURERS

- A. Subject to compliance with the Contract Documents, the following manufacturers are acceptable:
 - 1. Wire and cable:
 - a. Aetna Insulated Wire.
 - b. General Cable.
 - c. The Kerite Company.
 - d. The Okonite Company.
 - e. Prysmian Cable Corporation.
 - f. Southwire Company.
 - 2. Lugs, connectors and terminations:
 - a. 3M Company.
 - b. Elastimold, a Thomas and Betts Company.
 - c. Joslyn.
 - d. Raychem.
 - e. Eaton Cooper Power Systems.

2.2 MEDIUM VOLTAGE CABLES

- A. Ratings:
 - 1. Voltage class as indicated on the Drawings.
- B. Standards:
 - 1. NEMA/ICEA WC 74/S-93-639.
 - 2. AEIC CS8.
 - 3. UL 1072.
- C. Conductor Material:
 - 1. Compact stranded copper.
- D. Insulation:
 - 1. Temperature rating: Type MV-105 per NFPA 70.
 - 2. Cross-linked thermosetting polyethylene (XLP).
 - 3. Ethylene-propylene-rubber (EPR).
 - 4. 133 percent insulation level.
- E. Shielding:
 - 1. Shielding on cables rated above 2 kV consists of:
 - a. Semiconductor conductor screen.
 - b. Semiconductor insulation screen.
 - c. Copper tape or copper wire.

F. Grounds:

- 1. Insulated copper per Specification Section 26 05 19.
 - a. Bare copper per Specification Section 26 05 19.
- G. Jackets:
 - 1. Direct buried cables shall be rated for direct bury.
 - 2. Jacket: Polyethylene.

2.3 CABLE ACCESSORIES

- A. Lugs and Connectors:
 - 1. Lugs:
 - a. Compression type.
 - b. Standard: UL 486A for copper cables.
 - c. Voltage rating: Up to 35 kV.
 - d. Current rating: Continuous operation at the rating of the cable.
 - e. Material: Tin-plated copper.
 - f. Number of holes: Two (2), except one (1) on motor leads.
 - 2. Splice connectors:
 - a. Standard: UL 486A for copper cables.
 - b. Voltage rating: Up to 35kV.
 - c. Current rating: Continuous operation at the rating of the cable.
 - d. Material: Tin-plated copper.
- B. Terminations:
 - 1. End caps:
 - a. Cold or hot shrink.
 - b. Used to environmentally seal and mechanically protect exposed cable ends.
 - 2. Cold shrink kits:
 - a. Standard: IEEE 48, Class 1 termination.
 - b. Voltage rating: Same as the cable rating.
 - c. Current rating: Continuous operation at the rating of the cable.
 - d. One-piece design, where high-dielectric constant stress control is integrated within a skirted insulator made of silicone rubber.
 - e. Suitable for contaminated indoor and outdoor locations.
 - 3. Molded rubber kit:
 - a. Standard: IEEE 48.
 - b. Voltage rating: Same as the cable rating.
 - c. Current rating: Continuous operation at the rating of the cable.
 - d. One-piece design or modular with stress cone and skirts, where high-dielectric constant stress control is integrated within a skirted insulator made of EPDM rubber.
 - e. Suitable for contaminated indoor and outdoor locations.
 - 4. Elbow connectors:
 - a. Standard: IEEE 386.
 - b. Voltage rating: Same as the cable rating.
 - c. Current rating: 200A.
 - d. One-piece design, comprised of an insulation shield, insulation layer and an outer shield constructed of EPDM rubber.
 - e. Deadfront, loadbreak type with:
 - 1) Hot stick pulling eye.
 - 2) Grounding tab.
 - 3) {No test point.} {Test point.}
 - f. Accessories to be constructed in a similar manner as the elbow connector:
 - 1) Bushing inserts.
 - 2) Bushing well plugs.
 - 3) Feed thru inserts.
 - 4) Protective caps.
- C. Splices:

- 1. Cold shrink kits:
 - a. Standard: IEEE 404.
 - b. Voltage rating: Same as the cable rating.
 - c. Current rating: Continuous operation at the rating of the cable.
 - d. One-piece design, comprised of an insulation shield, insulation layer and a silicone rubber body.
 - e. Suitable for indoor, direct burial or submersible applications.
- 2. Molded rubber kit:
 - a. Standard: IEEE 386 or IEEE 404.
 - b. Voltage rating: Same as the cable rating.
 - c. Current rating: Continuous operation at the rating of the cable.
 - d. One- or multi-piece design, comprised of an insulation shield, insulation layer and an outer shield constructed of EPDM rubber.
 - e. Suitable for indoor, direct burial or submersible applications.
- 3. Modular separable molded rubber:
 - a. Standard: IEEE 386.
 - b. Voltage rating: Same as the cable rating.
 - c. Current rating: 600A.
 - d. One-piece design, comprised of an insulation shield, insulation layer and an outer shield constructed of EPDM rubber.
 - e. Deadfront, deadbreak type.
 - f. Components: T-body, insulating plug with cap, insulating plug with cap and stud, and connecting plug.
 - g. Suitable for submersible applications.
- D. Cable Shield Grounding Adapters:
 - 1. Type: Molded rubber with constant force spring and solder-blocked tinned copper braid pigtail.
 - 2. Waterproof, providing a positive seal for the cable jacket.
 - 3. May be integral with termination of splice device with Engineer's approval.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Do not install cable during wet conditions.
 - 1. Prior to pulling cables, drain or pump out manholes and other low points if standing water is present.
 - 2. Blow out conduits with dried compressed air if moisture is present in conduits.
 - 3. Install end caps immediately on all cut ends of cable prior to pulling, and maintain end caps while pulling in cable.
 - a. If end caps are damaged, remove and install new end caps.
 - b. Do not remove end caps until ready to terminate or splice cable.
- B. Cable Installation in Manholes:
 - 1. Provide enough cable slack in each manhole for a complete loop around the manhole.
 - a. When cable is spliced in a manhole, provide enough cable slack for a complete loop around the manhole.
 - b. The loop will provide slack to facilitate future cable repairs.
 - 2. Arc-proof all cables in manholes.
 - a. Apply in spiral, half-overlap fashion to full exposed length of each cable in manhole.
 - b. Secure in place with glass cloth electrical tape.
 - 1) Apply in reverse spiral to arc-proofing tape, at maximum interval of 9 IN and double wrapped at each end.
- C. Do not install conductors when ambient temperature is near minimum as recommended by manufacturer for installation of the type of conductor insulation.

- D. Provide components in kit form, complete with instructions, supplied by a single approved manufacturer and suitable for each shielded cable termination.
 - 1. Select correct termination to match cable diameter and construction.
 - 2. Form and install terminations in strict accordance with instructions of cable manufacturer and termination manufacturer.
- E. Splices:
 - 1. Provide components in kit form, complete with instructions, supplied by a single approved manufacturer and suitable for the type of cable being used.
 - 2. Prepare cable ends, provide materials and follow all application steps in accordance with manufacturer's instructions.
 - a. As a minimum requirement:
 - 1) The cable ends shall be cut squarely.
 - 2) The insulation shall be free from nicks or burrs after removal of jacket.
 - 3) The conductors shall be cleaned and an oxide inhibitor applied.
 - 4) For splices, connector indents shall be filled with insulating putty to eliminate voids or prepared per manufacture's instructions.
 - 5) Attach grounding lead to system ground.
 - 3. Splices shall be avoided whenever possible.
 - a. No more than one (1) splice is permitted between termination points without Engineer's approval.
 - b. No splices are permitted in runs less than 100 FT long.
 - c. Splices will be made only at manholes or other accessible locations.
 - d. Do not pull splices into ductbanks or conduits or leave them under tension.
- F. The ground shield grounding adaptors shall be grounded:
 - 1. Shirted and elbow terminators: Grounded to ground bar or cable loop in equipment.
 - 2. Splices: Grounded to ground bar or rod in manhole.
 - 3. Connect with insulated, stranded #6 AWG wire.

3.2 FIELD QUALITY CONTROL

- A. Provide cable pulling plan showing all proposed splice points and cable pulling direction for each pull.
- B. Provide measurement of tensions during the pull.
- C. See Specification Section 26 08 13 for acceptance testing requirements.

END OF SECTION

SECTION 26 05 19 WIRE AND CABLE: 600 VOLT AND BELOW

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Material and installation requirements for:
 - a. Building wire.
 - b. Wire connectors.
 - c. Insulating tape.
 - d. Pulling lubricant.
- B. Related Specification Sections include but are not necessarily limited to:
 - 1. Division 00 Procurement and Contracting Requirements.
 - 2. Division 01 General Requirements.
 - 3. Section 26 05 00 Electrical: Basic Requirements.
 - 4. Section 26 08 13 Acceptance Testing.

1.2 QUALITY ASSURANCE

Referenced Standards:

- 1. National Electrical Manufacturers Association (NEMA):
 - a. ICS 4, Industrial Control and Systems: Terminal Blocks.
- 2. National Electrical Manufacturers Association/Insulated Cable Engineers Association (NEMA/ICEA):
 - a. WC 70/S-95-658, Non-Shielded Power Cables Rated 2000 Volts or Less for the Distribution of Electrical Energy.
- 3. National Fire Protection Association (NFPA):
 - a. 70, National Electrical Code (NEC).
- 4. Underwriters Laboratories, Inc. (UL):
 - a. 44, Standard for Safety Thermoset-Insulated Wires and Cables.
 - b. 83, Standard for Safety Thermoplastic-Insulated Wires and Cables.
 - c. 467, Standard for Safety Grounding and Bonding Equipment.
 - d. 486A, Standard for Safety Wire Connectors and Soldering Lugs for use with Copper Conductors.
 - e. 486C, Standard for Safety Splicing Wire Connections.
 - f. 510, Standard for Safety Polyvinyl Chloride, Polyethylene and Rubber Insulating Tape.
 - g. 1581, Standard for Safety Reference Standard for Electrical Wires, Cables, and Flexible Cords.

1.3 DEFINITIONS

- A. Cable: Multi-conductor, insulated, with outer sheath containing either building wire or instrumentation wire.
- B. Building Wire: Single conductor, insulated, with or without outer jacket depending upon type.

1.4 SUBMITTALS

- A. Shop Drawings:
 - 1. Product technical data:
 - a. Provide submittal data for all products specified in PART 2 of this Specification Section except:
 - 1) Wire connectors.
 - 2) Insulating tape.
 - 3) Cable lubricant.

10030203

LEE COUNTY SOLID WASTE DIVISION

SITE 4.16KV DISTRIBUTION FEEDER EXTENSION - Issued for Bid WIRE AND CABLE: 600 VOLT AND BELOW

06-22-2016

b. See Specification Section 26 05 00 for additional requirements.

1.5 DELIVERY, STORAGE, AND HANDLING

A. See Specification Section 26 05 00.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

- A. Subject to compliance with the Contract Documents, the following manufacturers are acceptable:
 - 1. Building wire, power and control cable {and multiplex cable}:
 - a. Aetna Insulated Wire.
 - b. Alphawire.
 - c. Cerrowire.
 - d. Encore Wire Corporation.
 - e. General Cable.
 - f. Okonite Company.
 - g. Southwire Company.
 - 2. Wire connectors:
 - a. Burndy Corporation.
 - b. Buchanan.
 - c. Ideal.
 - d. Ilsco.
 - e. 3M Co.
 - f. Teledyne Penn Union.
 - g. Thomas and Betts.
 - h. Phoenix Contact.
 - 3. Insulating and color coding tape:
 - a. 3M Co.
 - b. Plymouth Bishop Tapes.
 - c. Red Seal Electric Co.

2.2 MANUFACTURED UNITS

- A. Building Wire:
 - 1. Conductor shall be copper with 600 V rated insulation.
 - 2. Conductors shall be stranded, except for conductors used in lighting and receptacle circuits which may be stranded or solid.
 - 3. Surface mark with manufacturer's name or trademark, conductor size, insulation type and UL label.
 - 4. Conform to NEMA/ICEA WC 70/S-95-658 and UL 83 for type THHN/THWN and THHN/THWN-2 insulation.
 - 5. Conform to NEMA/ICEA WC 70/S-95-658 and UL 44 for type XHHW-2 insulation.
- B. Electrical Equipment Control Wire:
 - 1. Conductor shall be copper with 600 V rated insulation.
 - 2. Conductors shall be stranded.
 - 3. Surface mark with manufacturer's name or trademark, conductor size, insulation type and UL label.
 - 4. Conform to UL 44 for Type SIS insulation.
 - 5. Conform to UL 83 for Type MTW insulation.
- C. Wire Connectors:
 - 1. Twist/screw on type:
 - a. Insulated pressure or spring type solderless connector.
 - b. 600 V rated.

LEE COUNTY SOLID WASTE DIVISION SITE 4.16KV DISTRIBUTION FEEDER EXTENSION - Issued for Bid WIRE AND CABLE: 600 VOLT AND BELOW 26 05 19 - 2

- c. Ground conductors: Conform to UL 486C and/or UL 467 when required by local codes.
- d. Phase and neutral conductors: Conform to UL 486C.
- 2. Compression and mechanical screw type:
 - a. 600 V rated.
 - b. Ground conductors: Conform to UL 467.
 - c. Phase and neutral conductors: Conform to UL 486A.
- 3. Terminal block type:
 - a. High density, screw-post barrier-type with white center marker strip.
 - b. 600 V and ampere rating as required, for power circuits.
 - c. 600 V, 20 ampere rated for control circuits.
 - d. 300 V, 15 ampere rated for instrumentation circuits.
 - e. Conform to NEMA ICS 4 and UL 486A.
- D. Insulating and Color Coding Tape:
 - 1. Pressure sensitive vinyl.
 - 2. Premium grade.
 - 3. Heat, cold, moisture, and sunlight resistant.
 - 4. Thickness, depending on use conditions: 7, 8.5, or 10 mil.
 - 5. For cold weather or outdoor location, tape must also be all-weather.
 - 6. Color:
 - a. Insulating tape: Black.
 - b. Color coding tape: Fade-resistant color as specified herein.
 - 7. Comply with UL 510.
- E. Pulling Lubricant: Cable manufacturer's standard containing no petroleum or other products which will deteriorate insulation.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Permitted Usage of Insulation Types:
 - 1. Type XHHW-2:
 - a. Building wire and power and control cable in architectural and non-architectural finished areas.
 - b. Building wire and power and control cable in conduit below grade.
 - 2. Type THHN/THWN and THHN/THWN-2:
 - a. Building wire and power and control cable No. 8 AWG and smaller in architectural and non-architectural finished areas.
 - 3. Type SIS and MTW:
 - a. For the wiring of control equipment within control panels and field wiring of control equipment within switchgear, switchboards, motor control centers.
- B. Conductor Size Limitations:
 - 1. Feeder and branch power conductors shall not be smaller than No. 12 AWG unless otherwise indicated on the Drawings.
- C. Color Code All Wiring as Follows:
 - 1. Building wire:

	240 V, 208 V, 240/120 V, 208/120 V	480 V, 480/277 V
Phase 1	Black	Brown
Phase 2	Red *	Orange
Phase 3	Blue	Yellow

Neutral	White	White or Gray
Ground	Green	Green

* Orange when it is a high leg of a 120/240 V Delta system.

- a. Conductors No. 6 AWG and smaller: Insulated phase, neutral and ground conductors shall be identified by a continuous colored outer finish along its entire length.
- b. Conductors larger than No. 6 AWG:
 - 1) Insulated phase and neutral conductors shall be identified by one (1) of the following methods:
 - a) Continuous colored outer finish along its entire length.
 - b) 3 IN of colored tape applied at the termination.
 - 2) Insulated grounding conductor shall be identified by one (1) of the following methods:
 - a) Continuous green outer finish along its entire length.
 - b) Stripping the insulation from the entire exposed length.
 - c) Using green tape to cover the entire exposed length.
 - 3) The color coding shall be applied at all accessible locations, including but not limited to: Junction and pull boxes, wireways, manholes and handholes.
- D. Splices and terminations for the following circuit types shall be made in the indicated enclosure type using the indicated method.
 - 1. Feeder and branch power circuits:
 - a. Junction and pull boxes and wireways:
 - 1) Twist/screw on type connectors for use on No. 8 and smaller wire.
 - 2) Compression, mechanical screw or terminal block or terminal strip type connectors for use on No. 6 AWG and larger wire.
 - b. Manholes or handholes:
 - 1) Twist/screw on type connectors pre-filled with epoxy for use on No. 8 AWG and smaller wire.
 - 2) Watertight compression or mechanical screw type connectors for use on No. 6 AWG and larger wire.
 - 2. Non-insulated compression and mechanical screw type connectors shall be insulated with tape or hot or cold shrink type insulation to the insulation level of the conductors.
- E. Insulating Tape Usage:
 - 1. For insulating connections of No. 8 AWG wire and smaller: 7 mil vinyl tape.
 - 2. For insulating splices and taps of No. 6 AWG wire or larger: 10 mil vinyl tape.
 - 3. For insulating connections made in cold weather or in outdoor locations: 8.5 mil, all weather vinyl tape.
- F. Color Coding Tape Usage: For color coding of conductors.

FIELD QUALITY CONTROL

- A. Acceptance Testing:
 - 1. See Specification Section 26 08 13.

END OF SECTION

SECTION 26 05 26 GROUNDING AND BONDING

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Material and installation requirements for grounding and bonding system(s).
- B. Related Specification Sections include but are not necessarily limited to:
 - 1. Division 00 Procurement and Contracting Requirements.
 - 2. Division 01 General Requirements.
 - 3. Section 10 14 00 Identification Devices.
 - 4. Section 26 05 00 Electrical: Basic Requirements.
 - 5. Section 26 05 19 Wire and Cable 600 Volt and Below.
 - 6. Section 26 05 33 Raceways and Boxes.
 - 7. Section 26 08 13 Acceptance Testing.

1.2 QUALITY ASSURANCE

Referenced Standards:

- 1. ASTM International (ASTM):
 - a. B8, Standard Specification for Concentric-Lay-Stranded Copper Conductors, Hard, Medium-Hard, or Soft.
- Institute of Electrical and Electronics Engineers, Inc. (IEEE):
 a. 837, Standard for Qualifying Permanent Connections Used in Substation Grounding.
- 3. National Fire Protection Association (NFPA):
- a. 70, National Electrical Code (NEC).
- 4. Underwriters Laboratories, Inc. (UL):
 - a. 467, Grounding and Bonding Equipment.
- B. Assure ground continuity is continuous throughout the entire Project.

1.3 SUBMITTALS

- A. Shop Drawings:
 - 1. Product technical data.
 - a. Provide submittal data for all products specified in PART 2 of this Specification Section except:
 - 1) Grounding clamps, terminals and connectors.
 - 2) Exothermic welding system.
 - b. See Specification Section 26 05 00 for additional requirements.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

- A. Subject to compliance with the Contract Documents, the following manufacturers are acceptable:
 - 1. Ground rods and bars and grounding clamps, connectors and terminals:
 - a. Erico Products, Inc.
 - b. Harger Lightning & Grounding.
 - c. Heary Brothers.
 - d. Hubbell Burndy.
 - e. Robbins Lightning Protection.
 - f. Thomas & Betts Blackburn.

- g. Thompson Lightning Protection.
- 2. Exothermic weld connections:
 - a. Erico Products Inc., Cadweld.
 - b. Harger Lightning & Grounding Ultraweld.
 - c. Hubbell Burndy (Thermoweld).
 - d. Thomas & Betts Furseweld.

2.2 COMPONENTS

- A. Wire and Cable:
 - 1. Bare conductors: Soft drawn stranded copper meeting ASTM B8.
 - 2. Insulated conductors: Color coded green, per Specification Section 26 05 19.
- B. Conduit: As specified in Specification Section 26 05 33.
- C. Ground Bars:
 - 1. Solid copper:
 - a. 1/4 IN thick.
 - b. 2 or 4 IN wide.
 - c. 24 IN long minimum in main service entrance electrical rooms, 12 IN long elsewhere.
 - 2. Predrilled grounding lug mounting holes.
 - 3. Stainless steel or galvanized steel mounting brackets.
 - 4. Insulated standoffs.
- D. Ground Rods:

2.

- 1. 5/8 IN x 10 FT.
- 2. Copper-clad:
 - a. 10 mil minimum uniform coating of electrolytic copper molecularly bonded to a rigid steel core.
 - b. Corrosion resistant bond between the copper and steel.
 - c. Hard drawn for a scar-resistant surface.
- E. Grounding Clamps, Connectors and Terminals:
 - 1. Mechanical type:
 - a. Standards: UL 467.
 - b. High copper alloy content.
 - Compression type for interior locations:
 - a. Standards: UL 467.
 - b. High copper alloy content.
 - c. Non-reversible.
 - d. Terminals for connection to bus bars shall have two bolt holes.
 - 3. Compression type suitable for direct burial in earth or concrete:
 - a. Standards: UL 467, IEEE 837.
 - b. High copper alloy content.
 - c. Non-reversible.
 - d. Factory filled with oxide inhibiting compound.
- F. Exothermic Weld Connections:
 - 1. Copper oxide reduction by aluminum process.
 - 2. Molds properly sized for each application.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. General:
 - 1. Install products in accordance with manufacturer's instructions.
 - 2. Size grounding conductors and bonding jumpers in accordance with NFPA 70, Article 250, except where larger sizes are indicated on the Drawings.

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LEE COUNTY SOLID WASTE DIVISION

- 3. Remove paint, rust, or other non-conducting material from contact surfaces before making ground connections.
- 4. Do not splice grounding conductors except at ground rods.
- 5. Install ground rods and grounding conductors in undisturbed, firm soil.
 - a. Provide excavation required for installation of ground rods and ground conductors.
 - b. Use driving studs or other suitable means to prevent damage to threaded ends of sectional rods.
 - c. Unless otherwise specified, connect conductors to ground rods with compressor type connectors or exothermic weld.
 - d. Provide sufficient slack in grounding conductor to prevent conductor breakage during backfill or due to ground movement.
 - e. Backfill excavation completely, thoroughly tamping to provide good contact between backfill materials and ground rods and conductors.
- 6. Do not use exothermic welding if it will damage the structure the grounding conductor is being welded to.
- B. Grounding Electrode System:
 - 1. Provide a grounding electrode system in accordance with NFPA 70, Article 250 and as indicated on the Drawings.
 - 2. Grounding conductor terminations:
 - a. Ground bars in electrical equipment, use compression type terminal and bolt it to the ground bar.
 - b. Piping systems use mechanical type connections.
 - c. Building steel, below grade and encased in concrete, use compression type connector or exothermic weld.
 - d. At all above grade terminations, the conductors shall be labeled per Specification Section 10 14 00.
- C. Supplemental Grounding Electrode:
 - 1. Provide the following grounding in addition to the equipment ground conductor supplied with the feeder conductors whether or not shown on the Drawings.
 - 2. Equipment support rack and pedestals mounted outdoors:
 - a. Connect metallic structure to a ground rod.
 - b. Grounding conductor: #6 AWG minimum.
- D. Raceway Bonding/Grounding:
 - 1. All metallic conduit shall be installed so that it is electrically continuous.
 - 2. All conduits to contain a grounding conductor with insulation identical to the phase conductors, unless otherwise indicated on the Drawings.
 - 3. NFPA 70 required grounding bushings shall be of the insulating type.
 - 4. Provide double locknuts at all panels.
 - 5. Bond all conduit, at entrance and exit of equipment, to the equipment ground bus or lug.
 - 6. Provide bonding jumpers if conduits are installed in concentric knockouts.
 - 7. Make all metallic raceway fittings and grounding clamps tight to ensure equipment grounding system will operate continuously at ground potential to provide low impedance current path for proper operation of overcurrent devices during possible ground fault conditions.
- E. Equipment Grounding:
 - 1. All utilization equipment shall be grounded with an equipment ground conductor.
- F. Manhole and Handhole Grounding:
 - 1. Provide a ground rod and ground bar, when indicated or as needed, in each manhole and handhole with exposed metal parts.
 - a. Expose a minimum of 4 IN of the rod above the floor for field connections to the rod.
 - 2. Connect all exposed metal parts (e.g., conduits and cable racks) to the ground rod.
- G. Pad Mounted Switch and Above Grade Sectionalizer Box Grounding:

- 1. Provide a ground rod(s) in each enclosure with a minimum of 4 IN of rod exposed above the floor for connection to the rod.
- 2. Connect metal frame to the ground rod.
- 3. Connect medium voltage cable shields to the ground rod.
- H. Pad Mounted Transformer Grounding:
 - 1. Provide a ground ring around transformer with:
 - a. A minimum of four ground rods located at the corners.
 - b. A ground rod connected to the ring and located in the conduit stub up area.
 - c. Or as indicated on the Drawings.
 - 2. Connect medium voltage cable shields to the ground rod.
 - 3. Connect surge arrestor to the ground rod.
 - 4. Connect the XO and ground pad to the ground rod.
 - 5. Connect exposed metallic conduits to the ground rod.

3.2 FIELD QUALITY CONTROL

- A. Leave grounding system uncovered until observed by Owner.
- B. Acceptance testing:
 - 1. See Specification Section 26 08 13.
- C. Provide a continuity test on the components of the grounding electrode system.
- D. Complete grounding system: Resistance of 5 ohms or less.
- E. Test resistance of installed ground system after backfilling and before connection to any other grounded system including underground piping, utility services or other building ground systems.
 - 1. Test ground grid resistance by fall-of-potential method.

END OF SECTION

SECTION 26 05 33 RACEWAYS AND BOXES

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Material and installation requirements for:
 - a. Conduits.
 - b. Conduit fittings.
 - c. Conduit supports.
 - d. Pull and junction boxes.
- B. Related Specification Sections include but are not necessarily limited to:
 - 1. Division 00 Procurement and Contracting Requirements.
 - 2. Division 01 General Requirements.
 - 3. Section 26 05 00 Electrical: Basic Requirements.
 - 4. Section 26 05 43 Electrical: Exterior Underground.

1.2 QUALITY ASSURANCE

Referenced Standards:

- 1. American Iron and Steel Institute (AISI).
- 2. ASTM International (ASTM):
 - a. A123/A123M, Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
 - b. A153/A153M, Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware.
 - c. D2564, Standard Specification for Solvent Cements for Poly (Vinyl Chloride) (PVC) Plastic Piping Systems.
- 3. National Electrical Manufacturers Association (NEMA):
 - a. 250, Enclosures for Electrical Equipment (1000 Volts Maximum).
 - b. RN 1, Polyvinyl Chloride (PVC) Externally Coated Galvanized Rigid Steel Conduit and Intermediate Metal Conduit (IMC).
 - c. TC 2, Electrical Polyvinyl Chloride (PVC) Tubing and Conduit.
 - d. TC 3, Polyvinyl Chloride (PVC) Fittings for Use with Rigid PVC Conduit and Tubing.
 - e. TC 14.AG, Aboveground Reinforced Thermosetting Resin Conduit (RTRC) and Fittings.
 - f. TC 14.BG, Belowground Reinforced Thermosetting Resin Conduit (RTRC) and Fittings.
- 4. National Electrical Manufacturers Association/American National Standards Institute (NEMA/ANSI):
 - a. C80.1, Electric Rigid Steel Conduit (ERSC).
 - b. OS 1, Sheet-Steel Outlet Boxes, Device Boxes, Covers, and Box Supports.
- 5. National Fire Protection Association (NFPA):
- a. 70, National Electrical Code (NEC).
- 6. Underwriters Laboratories, Inc. (UL):
 - a. 1,
 - b. 6, Standard for Electrical Rigid Metal Conduit Steel.
 - c. 50, Enclosures for Electrical Equipment, Non-Environmental Considerations.
 - d. 467, Grounding and Bonding Equipment.
 - e. 514B, Conduit, Tubing, and Cable Fittings.
 - f. 651, Standard for Schedule 40 and 80 Rigid PVC Conduit and Fittings.
 - g. 870, Standard for Wireways, Auxiliary Gutters, and Associated Fittings.

1.3 SUBMITTALS

A. Shop Drawings:

- 1. Product technical data:
 - a. Provide submittal data for all products specified in PART 2 of this Specification Section except:
 - 1) Conduit fittings.
 - 2) Support systems.
 - b. See Specification Section 26 05 00 for additional requirements.
- 2. Fabrication and/or layout drawings:
 - a. Identify dimensional size of pull and junction boxes to be used.

1.4 DELIVERY, STORAGE, AND HANDLING

A. See Specification Section 26 05 00.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

- A. Subject to compliance with the Contract Documents, the following manufacturers are acceptable:
 - 1. Rigid metallic conduits:
 - a. Allied Tube and Conduit Corporation.
 - b. Triangle PWC Inc.
 - c. Western Tube and Conduit Corporation.
 - d. Wheatland Tube Company.
 - e. LTV Steel Company.
 - 2. PVC coated rigid metallic conduits:
 - a. Thomas & Betts Ocal.
 - b. Rob-Roy Ind.
 - 3. Rigid nonmetallic conduit:
 - a. Prime Conduit (Carlon).
 - b. Cantex.
 - c. Osburn Associates.
 - 4. Conduit fittings and accessories:
 - a. Appleton Electric Co.
 - b. Carlon.
 - c. Cantex.
 - d. Crouse-Hinds.
 - e. Killark.
 - f. Osburn Associates.
 - g. OZ Gedney Company.
 - h. RACO.

5.

- i. Steel City.
- j. Thomas & Betts.
- Support systems:
- a. Unistrut Building Systems.
- b. Eaton B-Line.
- c. Kindorf.
- d. Minerallac Fastening Systems.
- e. Caddy.
- f. Thomas & Betts Superstrut.
- 6. Outlet, pull and junction boxes:
 - a. Appleton Electric Co.
 - b. Eaton Crouse-Hinds.
 - c. Killark.

- d. O-Z/Gedney.
- e. Thomas & Betts Steel City.
- f. Raco.
- g. Bell.
- h. Hoffman Engineering Co.
- i. Wiegmann.
- j. Eaton B-Line.
- k. Adalet.
- l. Rittal.
- m. Stahlin.

2.2 RIGID METALLIC CONDUITS

- A. Rigid Galvanized Steel Conduit (RGS):
 - 1. Mild steel with continuous welded seam.
 - 2. Metallic zinc applied by hot-dip galvanizing or electro-galvanizing.
 - 3. Threads galvanized after cutting.
 - 4. Internal coating: Baked lacquer, varnish or enamel for a smooth surface.
 - 5. Standards: NFPA 70 Type RMC, NEMA/ANSI C80.1, UL 6.
- B. PVC-Coated Rigid Steel Conduit (PVC-RGS):
 - 1. Nominal 40 mil Polyvinyl Chloride Exterior Coating:
 - a. Coating: Bonded to hot-dipped galvanized rigid steel conduit conforming to NEMA/ANSI C80.1.
 - b. The bond between the PVC coating and the conduit surface: Greater than the tensile strength of the coating.
 - 2. Nominal 2 mil, minimum, urethane interior coating.
 - 3. Urethane coating on threads.
 - 4. Conduit: Epoxy prime coated prior to application of PVC and urethane coatings.
 - 5. Female Ends:
 - a. Have a plastic sleeve extending a minimum of 1 pipe diameter or 2 IN, whichever is less beyond the opening.
 - b. The inside diameter of the sleeve shall be the same as the outside diameter of the conduit to be used with it.
 - 6. Standards: NFPA 70 Type RMC, NEMA/ANSI C80.1, UL 6, NEMA RN 1.

2.3 RIGID NONMETALLIC CONDUIT

- A. Schedules 40 (PVC-40) and 80 (PVC-80):
 - 1. Polyvinyl-chloride (PVC) plastic compound which includes inert modifiers to improve weatherability and heat distribution.
 - 2. Rated for direct sunlight exposure.
 - 3. Fire retardant and low smoke emission.
 - 4. Shall be suitable for use with 90 DegC wire and shall be marked "maximum 90 DegC".
 - 5. Standards: NFPA 70 Type PVC, NEMA TC 2, UL 651.

2.4 CONDUIT FITTINGS AND ACCESSORIES

- A. Fittings for Use with RGS:
 - 1. Locknuts:
 - a. Threaded steel or malleable iron.
 - b. Gasketed or non-gasketed.
 - c. Grounding or non-grounding type.
 - 2. Bushings:
 - a. Threaded, insulated metallic.
 - b. Grounding or non-grounding type.
 - 3. Hubs: Threaded, insulated and gasketed metallic for raintight connection.
 - 4. Couplings:

10030203

LEE COUNTY SOLID WASTE DIVISION SITE 4.16KV DISTRIBUTION FEEDER EXTENSION - Issued for Bid RACEWAYS AND BOXES 26 05 33 - 3

- a. Threaded straight type: Same material and finish as the conduit with which they are used on.
- b. Threadless type: Gland compression or self-threading type, concrete tight.
- Unions: Threaded galvanized steel or zinc plated malleable iron.
- 6. Conduit bodies (ells and tees):
 - a. Body: Zinc plated cast iron or cast copper free aluminum with threaded hubs.
 - b. Standard and mogul size.
 - c. Cover:

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- 1) Clip-on type with stainless steel screws.
- 2) Gasketed or non-gasketed galvanized steel, zinc plated cast iron or cast copper free aluminum.
- 7. Conduit bodies (round):
 - a. Body: Zinc plated cast iron or cast copper free aluminum with threaded hubs.
 - b. Cover: Threaded screw on type, gasketed, galvanized steel, zinc plated cast iron or cast copper free aluminum.
- 8. Standards: UL 467, UL 514B, UL 886.
- B. Fittings for Use with PVC-RGS:
 - 1. The same material and construction as those fittings listed under paragraph "Fittings for Use with RGS and RAC" and coated as defined under paragraph "PVC Coated Rigid Steel Conduit (PVC-RGS)."
- C. Fittings for Use with Rigid Nonmetallic PVC Conduit:
 - 1. Coupling, adapters and conduit bodies:
 - a. Same material, thickness, and construction as the conduits with which they are used.
 - b. Homogeneous plastic free from visible cracks, holes or foreign inclusions.
 - c. Bore smooth and free of blisters, nicks or other imperfections which could damage the conductor.
 - 2. Solvent cement for welding fittings shall be supplied by the same manufacturer as the conduit and fittings.
 - 3. Standards: ASTM D2564, NEMA TC 3, UL 651, UL 514B.
- D. Weather and Corrosion Protection Tape:
 - 1. PVC based tape, 10 mils thick.
 - 2. Protection against moisture, acids, alkalis, salts and sewage and suitable for direct bury.
 - 3. Used with appropriate pipe primer.

2.5 ALL RACEWAY AND FITTINGS

- A. Mark Products:
 - 1. Identify the nominal trade size on the product.
 - 2. Stamp with the name or trademark of the manufacturer.

2.6 PULL AND JUNCTION BOXES

- A. NEMA 3R Rated:
 - 1. Body and cover: 14 GA minimum, steel finished with rust inhibiting primer and manufacturers standard paint inside and out.
 - 2. Drip shield top and seam-free sides, front and back.
 - 3. With or without concentric knockouts on bottom.
 - 4. Slip-on removable cover fastened on bottom edge with screws or continuous hinged cover fastened with screws.
- B. NEMA 4 Rated:
 - 1. Body and cover: 14 GA steel finished with rust inhibiting primer and manufacturers standard paint inside and out.
 - 2. Seams continuously welded and ground smooth.
 - 3. No knockouts.
 - 4. External mounting flanges.

LEE COUNTY SOLID WASTE DIVISION

SITE 4.16KV DISTRIBUTION FEEDER EXTENSION - Issued for Bid RACEWAYS AND BOXES

- 5. Hinged or non-hinged cover held closed with stainless steel screws and clamps.
- 6. Cover with oil resistant gasket.
- C. NEMA 4X Rated (metallic):
 - 1. Body and cover: 14 GA Type 304 or 316 stainless steel.
 - 2. Seams continuously welded and ground smooth.
 - 3. No knockouts.
 - 4. External mounting flanges.
 - 5. Hinged door and stainless steel screws and clamps.
 - 6. Door with oil-resistant gasket.
- D. NEMA 4X Rated (Nonmetallic):
 - 1. Body and cover: Ultraviolet light protected fiberglass-reinforced polyester boxes.
 - 2. No knockouts.
 - 3. External mounting flanges.
 - 4. Hinged door with quick release latches and padlocking hasp.
 - 5. Door with oil resistant gasket.
- E. NEMA 7 and NEMA 9 Rated:
 - 1. Cast gray iron alloy or copper-free aluminum with manufacturers standard finish.
 - 2. Drilled and tapped openings or tapered threaded hub.
 - 3. Cover bolted-down with stainless steel bolts or threaded cover with neoprene gasket.
 - 4. External mounting flanges.
 - 5. Grounding lug.
 - 6. Accessories: 40 mil PVC exterior coating and 2 mil urethane interior coating.
- F. NEMA 12 Rated:
 - 1. Body and cover:
 - a. 14 GA steel finished with rust inhibiting primer and manufacturers standard paint inside and out.
 - b. Type 5052 H-32 aluminum, unpainted.
 - 2. Seams continuously welded and ground smooth.
 - 3. No knockouts.
 - 4. External mounting flanges.
 - 5. Non-hinged cover held closed with captivated cover screws threaded into sealed wells or hinged cover held closed with stainless steel screws and clamps.
 - 6. Flat door with oil resistant gasket.
- G. Miscellaneous Accessories:
 - 1. Rigid handles for covers larger than 9 SF or heavier than 25 LBS.
 - 2. Split covers when heavier than 25 LBS.
 - 3. Weldnuts for mounting optional panels and terminal kits.
 - 4. Terminal blocks: Screw-post barrier-type, rated 600 volt and 20 ampere minimum.
- H. Standards: NEMA 250, UL 50.

2.7 SUPPORT SYSTEMS

- A. Multi-conduit Surface or Trapeze Type Support and Pull or Junction Box Supports:
 - 1. Material requirements.
 - a. Galvanized steel: ASTM A123/A123M or ASTM A153/A153M.
 - b. Stainless steel: AISI Type 316.
 - PVC coat galvanized steel: ASTM A123/A123M or ASTM A153/A153M and 20 mil PVC coating.
- B. Single Conduit and Outlet Box Support Fasteners:
 - 1. Material requirements:
 - a. Zinc plated steel.
 - b. Stainless steel.
 - c. Malleable iron.

- d. PVC coat malleable iron or steel: 20 mil PVC coating.
- e. Steel protected with zinc phosphate and oil finish.

PART 3 - EXECUTION

3.1 RACEWAY INSTALLATION - GENERAL

- A. Shall be in accordance with the requirements of:
 - 1. NFPA 70.
 - 2. Manufacturer instructions.
- B. Size of Raceways:
 - 1. Raceway sizes are shown on the Drawings, if not shown on the Drawings, then size in accordance with NFPA 70.
 - Unless specifically indicated otherwise, the minimum raceway size shall be:
 a. Conduit: 3/4 IN.
- C. Field Bending and Cutting of Conduits:
 - 1. Utilize tools and equipment recommended by the manufacturer of the conduit, designed for the purpose and the conduit material to make all field bends and cuts.
 - 2. Do not reduce the internal diameter of the conduit when making conduit bends.
 - 3. Prepare tools and equipment to prevent damage to the PVC coating.
 - 4. Degrease threads after threading and apply a zinc rich paint.
 - 5. Debur interior and exterior after cutting.
- D. Male threads of conduit systems shall be coated with an electrically conductive anti-seize compound.
- E. The protective coating integrity of conduits, fittings, outlet, pull and junction boxes and accessories shall be maintained.
 - 1. Repair galvanized components utilizing a zinc rich paint.
 - 2. Repair painted components utilizing touch up paint provided by or approved by the manufacturer.
 - 3. Repair PVC coated components utilizing a patching compound, of the same material as the coating, provided by the manufacturer of the conduit; or a self-adhesive, highly conformable, cross-linked silicone composition strip, followed by a protective coating of vinyl tape.
 - a. Total nominal thickness: 40 mil.
 - 4. Repair surfaces which will be inaccessible after installation prior to installation.
- F. Remove moisture and debris from conduit before wire is pulled into place.
 - 1. Pull mandrel with diameter nominally 1/4 IN smaller than the interior of the conduit, to remove obstructions.
 - 2. Swab conduit by pulling a clean, tight-fitting rag through the conduit.
 - 3. Tightly plug ends of conduit with tapered wood plugs or plastic inserts until wire is pulled.
- G. Only nylon or polyethylene rope shall be used to pull wire and cable in conduit systems.
- H. Where portions of a raceway are subject to different temperatures and where condensation is known to be a problem, as in cold storage areas of buildings or where passing from the interior to the exterior of a building, the raceway shall be sealed to prevent circulation of warm air to colder section of the raceway.

3.2 RACEWAY ROUTING

- A. Raceways shall be routed in the field unless otherwise indicated.
 - 1. Conduit and fittings shall be installed, as required, for a complete system that has a neat appearance and is in compliance with all applicable codes.
 - 2. Conduit shall not interfere with, or prevent access to, piping, valves, ductwork, or other equipment for operation, maintenance and repair.

10030203

LEE COUNTY SOLID WASTE DIVISION SITE 4.16KV DISTRIBUTION FEEDER EXTENSION - Issued for Bid

- 3. Provide pull boxes or conduit bodies as needed so that there is a maximum of 360 degrees of bends in the conduit run or in long straight runs to limit pulling tensions.
- B. Maintain minimum spacing between parallel conduit and piping runs in accordance with the following when the runs are greater than 30 FT:
 - 1. Between instrumentation and telecommunication: 1 IN.
 - 2. Between instrumentation and 125 V, 48 V and 24 Vdc, 2 IN.
 - 3. Between instrumentation and 600 V and less AC power or control: 6 IN.
 - 4. Between instrumentation and greater than 600 Vac power: 12 IN.
 - 5. Between telecommunication and 125 V, 48 V and 24 Vdc, 2 IN.
 - 6. Between telecommunication and 600 V and less AC power or control: 6 IN.
 - 7. Between telecommunication and greater than 600 Vac power: 12 IN.
 - 8. Between 125 V, 48 V and 24 Vdc and 600 V and less AC power or control: 2 IN.
 - 9. Between 125 V, 48 V and 24 Vdc and greater than 600 Vac power: 2 IN.
 - 10. Between 600 V and less AC and greater than 600 Vac: 2 IN.
 - 11. Between process, gas, air and water pipes: 6 IN.
- C. Conduits shall be installed to eliminate moisture pockets.
 - Where water cannot drain to openings, provide drain fittings in the low spots of the conduit 1. run.
 - 2.

3.3 **RACEWAY APPLICATIONS**

- A. Permitted Raceway Types Per Wire or Cable Types: 1. Power wire or cables: All raceway types.
- B. Permitted Raceway Types Per Area Designations:
 - 1. Dry areas:
 - a. RGS.
 - 2. Wet areas:
 - a. RGS.
 - b. PVC-80
 - 3. Corrosive areas: a. PVC-RGS.
 - b. PVC-80
 - 4. Highly corrosive areas:
 - a. PVC-RGS.
 - b. PVC-80.
- C. Permitted Raceway Types Per Routing Locations:
 - RGS wrapped with factory applied weather and corrosion protection tape when а
 - emerging from concrete into areas designated as dry, wet, corrosive or highly corrosive.
 - b. PVC-80.
 - 2. Direct buried conduits and ductbanks:
 - a. PVC-80.
 - 90 degree elbows for transitions to above grade: b.
 - 1) RGS wrapped with factory applied weather and corrosion protection tape. 2) PVC-RGS.
 - c. Long sweeping bends greater than 15 degrees:
 - 1) RGS wrapped with factory applied weather and corrosion protection tape. 2) PVC-RGS.
 - Concrete encased ductbanks: 3.
 - a. PVC-80.
 - b. 90 degree elbows for transitions to above grade:
 - 1) RGS wrapped with factory applied weather and corrosion protection tape.
 - 2) PVC-RGS.
 - c. Long sweeping bends greater than 15 degrees:

LEE COUNTY SOLID WASTE DIVISION

- 1) RGS for sizes 2 IN and larger.
- D. NEMA 3R Wiring Trough:
 - 1. Surface mounted in exterior locations.
- E. NEMA 4X Rated Wireway:
 - 1. Surface mounted in areas designated as wet and or corrosive.
- F. NEMA 12 Rated Wireway:
 - 1. Surface mounted in areas designated as dry in architecturally and non-architecturally finished areas.
- G. Underground Conduit: See Specification Section 26 05 43.

3.4 CONDUIT FITTINGS AND ACCESSORIES

- A. Rigid nonmetallic conduit and fittings shall be joined utilizing solvent cement.
 - 1. Immediately after installation of conduit and fitting, the fitting or conduit shall be rotated 1/4 turn to provide uniform contact.
- B. Install Expansion Fittings:
 - 1. Where conduits are exposed to the sun and conduit run is greater than 200 FT.
 - 2. Elsewhere as identified on the Drawings.
- C. Threaded connections shall be made wrench-tight.
- D. Conduit joints shall be watertight:
 - 1. Where subjected to possible submersion.
 - 2. In areas classified as wet.
 - 3. Underground.
- E. Terminate Conduits:
 - 1. In NEMA 12 rated enclosures:
 - a. Watertight, insulated and gasketed hub and locknut.
 - b. Use grounding type locknut or bushing when required by NFPA 70.
 - In NEMA 3R, NEMA 4 and NEMA 4X rated enclosures:
 a. Watertight, insulated and gasketed hub and locknut.
 - 3. In NEMA 7 and NEMA 9 rated enclosures:
 - a. Into an integral threaded hub.
 - 4. When stubbed up through the floor into floor mount equipment:
 - a. With an insulated grounding bushing on metallic conduits.
 - b. With end bells on nonmetallic conduits.
- F. Threadless couplings shall only be used to join new conduit to existing conduit when the existing conduit end is not threaded and it is not practical or possible to cut threads on the existing conduit with a pipe threader.

3.5 CONDUIT SUPPORT

- A. Permitted multi-conduit surface or trapeze type support system per area designations and conduit types:
 - 1. Dry or wet and/or hazardous areas:
 - a. Galvanized system consisting of: Galvanized steel channels and fittings, nuts and hardware and conduit clamps.
 - 2. Corrosive areas:
 - a. Stainless steel system consisting of: Stainless steel channels and fittings, nuts and hardware and conduit clamps.
 - b. PVC coated steel system consisting of: PVC coated galvanized steel channels and fittings and conduit clamps with stainless steel nuts and hardware.
 - c. Fiberglass system consisting of: Fiberglass channels and fittings, nuts and hardware and conduit clamps.
 - 3. Highly corrosive areas:

- a. PVC coated steel system consisting of: PVC coated galvanized steel channels and fittings and conduit clamps with stainless steel nuts and hardware.
- b. Fiberglass system consisting of: Fiberglass channels and fittings, nuts and hardware and conduit clamps.
- 4. Conduit type shall be compatible with the support system material.
 - a. Galvanized steel system may be used with RGS.
 - b. Stainless steel system may be used with RGS and PVC-RGS.
 - c. PVC coated galvanized steel system may be used with PVC-RGS and PVC-40 and PVC-80 and Fiberglass.
 - d. Fiberglass system may be used with PVC-40 and PVC-80 and PVC-RGS and Fiberglass.
- B. Permitted single conduit support fasteners per area designations and conduit types:
 - 1. Architecturally finished areas:
 - a. Material: Zinc plated steel, or steel protected with zinc phosphate and oil finish.
 - b. Types of fasteners: Spring type hangers and clips, straps, hangers with bolts, clamps with bolts and bolt on beam clamps.
 - c. Provide anti-rattle conduit supports when conduits are routed through metal studs.
 - 2. Dry or wet and/or hazardous areas:
 - a. Material: Zinc plated steel, stainless steel and malleable iron.
 - b. Types of fasteners: Straps, hangers with bolts, clamps with bolts and bolt on beam clamps.
 - 3. Corrosive areas:
 - a. Material: Stainless steel and PVC coat malleable iron or steel.
 - b. Types of fasteners: Straps, hangers with bolts, clamps with bolts and bolt on beam clamps.
 - 4. Highly corrosive areas:
 - a. Material: PVC coat malleable iron or steel.
 - b. Types of fasteners: Straps, hangers with bolts, clamps with bolts and bolt on beam clamps.
 - 5. Conduit type shall be compatible with the support fastener material.
 - a. Zinc plated steel, steel protected with zinc phosphate and oil finish and malleable iron fasteners may be used with RGS.
 - b. Stainless steel system may be used with RGS and PVC-RGS.
 - c. PVC coated fasteners may be used with PVC-RGS and PVC-40 and PVC-80.
 - d. Nonmetallic fasteners may be used with PVC-40, PVC-80 and fiberglass.
- C. Conduit Support General Requirements:
 - 1. Maximum spacing between conduit supports per NFPA 70.
 - 2. Do not support conduit from process, gas, air or water piping; or from other conduits.

3.6 OUTLET, PULL AND JUNCTION BOX INSTALLATION

- A. General:
 - 1. Install products in accordance with manufacturer's instructions.
 - 2. See Specification Section 26 05 00 and the Drawings for area classifications.
 - 3. Fill unused punched-out, tapped, or threaded hub openings with insert plugs.
 - 4. Size boxes to accommodate quantity of conductors enclosed and quantity of conduits connected to the box.
- B. Pull and Junction Boxes:
 - 1. Install pull or junction boxes in conduit runs where indicated or required to facilitate pulling of wires or making connections.
 - a. Make covers of boxes accessible.
 - 2. Permitted uses of NEMA 3R enclosure:
 - a. Pull or junction box surface mounted in exterior locations.
 - 3. Permitted uses of NEMA 3RX enclosure:
 - a. Pull or junction box surface mounted in exterior corrosive locations.

LEE COUNTY SOLID WASTE DIVISION SITE 4.16KV DISTRIBUTION FEEDER EXTENSION - Issued for Bid
- 4. Permitted uses of NEMA 4 enclosure:
 - a. Pull or junction box surface mounted in areas designated as wet.
- 5. Permitted uses of NEMA 4X metallic enclosure:
- a. Pull or junction box surface mounted in areas designated as wet and/or corrosive.
- 6. Permitted uses of NEMA 7 enclosure:
 - a. Pull or junction box surface mounted in areas designated as Class I hazardous.
 - 1) Provide PVC coating in corrosive and highly corrosive areas when PVC coated conduit is used.
- 7. Permitted uses of NEMA 12 enclosure:
 - a. Pull or junction box surface mounted in areas designated as dry.

SECTION 26 05 43 ELECTRICAL: EXTERIOR UNDERGROUND

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Material and installation requirements for:
 - a. Manholes.
 - b. Handhole.
 - c. Underground conduits and ductbanks.
- B. Related Specification Sections include but are not necessarily limited to:
 - 1. Division 00 Procurement and Contracting Requirements.
 - 2. Division 01 General Requirements.
 - 3. Section 31 23 33 Trenching, Backfilling and Compacting for Utilities.
 - 4. Section 10 14 00 Identification Devices.
 - 5. Section 26 05 26 Grounding.
 - 6. Section 26 05 33 Raceways and Boxes.

1.2 QUALITY ASSURANCE

Referenced Standards:

- 1. American Association of State Highway and Transportation Officials (AASHTO):
- a. HB, Standard Specifications for Highway Bridges.
- 2. ASTM International (ASTM):
 - a. A536, Standard Specification for Ductile Iron Castings.
- 3. National Fire Protection Association (NFPA):
 - a. 70, National Electrical Code (NEC).
- 4. Society of Cable Telecommunications Engineers (SCTE):
 - a. 77, Specification for Underground Enclosure Integrity.

1.3 DEFINITIONS

- A. Direct-buried conduit(s):
 - 1. Individual (single) underground conduit.
 - 2. Multiple underground conduits, arranged in one or more planes, in a common trench.
- B. Concrete encased ductbank: An individual (single) or multiple conduit(s), arranged in one or more planes, encased in a common concrete envelope.

1.4 SUBMITTALS

- A. Shop Drawings:
 - 1. Product technical data:
 - a. Provide submittal data for all products specified in PART 2 of this Specification Section.
 - 2. Fabrication and/or layout drawings:
 - a. Provide dimensional drawings of each manhole indicating all specified accessories and conduit entry locations.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

A. Subject to compliance with the Contract Documents, the following manufacturers are acceptable:

- 1. Precast manholes and handholes:
 - a. Utility Vault Co.
 - b. Oldcastle Precast, Inc.
 - c. Lister Industries.
 - d. Concast
- 2. Manhole and handhole and ductbank accessories:
 - a. Neenah.
 - b. Unistrut.
 - c. Condux International, Inc.
 - d. Underground Devices, Inc.
 - e. Concast

2.2 MANHOLES AND HANDHOLES

- A. Precast Manholes and Handholes:
 - 1. Fiberglass reinforced polymer concrete or steel reinforced cement concrete structures:
 - 2. AASHTO live load rating: H-20 for full deliberate vehicle traffic.
 - 3. Mating edges: Tongue and groove type.
 - 4. Solid bottom with a 12 IN x 12 IN or 12 IN DIA french drain in the bottom of each manhole.
 - 5. Cover extension rings as required.
 - 6. Cable pulling eyes opposite all conduit entrances.
 - a. Coordinate exact location with installation contractor.

2.3 CONCRETE MANHOLE AND HANDHOLE ACCESSORIES

- A. Concast aluminum diamond cover and frame or approved equal:
 - 1. Aluminum Flats 6061-T6511 ASTM B221.
 - 2. Aluminum Sheet Smooth 5052-H32 ASTM B209.
 - 3. Aluminum Deck Plating 3003 ASTM B209 or 6061 ASTM B632.
 - 4. Aluminum Angles 6061-T6 ASTM B308.
 - 5. Aluminum Channels 6061-T6 ASTM B308.
 - 6. Pedestrian Rated
 - 7. Minimum Dimensions: 48 IN X 48IN.
 - 8. Cast the legend "DANGER HIGH VOLTAGE" into manhole and handhole covers.
 - 9. Secure cover with Concast sure lock bolts.
- B. Cable Racks and Hooks:
 - 1. Material: Heavy-duty nonmetallic (glass reinforced nylon).
 - 2. Hook loading capacity: 400 LBS minimum.
 - 3. Rack loading capacity: Four (4) hooks maximum.
 - 4. Hook deflection: 0.25 IN maximum.
 - 5. Hooks: Length, as required, with positive locking device to prevent upward movement.
 - 6. Mounding hardware: Stainless steel.
- C. Cable Pulling Irons:
 - 1. 7/8 IN DIA hot-dipped galvanized steel.
 - 2. 6000 LB minimum pulling load.
- D. Ground Rods and Grounding Equipment: See Specification Section 26 05 26.

2.4 UNDERGROUND CONDUIT AND ACCESSORIES

- A. Conduit: See Specification Section 26 05 33.
- B. Duct Spacers/Supports:
 - 1. High density polyethylene or high impact polystyrene.
 - 2. Interlocking.
 - 3. Provide 2 IN minimum spacing between conduits.
 - 4. Accessories, as required:

10030203

LEE COUNTY SOLID WASTE DIVISION

SITE 4.16KV DISTRIBUTION FEEDER EXTENSION - Issued for Bid ELECTRICAL: EXTERIOR UNDERGROUND

- a. Hold down bars.
- b. Ductbank strapping.

PART 3 - EXECUTION

3.1 GENERAL

- A. Drawings indicate the intended location of manholes and handholes and routing of ductbanks and direct buried conduit.
 - 1. Field conditions may affect actual routing.
- B. Manhole and Handhole Locations:
 - 1. Approximately where shown on the Drawings.
 - 2. As required for pulling distances.
 - 3. As required to keep pulling tensions under allowable cable tensions.
 - 4. As required for number of bends in ductbank routing.
 - 5. Shall not be installed in a swale or ditch.
 - 6. Determine the exact locations after careful consideration has been given to the location of other utilities, grading, and paving.
 - 7. Locations are to be approved by the Engineer prior to excavation and placement or construction of manholes and handholes.
- C. Install products in accordance with manufacturer's instructions.
- D. Install manholes and handholes in conduit runs where indicated or as required to facilitate pulling of wires or making connections.
- E. Comply with Specification Section 31 23 33 for trenching, backfilling and compacting.

3.2 MANHOLES AND HANDHOLES

- A. Precast Manholes and Handholes:
 - 1. For use in vehicular and non-vehicular traffic areas.
 - 2. Construction:
 - a. Grout or seal all joints, per manufacturer's instructions.
 - b. Support cables on walls by cable racks:
 - 1) Provide a minimum of two (2) racks, install symmetrically on each wall of manholes and handholes.
 - a) Provide additional cable racks, as required, so that both ends of cable splices will be supported horizontally.
 - 2) Equip cable racks with adjustable hooks: Quantity of cable hooks as required by the number of conductors to be supported.
 - c. In each manhole and handhole, drive 3/4 IN x 10 FT long copper clad ground rod into the earth with approximately 6 IN exposed above finished floor.
 - 1) Drill opening in floor for ground rod.
 - 2) Connect all metallic components to ground rod by means of #8 AWG minimum copper wire and approved grounding clamps.
 - 3) Utilize a ground bar in the manhole or handhole if the quantity of ground wires exceeds three (3).
 - a) Connect ground bar to ground rod with a #2/0 AWG minimum copper wire.
 - 3. Place manhole or handhole on a foundation of compacted 1/4 to 1/2 IN crushed rock or gravel a minimum of 8 IN thick and 6 IN larger than manholes or handholes footprint on all sides.
 - 4. Install so that the top of cover is 1 IN above finished grade.
 - a. Where existing grades are higher than finished grades, install sufficient number of courses of curved segmented concrete block between top of handhole and manhole frame to temporarily elevate manhole cover to existing grade level.
 - 5. After installation is complete, backfill and compact soil around manholes and handholes.
 - 6. Handhole size:

- a. As indicated on the Drawings or as required for the number and size of conduits entering or as indicated on the Drawings.
- b. Minimum floor dimension of 4 FT x 4 FT and minimum depth of 4 FT, unless otherwise noted in the Drawings.
- 7. Manhole size:
 - a. As indicated on the Drawings or as required for the number and size of conduits entering or as indicated on the Drawings.
 - b. Minimum floor dimension of 6 FT x 6 FT and a minimum depth of 6 FT.

3.3 UNDERGROUND CONDUITS

- A. General Installation Requirements:
 - 1. Ductbank types per location:
 - a. Concrete encased ductbank:
 - 1) Under roads.
 - 2) Conduits containing medium voltage cables.
 - 3) Pad mounted transformer secondaries.
 - b. Direct-buried conduit(s):
 - 1) Area/Roadway lighting.
 - 2) .Conduits containing 600V and below cables except for pad mounted transformer secondaries.
 - 3) As indicated in the Ductbank Schedule
 - 2. Do not place concrete or soil until conduits have been observed by the Engineer.
 - 3. Ductbanks shall be sloped a minimum of 4 IN per 100 FT or as directed by Lee County's Project Manager.
 - a. Low points shall be at manholes or handholes.
 - 4. During construction and after conduit installation is complete, plug the ends of all conduits.
 - 5. Provide conduit supports and spacers.
 - a. Place supports and spacers for rigid nonmetallic conduit on maximum centers as indicated for the following trade sizes:
 - 1) 1 IN and less: 3 FT.
 - 2) 1-1/4 to 3 IN: 5 FT.
 - 3) 3-1/2 to 6 IN: 7 FT.
 - b. Place supports and spacers for rigid steel conduit on maximum centers as indicated for the following trade sizes:
 - 1) 1 IN and less: 10 FT.
 - 2) 1-1/4 to 2-1/2 IN: 14 FT.
 - 3) 3 IN and larger: 20 FT.
 - c. Securely anchor conduits to supports and spacers to prevent movement during placement of concrete or soil.
 - 6. Stagger conduit joints at intervals of 6 IN vertically.
 - 7. Make conduit joints watertight and in accordance with manufacturer's recommendations.
 - 8. Accomplish changes in direction of runs exceeding a total of 15 degrees by long sweep bends having a minimum radius of 25 FT.
 - a. Sweep bends may be made up of one or more curved or straight sections or combinations thereof.
 - 9. Furnish manufactured bends at end of runs.
 - a. Minimum radius of 18 IN for conduits less than 3 IN trade size and 36 IN for conduits 3 IN trade size and larger.
 - 10. Field cuts requiring tapers shall be made with the proper tools and shall match factory tapers.
 - 11. After the conduit run has been completed:
 - a. Prove joint integrity and test for out-of-round duct by pulling a test mandrel through each conduit.
 - 1) Test mandrel:
 - a) Length: Not less than 12 IN

LEE COUNTY SOLID WASTE DIVISION

SITE 4.16KV DISTRIBUTION FEEDER EXTENSION - Issued for Bid ELECTRICAL: EXTERIOR UNDERGROUND

- b) Diameter: Approximately 1/4 IN less than the inside diameter of the conduit.
- b. Clean the conduit by pulling a heavy duty wire brush mandrel followed by a rubber duct swab through each conduit.
- 12. Pneumatic rodding may be used to draw in lead wire.
 - a. Install a heavy nylon cord free of kinks and splices in all unused new ducts.
 - b. Extend cord 3 FT beyond ends of conduit.
- 13. Transition from rigid nonmetallic conduit to rigid metallic conduit, per Specification Section 26 05 33, prior to entering a structure or going above ground.
 - a. Except rigid nonmetallic conduit may be extended directly to manholes, handholes, pad mounted transformer boxes and other exterior pad mounted electrical equipment where the conduit is concealed within the enclosure.
 - b. Terminate rigid PVC conduits with end bells.
 - c. Terminate steel conduits with insulated bushings.
- 14. Place warning tape in trench directly over ductbanks, direct-buried conduit, and directburied wire and cable in accordance with Specification Section 10 14 00.
- 15. Placement of conduits stubbing into handholes and manholes shall be located to allow for proper bending radiuses of the cables.
- B. Concrete Encased Ductbank:
 - 1. Ductbank system consists of conduits completely encased in minimum 2 IN of concrete and with separations between different cabling types as required in Specification Section 26 05 33 or as detailed on the Drawings.
 - 2. Install so that top of concrete encased duct, at any point:
 - a. Is not less than 36 IN below grade.
 - b. Is below pavement sub-grading.
 - 3. Conduit supports shall provide a uniform minimum clearance of 2 IN between the bottom of the trench and the bottom row of conduit.
 - 4. Conduit separators shall provide a uniform minimum clearance of 2 IN between conduits or as required in Specification Section 26 05 33 for different cabling types.
- C. Direct-Buried Conduit(s):
 - 1. Install so that the top of the uppermost conduit, at any point:
 - a. Is not less than 30 IN below grade.
 - b. Is below pavement sub-grading.
 - 2. Provide a uniform minimum clearance of 2 IN between conduits or as required in Specification Section 26 05 33 for different cabling types.
 - a. Maintain the separation of multiple planes of conduits by one of the following methods:
 - 1) Install multilevel conduits with the use of conduit supports and separators to maintain the required separations, and backfill with flowable fill (100 PSI) or concrete per Specification Section 31 23 33.
 - 2) Install the multilevel conduits one level at a time.
 - a) Each level is backfilled with the appropriate amount of soil and compaction, per Specification Section 31 23 33, to maintain the required separations.

SECTION 26 08 13 ACCEPTANCE TESTING

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Basic requirements for acceptance testing.
- B. Related Specification Sections include but are not necessarily limited to:
 - 1. Division 00 Procurement and Contracting Requirements.
 - 2. Division 01 General Requirements.

1.2 QUALITY ASSURANCE

Referenced Standards:

- 1. Institute of Electrical and Electronics Engineers, Inc. (IEEE):
 - a. 400, Guide for Field Testing and Evaluation of the Insulation of Shielded Power Cable Systems.
 - b. 400.3, Guide for Partial Discharge Testing of Power Cable Systems in a Field Environment.
- 2. InterNational Electrical Testing Association (NETA):
 - a. ATS, Standard for Acceptance Testing Specifications for Electric Power Equipment and Systems.
- 3. Nationally Recognized Testing Laboratory (NRTL).
- B. Qualifications:
 - a. As an alternative, supervising technician may be certified by the equipment manufacturer.
- C. Phasing Diagram:
 - 1. Coordinate with the Owner for phase rotations and Phase A, B and C markings.
 - a. Create a phasing diagram showing the coordinated phase rotations with generators and motors through the transformers.

1.3 SUBMITTALS

- A. Shop Drawings:
- B. Informational Submittals:
 - 1. Prior to energizing equipment:
 - a. Coordinated phasing diagram.
 - b. Photocopies of continuity tests.

PART 2 - PRODUCTS

2.1 FACTORY QUALITY CONTROL

- A. Provide Electrical equipment with all factory tests required by the applicable industry standards or NRTL.
- B. Factory testing will not be accepted in lieu of field acceptance testing requirements specified in this Specification Section.

PART 3 - EXECUTION

3.1 FIELD QUALITY CONTROL

A. General:

- 1. Complete electrical testing in three (3) phases:
 - a. Pre-energization testing phase.
 - b. Equipment energized with no load.
 - c. Equipment energized under load.
- 2. Perform testing in accordance with this Specification Section and NETA ATS.
- B. Electrical Equipment and Connections Testing Program:
 - 1. See individual Division 26 Specification Sections for equipment specific testing requirements.
 - 2. Test all electrical equipment.
 - a. Perform all required NETA testing.
 - b. Perform all required NETA testing plus the optional testing identified with each specific type of equipment in Article 3.2 of this Specification Section.

3.2 SPECIFIC EQUIPMENT TESTING REQUIREMENTS

- A. Switchgear and Switchboards:
 - 1. Perform inspections and tests per NETA ATS 7.1.
 - 2. Components: Test all components per applicable paragraphs of this Specification Section and NETA ATS.
- B. Transformers Liquid Filled:
 - 1. Perform inspections and tests per NETA ATS 7.2.2.:
 - a. Bushing power factor.
 - b. Core insulation resistance.
 - c. Dissolved gas analysis.
 - 2. Components: Test all components per applicable paragraphs of this Specification Section and NETA ATS.
 - 3. Perform the following optional tests per NETA ATS:
 - a. Excitation current.
 - b. Optional oil tests.
 - 4. Perform the following additional tests:
 - a. Record phase-to-phase, phase-to-neutral, and neutral-to-ground voltages at no load after energizing, and at operating load after start-up.
 - 5. Adjust tap changer setting as required to provide secondary voltage within 2-1/2 percent of nominal under normal load after approval of Engineer.
 - 6. Record as-left tap changer setting.
- C. Cable Low Voltage:
 - 1. Perform inspections and tests per NETA ATS 7.3.2.
- D. Cable Medium Voltage:
 - 1. Perform inspections and tests per NETA ATS 7.3.3.
 - 2. Non-destructive partial discharge test:
 - a. After energization, perform a partial discharge test for baseline data for future partial discharge maintenance testing.
 - b. Perform the work while the medium voltage circuits and equipment are energized.
 - 1) The cables shall not be disconnected or de-energized and the testing shall not expose the cables to voltages that exceed normal operating voltage.
 - c. Use a frequency domain detection process incorporating a spectrum analyzer with radio frequency current transformer (RF CT) sensors.
 - The detection system, including spectrum analyzer, RF CT's and interconnecting cable, shall have a partial discharge detection range that at least covers the frequency range of 10 kHz to 300 MHz.

- 2) Testing shall be performed in a manner that complies with the requirements of IEEE 400 and IEEE 400.3.
- E. Low Voltage Molded Case Circuit Breakers:
 - 1. Perform inspections and tests per NETA ATS 7.6.1.1.
 - 2. Components:
 - a. Test all components per applicable paragraphs of this Specification Section and NETA ATS.
 - b. Thermal magnetic breakers: Visual and mechanical inspection per NETA ATS only.
 - c. Solid state trip type: Visual and mechanical inspection and electrical tests per NETA ATS.
 - 3. Record as-left settings.
- F. Grounding:
 - 1. Perform inspections and tests per NETA ATS 7.13.
 - 2. Components: Test all components per applicable paragraphs of this Specification Section and NETA ATS.

SECTION 26 12 19 DISTRIBUTION TRANSFORMERS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Distribution pad-mounted transformers.
- B. Related Specification Sections include but are not necessarily limited to:
 - 1. Division 00 Procurement and Contracting Requirements.
 - 2. Division 01 General Requirements.
 - 3. Section 26 05 00 Electrical: Basic Requirements.
 - 4. Section 26 08 13 Acceptance Testing.

1.2 QUALITY ASSURANCE

Referenced Standards:

- 1. American National Standards Institute (ANSI).
- 2. Institute of Electronic and Electronics Engineers, Inc. (IEEE):
 - a. 386, Standard for Separable Insulated Connector Systems for Power Distribution Systems Above 600 V.
 - b. C57.12.00, Standard General Requirements for Liquid-Immersed Distribution, Power, and Regulating Transformers.
 - c. C57.12.28, Standard Requirements for Pad-Mounted Equipment Enclosure Integrity.
 - d. C57.12.34, Standard Requirements for Pad-Mounted, Compartmental-Type, Self-Cooled, Three-Phase Distribution Transformers (2500 kVa and Smaller) High-Voltage: 34 500 GrdY/19 920 Volts and Below; Low-Voltage: 480 Volts and Below.
 - e. C57.12.70, Standard Terminal Markings and Connections for Distribution and Power Transformers.
 - f. C57.12.80, Standard Terminology for Power and Distribution Transformers.
 - g. C57.12.90, Standard Test Code for Liquid-Immersed Distribution, Power, and Regulating Transformers.
 - h. C62.11, Standard for Metal-Oxide Surge Arresters for Alternating Current Power Circuits (>1 kV).
- 3. National Fire Protection Association (NFPA):
 - a. 70, National Electrical Code (NEC).

1.3 SUBMITTALS

- A. Shop Drawings:
 - 1. Product technical data:
 - a. Provide submittal data for all products including subcomponents specified in PART 2 of this Specification Section.
 - b. See Specification Section 26 05 00 for additional requirements.
 - 2. Fabrication and/or layout Drawings.
 - a. Outline Drawing including dimensions, weight and identification of all components and features.
 - b. Nameplate Drawing.
 - 3. Certifications:
 - a. Letter stating compliance with current Department of Energy efficiency requirements.
- B. Contract Closeout Information:
 - 1. Operation and Maintenance Data:
 - a. Content of Operation and Maintenance Manual:
 - 1) Instruction and maintenance manual.

- 2) Product technical data provided in the submittal.
- 3) Outline drawing updated for as-built conditions.
- 4) Nameplate Drawing updated for as-built conditions.
- 5) Actual impedance data.
- 6) Factory test report.
- 7) Acceptance testing report.
- C. Informational Submittals:
 - 1. Factory test report.

1.4 DELIVERY, STORAGE, AND HANDLING

A. See Specification Section 26 05 00.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

- A. Subject to compliance with the Contract Documents, the following manufacturers are acceptable:
 - 1. ABB.
 - 2. Eaton Cooper Power Systems.
 - 3. Howard Industries, Inc.
 - 4. Prolec GE.
 - 5. Square D Company.

2.2 THREE-PHASE TRANSFORMER

- A. General:
 - Transformer to be designed and constructed in accordance with:
 a. IEEE C57.12.00, IEEE C57.12.28, IEEE C57.12.34, IEEE C57.12.70, IEEE C57.12.80.
- B. Ratings and Configurations:
 - 1. Type: Outdoor, pad-mounted, liquid-immersed, self-cooled, compartmental type.
 - 2. Operation and application: Step-down operation.
 - 3. Configuration:
 - a. Dead-front, loop-feed primary.
 - 4. Voltage and kVA Ratings: As specified on the Drawings.
 - 5. Number of phases: Three (3).
 - 6. Frequency: 60 Hz.
 - 7. Polarity: ANSI standard.
 - 8. Percent impedance: ANSI standard.
 - 9. Basic impulse level (BIL):
 - a. Primary: 95 kV.
 - b. Secondary: 30kV.
 - 10. Temperature rise: 65 DegC.
 - 11. Efficiency: Meet all current Department of Energy rules.
 - 12. Connections:
 - a. Delta or Wye: As indicated on the Drawings.
 - b. Primary: 600 ampere one-piece bushing/well for deadbreak elbows.
 - c. Secondary (480/277V):
 - 1) 500 kVA: Four-hole, tin plated, spade-type minimum or as required.
 - 2) Removable ground strap on neutral terminal.
 - 13. Tap-changer: De-energized type on H-winding, five (5) total with:
 - a. Two (2)2.5 percent above and two (2) 2.5 percent below nominal tap.
- C. Components:
 - 1. Core and Coil:
 - a. Coil material: Aluminum or copper.

10030203

LEE COUNTY SOLID WASTE DIVISION SITE 4.16KV DISTRIBUTION FEEDER EXTENSION - Issued for Bid

- b. Windings designed to reduce losses.
- c. Insulating materials rated for 120 DegC class.
- d. Core material: High-grade, grain-oriented, non-aging silicon core steel with high magnetic permeability, low hysteresis and eddy current losses.
 - 1) Magnetic flux densities are to be kept well below saturation to allow for a minimum 10 percent overvoltage excitation.
 - 2) Properly annealed to reduce stresses induced during the manufacturing processes and reduce core losses.
- e. Core frame:
 - 1) Designed to provide maximum support for the core and coil assembly.
 - 2) Welded or bolted to ensure maximum short-circuit strength.
- f. Designed and manufactured to meet the short circuit requirements of ANSI C57.12.90.
- g. Vacuum processed and energized or baked in an oven prior to tanking to set the epoxy coating on the insulating paper and remove moisture from the insulation prior to vacuum filing.
- 2. Tank and Terminal Cabinet Enclosure:
 - a. Carbon steel reinforced with external, internal or sidewall braces, with all seams and joints continuously welded.
 - b. Design the tank and attached components to withstand pressures greater than the required operating design value without permanent deformation.
 - c. Sealed-tank construction:
 - 1) 1000kVA and below: Bolted main tank cover.
 - d. Lifting lugs welded to tank.
 - e. Steel divider between high-voltage (right side) and low-voltage (left side) compartments.
 - f. No exposed screws, bolts, or other fastening devices that are externally removable.
 - g. Tamper resistant per IEEE C57.12.28.
 - h. Cabinet depth: IEEE standard or 20 IN minimum.
 - i. 1 IN upper fill plug.
 - j. 1 IN drain valve with sampling device.
 - k. Automatic pressure relief device.
 - l. Ground pad(s):
 - 1) 500kVA and below: Two (2) steel pads with one (1) hole.
 - m. Door:
 - 1) Each compartment will have removable, three-point latching hinged doors equipped for latching in the open position.
 - 2) The high-voltage compartment door will have a fastening device that is accessible only through the low-voltage compartment.
 - 3) The hinge assemblies made of corrosion-resistant material.
 - a) Provide stainless-steel hinge pins of 3/8 IN minimum diameter.
 - 4) Both compartment doors capable of securing with a single padlock having a maximum 1/2 IN DIA shackle.
 - 5) Door secured with a hex-head bolt.
 - 6) Provisions for mounting fault indicator.
- 3. Overcurrent protection:
 - a. Internal partial-range current limiting backup fuse.
 - b. Provide full range protection two fuse system.
 - c. Partial-range current limiting backup fuse.
 - 1) Interrupting rating: 50,000A.
 - 2) Under oil, non-filed replaceable.
 - d. Dual element, expulsion-type, Bay-O-Net fuse.
- 4. Finish:
 - a. Manufacturer's standard corrosion protection system in accordance with IEEE C57.12.28.
- 5. Dielectric Fluid:
 - a. Tested for compatibility with the transformer.



- b. Less-flammable, natural or synthetic ester, biodegradable per US EPA OPPTS 835.3100 and certified to comply with US EPA Environmental Technology Verification requirements.
 - 1) Envirotemp FR3 or approved equal.
- c. Permanently affix nameplate stamped "Non PCB".
- 6. Accessories:
 - a. Liquid level gage.
 - b. Dial-type thermometer gage.
 - c. Stainless steel or laser-scribed anodized aluminum nameplate, with date of manufacturer.
 - d. Cable parking stands, one per bushing.
 - e.

2.3 SURGE ARRESTORS

- A. Standards: IEEE 386 and IEEE C62.11.
- B. MOV gapless elbow type.
- C. Elbow Connector:
 - 1. One-piece design, comprised of an insulation layer and outer shield constructed of EPDM rubber.
 - 2. For transformers with 600A bushings, provide the required load reducing tap plugs for arrestor connection.
- D. Voltage Class: As indicated on the Drawings.
- E. Arrestor MCOV Rating: As indicated on the Drawings.

2.4 SOURCE QUALITY CONTROL

A. Factory Tests: At a minimum, provide all routine tests as specified in IEEE C57.12.00 in accordance with IEEE C57.12.90.

2.5 MAINTENANCE MATERIALS

A. Touch-up paint, two (2) separate one (1) quart containers.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install on pad as detailed on the Drawings and in accordance with NFPA 70 and manufacture's instructions.
- B. Transformer locations as shown on the Drawings are intended to be used as a guide.
 - 1. Field conditions may affect actual transformer location.
 - 2. Coordinate final location with Owner.

FIELD QUALITY CONTROL

A. Acceptance Testing: See Specification Section 26 08 13.

SECTION 26 13 23 SECTIONALIZING EQUIPMENT

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Pad mounted sectionalizing switchgear.
 - 2.

Related Specification Sections include but are not necessarily limited to:

- 1. Division 00 Procurement and Contracting Requirements.
- 2. Division 01 General Conditions.
- 3. Section 26 05 00 Electrical: Basic Requirements.

1.2 QUALITY ASSURANCE

Referenced Standards:

- 1. Institute of Electronic and Electrical Engineers (IEEE):
 - a. 386, Standard for Separable Insulated Connector Systems for Power Distribution Systems Above 600V.
 - b. C37.20.3, Standard for Metal-Enclosed Interrupter Switchgear.
 - c. C57.12.28, Standard for Pad-Mounted Equipment Enclosure Integrity.

1.3 SUBMITTALS

- A. Shop Drawings:
 - 1. Product technical data including:
 - a. Provide submittal data for all products specified in PART 2 of this Specification Section.
 - b. Nameplate data.
 - c. See Specification Section 26 05 00 for additional requirements.
 - 2. Fabrication and/or layout drawings:
 - a. General arrangement plan view showing door swings, cable entrance locations, etc.
 - 3. Test reports:
 - a. Certified reports of all factory production tests.
- B. Contract Closeout Information:
 - 1. Provide two Operation and Maintenance Manuals in PDF electronic format in two CD-ROMs and two paper copies containing the technical information required for proper installation, operation and maintenance of electrical equipment and systems.:

1.4 DELIVERY, STORAGE AND HANDLING

A. See Specification Section 26 05 00.

PART 2 - PRODUCTS

ACCEPTABLE MANUFACTURERS

- A. Subject to compliance with the Contract Documents, the following manufacturers are acceptable:
 - 1. ABB (Malton Equipment Company).
 - 2. Cooper Power Systems.
 - 3. S&C Electric Company.
 - 4. Hubbell Power

10030203

2.2 PAD MOUNTED SECTIONALIZING SWITCHGEAR

A. General:

- 1. Deadfront construction.
- 2. Configuration: As indicated on the Drawings.
- B. Ratings:
 - 1. Voltage: 15 kV class.
 - 2. Amperage: 600A.
 - 3. Number of phases: 3.
 - 4. Number of wires: 3.
 - 5. Frequency: 60 Hz.
 - 6. Short circuit:
 - a. Fault closing and momentary: 22.4 kA.
 - b. Short time (1 second): 14 kA.
 - c. RMS Symmetrical: 14 kA.
 - 7. Basic impulse level: 95 kV.
- C. Construction:
 - 1. Standards: IEEE C37.20.3 and IEEE C57.12.28.
 - 2. Enclosure:
 - a. Heavy-duty channalized stainless steel construction.
 - b. Doomed roof.
 - c. Full length removable doors with:
 - 1) Stainless steel hinges and hardware.
 - 2) Positive 3-point latching system.
 - 3) Automatically latching door holders.
 - d. Lifting provisions.
 - 3. Full length steel barriers separate side-by-side compartments.
 - 4. Fiberglass-reinforced polyester barriers (front, interphase and end) for all fuses and switches.
 - 5. Recessed lockable switch handle pocket.
 - 6. Folding switch handles for all switches, secured inside switch operating pockets.
 - 7. Shaft lock for each switch so switch can be locked in open or closed positions.
 - 8. Grounding provisions in each section.
 - 9. Viewing window for viewing switch position.
 - 10. Nameplate with circuit diagram, switchgear ratings, manufacturer name and date of manufacture.
 - 11. Compartmental and phase identification labels.
 - 12. Interior and exterior surfaces cleaned and painted with manufacturer's standard paint. a. Finish color: Light gray or Manufacturer's standard.
 - 13. Accessories:
 - a. Storage rack for fuses in each fuse compartment.
 - b. Mounting provisions for fault indicator in each switch compartment without viewing window in door.
 - c. Key interlock to prevent opening fuse compartment doors unless all switches are locked open.
 - d. Base spacer to increase cable termination height:
 - 1) Material: Stainless steel.
 - 2) Height: As required to meet cable minimum bending radius recommended by the manufacturer and per NEC.
- D. Buses:
 - 1. Material: Tin-plated aluminum or silver-plated copper.
 - 2. Bus supports, stand-off insulators and sleeves: Porcelain or epoxy.

2.3 SOURCE QUALITY CONTROL

A. Switchgear factory tests in accordance with IEEE and ANSI standards.

2.4 MAINTENANCE MATERIALS

A. Touch-up paint.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install in accordance with manufacturer's instructions.
- B. Arrange as shown on the Drawings.
- C. Pad Mounted Sectionalizing Switchgear:1. Install on concrete pad per detail on the Drawings..
- D. Miscellaneous: Paint any scratched surfaces with touch-up paint.

FIELD QUALITY CONTROL

A. A qualified factory-trained manufacturer's representative shall certify in writing that the equipment has been installed, adjusted and tested in accordance with the manufacturer's recommendations.

3.3 TRAINING

A. A qualified factory-trained manufacturer's representative shall provide the Owner with 2 HRS of on-site training in the operation and maintenance of the unit substation and its components.

SECTION 26 24 16 PANELBOARDS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Power distribution panelboards.
- B. Related Specification Sections include but are not necessarily limited to:
 - 1. Division 00 Procurement and Contracting Requirements.
 - 2. Division 01 General Requirements.
 - 3. Section 26 05 00 Electrical: Basic Requirements.
 - 4. Section 26 28 00 Overcurrent and Short Circuit Protective Devices.

1.2 QUALITY ASSURANCE

Referenced Standards:

- 1. National Electrical Manufacturers Association (NEMA):
 - a. 250, Enclosures for Electrical Equipment (1000 Volts Maximum).b. PB 1, Panelboards.
- National Fire Protection Association (NFPA):
 a. 70, National Electrical Code (NEC).
- 3. Underwriters Laboratories, Inc. (UL):
 - a. 50, Enclosures for Electrical Equipment, Non-Environmental Considerations.
 - b. 67, Standard for Panelboards.

1.3 SUBMITTALS

- A. Shop Drawings:
 - 1. Product technical data.
 - a. Provide submittal data for all products specified in PART 2 of this Specification Section.
 - b. See Specification Section 26 05 00 for additional requirements.
 - 2. Fabrication and/or layout drawings:
 - a. Panelboard layout with alphanumeric designation, branch circuit breakers size and type, as indicated in the panelboard schedules.
- B. Contract Closeout Information:
 - 1. Operation and Maintenance Data.
 - 2. Panelboard schedules with as-built conditions.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

- A. Subject to compliance with the Contract Documents, the following manufacturers are acceptable:
 - 1. Eaton.
 - 2. General Electric Company.
 - 3. Square D Company.
 - 4. Siemens.

2.2 MANUFACTURED UNITS

- A. Standards: NEMA PB 1, NFPA 70, UL 50, UL 67.
- B. Ratings:

10030203

LEE COUNTY SOLID WASTE DIVISION SITE 4.16KV DISTRIBUTION FEEDER EXTENSION - Issued for Bid PANELBOARDS 26 24 16 - 1

- 1. Current, voltage, number of phases, number of wires as indicated on the Drawings.
- 2. Panelboards rated 240 Vac or less: 10,000 amp minimum short circuit rating or as indicated in the schedule.
- 3. Panelboards rated 480 Vac: 14,000 amp minimum short circuit rating or as indicated in the schedule.
- 4. Service Entrance Equipment rated when indicated on the Drawings.
- C. Construction:
 - 1. Interiors factory assembled and designed such that switching and protective devices can be replaced without disturbing adjacent units and without removing the main bus connectors.
 - 2. Multi-section panelboards: Feed-through or sub-feed lugs.
 - 3. Main lugs: Solderless type approved for copper and aluminum wire.
- D. Bus Bars:
 - 1. Main bus bars:
 - a. Plated aluminum or copper sized to limit temperature rise to a maximum of 65 DegC above an ambient of 40 DegC.
 - b. Drilled and tapped and arranged for sequence phasing of the branch circuit devices.
 - 2. Ground bus and isolated ground bus, when indicated on the Drawings: Solderless mechanical type connectors.
 - 3. Neutral bus bars: Insulated 100 percent rated or 200 percent rated, when indicated on the Drawings and with solderless mechanical type connectors.
- E. Enclosure:
 - 1. Boxes: Code gage galvanized steel, furnish without knockouts.
 - 2. Trim assembly: Code gage steel finished with rust inhibited primer and manufacturers standard paint inside and out.
 - 3. Power distribution panelboard:
 - a. Trims cover all live parts with switching device handles accessible.
 - b. Less than or equal to 12 IN deep with gutter space in accordance with NFPA 70.
 - c. Clear plastic cover for directory card mounted front of enclosure.
 - d. NEMA 3R or NEMA 12 rated: Doors gasketed and lockable with corrosion resistant chrome-plated combination lock and catch, all locks keyed alike.
- F. Overcurrent and Short Circuit Protective Devices:
 - 1. Main overcurrent protective device:
 - a. Molded case circuit breaker.
 - 2. Branch overcurrent protective devices:
 - a. Mounted molded case circuit breaker.
 - 3. See Section 26 28 00 for overcurrent and short circuit protective device requirements.
 - 4. Factory installed.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install as indicated on the Drawings, in accordance with the NFPA 70, and in accordance with manufacturer's instructions.
- B. Support panelboard enclosures from wall studs or modular channels support structure, per Specification Section 26 05 00.
- C. Provide NEMA 1, NEMA 3R or NEMA 12 rated enclosure as indicated on the Drawings.
- D. Provide each panelboard with a typed directory:
 - 1. Identify all circuit locations in each panelboard with the load type and location served.
 - 2. Mechanical equipment shall be identified by Owner-furnished designation if different than designation indicated on the Drawings.

3. Room names and numbers shall be final building room names and numbers as identified by the Owner if different than designation indicated on the Drawings.

SECTION 26 28 00

OVERCURRENT AND SHORT CIRCUIT PROTECTIVE DEVICES

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Low voltage circuit breakers.
 - 2. Low voltage fuses.
- B. Related Specification Sections include but are not necessarily limited to:
 - 1. Division 00 Procurement and Contracting Requirements.
 - 2. Division 01 General Requirements.
 - 3. Section 26 05 00 Electrical: Basic Requirements.
 - 4. Section 26 08 13 Acceptance Testing.

1.2 QUALITY ASSURANCE

Referenced Standards:

- 1. Institute of Electrical and Electronics Engineers, Inc. (IEEE):
 - a. C37.13, Standard for Low-Voltage AC Power Circuit Breakers Used in Enclosures.
 - b. C37.16, Low-Voltage Power Circuit Breakers and AC Power Circuit Protectors -Preferred Ratings, Related Requirements, and Application Recommendations.
 - c. C37.17, Trip Devices for AC and General Purpose DC Low Voltage Power Circuit Breakers.
- 2. National Fire Protection Association (NFPA):
 - a. 70, National Electrical Code (NEC).
- 3. Underwriters Laboratories, Inc. (UL):
 - a. 248-8, Low-Voltage Fuses Part 8: Class J Fuses.
 - b. 489, Standard for Safety Molded-Case Circuit Breakers, Molded-Case Switches, and Circuit-Breaker Enclosures.
 - c. 1066, Standard for Low-Voltage AC and DC Power Circuit Breakers Used in Enclosures.

1.3 SUBMITTALS

- A. Shop Drawings:
 - 1. Product technical data including:
 - a. Provide submittal data for all products specified in PART 2 of this Specification Section.
 - b. See Specification Section 26 05 00 for additional requirements.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

- A. Subject to compliance with the Contract Documents, the following manufacturers are acceptable:
 - 1. Circuit breakers:
 - a. Eaton.
 - b. General Electric Company.
 - c. Square D Company.
 - d. Siemens.
 - 2. Fuses:
 - a. Eaton Bussmann, Inc.
 - b. Littelfuse, Inc.

c. Mersen

2.2 CIRCUIT BREAKERS

- A. Molded Case Type:
 - 1. General:
 - a. Standards: UL 489.
 - b. Unit construction.
 - c. Over-center, toggle handle operated.
 - d. Quick-make, quick-break, independent of toggle handle operation.
 - e. Manual and automatic operation.
 - f. All poles open and close simultaneously.
 - g. Three (3) position handle: On, off and tripped.
 - h. Molded-in ON and OFF markings on breaker cover.
 - i. One-, two- or three-pole as indicated on the Drawings.
 - j. Current and interrupting ratings as indicated on the Drawings.
 - k. Bolt on type.
 - 2. Thermal magnetic type:
 - a. Inverse time overload and instantaneous short circuit protection by means of a thermal magnetic element.
 - b. Frame size 150 amp and below:
 - 1) Non-interchangeable, non-adjustable thermal magnetic trip units.
 - c. Frame sizes 225 to 400 amp (trip settings less than 400A):
 - 1) Interchangeable and adjustable instantaneous thermal magnetic trip units.
 - d. Ground Fault Circuit Interrupter (GFCI) Listed:
 - 1) Standard: UL 943.
 - 2) One- or two-pole as indicated on the Drawings.
 - 3) Class A ground fault circuit.
 - 4) Trip on 5 mA ground fault (4-6 mA range).

2.3 FUSES

- A. UL Class J fuses:
 - 1. Standard: UL 248-1 and UL 248-8.
 - 2. Dual-element time-delay and current limiting rejection type.
 - 3. Ratings: 600 V, 0-600 amps and 200,000 RMS AIC symmetrical.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Current and interrupting ratings as indicated on the Drawings.
- B. Series rated systems not acceptable.
- C. Devices shall be ambient temperature compensated.
- D. Circuit Breakers:
 - 1. Molded case circuit breakers shall incorporate the following, unless indicated otherwise on the Drawings:
 - a. Frame sizes 400 amp and less with trip setting less than 400A shall be thermal magnetic type.
- E. Fuses:
 - 1. UL Class J: Use for feeder devices 600 amps and smaller.

FIELD QUALITY CONTROL

- A. Testing:
 - 1. Acceptance testing: See Specification Section 26 08 13.
- 10030203

SAFETY SWITCHES

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Safety switches.
- B. Related Specification Sections include but are not necessarily limited to:
 - 1. Division 00 Procurement and Contracting Requirements.
 - 2. Division 01 General Requirements.
 - 3. Section 26 05 00 Electrical: Basic Requirements.
 - 4. Section 26 28 00 Overcurrent and Short Circuit Protective Devices.

1.2 QUALITY ASSURANCE

Referenced Standards:

- 1. National Electrical Manufacturers Association (NEMA):
 - a. 250, Enclosures for Electrical Equipment (1000 Volts Maximum).
 - b. KS 1, Enclosed and Miscellaneous Distribution Equipment Switches (600 Volts Maximum).
- 2. Underwriters Laboratories, Inc. (UL):
 - a. 98, Enclosed and Dead-Front Switches.

1.3 SUBMITTALS

- A. Shop Drawings:
 - 1. Product technical data:
 - a. Provide submittal data for all products specified in PART 2 of this Specification Section.
 - b. See Specification Section 26 05 00 for additional requirements.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

- A. Subject to compliance with the Contract Documents, the following safety switch manufacturers are acceptable:
 - 1. Eaton
 - 2. General Electric Company.
 - 3. Square D Company.
 - 4. Siemens.
 - 5. Appleton Electric Company.
 - 6. Crouse-Hinds.
 - 7. Killark.

2.2 SAFETY SWITCHES

A. General:

- 1. Non-fusible or fusible as indicated on the Drawings.
- 2. Suitable for service entrance when required.
- 3. NEMA Type HD heavy-duty construction.
- 4. Switch blades will be fully visible in the OFF position with the enclosure door open.
- 5. Quick-make/quick-break operating mechanism.
- 6. Deionizating arc chutes.

10030203

LEE COUNTY SOLID WASTE DIVISION SITE 4.16KV DISTRIBUTION FEEDER EXTENSION - Issued for Bid SAFETY SWITCHES 26 28 16 - 1

- 7. Manufacture double-break rotary action shaft and switchblade as one (1) common component.
- 8. Clear line shields to prevent accidental contact with line terminals.
- 9. Operating handle (except NEMA 7 and NEMA 9 rated enclosures):
 - a. Red and easily recognizable.
 - b. Padlockable in the OFF position
 - c. Interlocked to prevent door from opening when the switch is in the ON position with a defeater mechanism.
- B. Ratings:
 - 1. Horsepower rated of connected motor.
 - 2. Voltage and amperage: As indicated on the Drawings.
 - 3. Short circuit withstand:
 - a. Non-fused: 10,000A.
 - b. Fused: 200,000A.
- C. Accessories, when indicated in PART 3 of this Specification Section or on the Drawings:
 - 1. Neutral kits.
 - 2. Ground lug kits.
 - 3. Auxiliary contact kits:
 - a. Opens before main switch.
 - b. Rated 10A at 125/250 Vac.
 - c. One (1) N.O. and one (1) N.C. contact.
- D. Enclosures:
 - 1. NEMA 1 rated:
 - a. Body and cover: Sheet steel finished with rust inhibiting primer and manufacturers standard paint inside and out.
 - b. With or without knockouts, hinged and lockable door.
 - 2. NEMA 3R rated:
 - a. Body and cover: Sheet steel finished with rust inhibiting primer and manufacturers standard paint inside and out.
 - b. With or without knockouts, hinged and lockable door.
 - 3. NEMA 4 rated:
 - a. Body and cover: Sheet steel finished with rust inhibiting primer and manufacturers standard paint inside and out.
 - b. No knockouts, external mounting flanges, hinged, gasketed and lockable door.
 - 4. NEMA 4X rated (metallic):
 - a. Body and cover: Type 304 or 316 stainless steel.
 - b. No knockouts, external mounting flanges, hinged and gasketed door.
 - 5. NEMA 4X rated (nonmetallic):
 - a. Body and cover: Ultraviolet light protected fiberglass-reinforced polyester boxes.
 - b. No knockouts, external mounting flanges, hinged, gasketed and lockable door.
 - 6. NEMA 7 and NEMA 9 rated:
 - a. Cast gray iron alloy or copper-free aluminum with manufacturers standard finish.
 - b. Drilled and tapped openings or tapered threaded hub.
 - c. Gasketed cover bolted-down with stainless steel bolts.
 - d. External mounting flanges.
 - e. Operating handle padlockable in the OFF position.
 - 7. NEMA 12 rated:
 - a. Body and cover: Sheet steel finished with rust inhibiting primer and manufacturers standard paint inside and out.
 - b. No knockouts, external mounting flanges, hinged and gasketed door.
- E. Overcurrent and short circuit protective devices:
 - 1. Fuses.

- 2. See Specification Section 26 28 00 for overcurrent and short circuit protective device requirements.
- F. Standards: NEMA KS 1, UL 98.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install as indicated and in accordance with manufacturer's instructions and recommendations.
- B. Install switches adjacent to the equipment they are intended to serve unless otherwise indicated on the Drawings.
- C. Permitted uses of NEMA 1 enclosure:1. Surface or flush mounted in areas designated dry in architecturally finished areas.
- D. Permitted uses of NEMA 3R enclosure:1. Surface mounted in exterior location for HVAC equipment only.
- E. Permitted uses of NEMA 4 enclosure:1. Surface mounted in areas designated as wet.
- F. Permitted uses of NEMA 4X metallic enclosure:
 - 1. Surface mounted in areas designated as wet and/or corrosive.
- G. Permitted uses of NEMA 4X nonmetallic enclosure:
 - 1. Surface mounted in areas designated as corrosive.
 - 2. Surface mounted in areas designated as highly corrosive.
- H. Permitted uses of NEMA 12 enclosure:
 - 1. Surface mounted in areas designated as dry in non-architecturally finished areas.

SECTION 31 23 33

TRENCHING, BACKFILLING, AND COMPACTING FOR UTILITIES

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Excavation, trenching, backfilling and compacting for all underground utilities.
 - 2. Electrical ductbanks, conduits, and direct burial cables.
- B. Related Specification Sections include but are not necessarily limited to:
 - 1. Division 00 Procurement and Contracting Requirements.
 - 2. Division 01 General Requirements.
 - 3. Division 26 Electrical.

1.2 QUALITY ASSURANCE

Referenced Standards:

- 1. ASTM International (ASTM):
 - a. {C33, Standard Specification for Concrete Aggregates.}
 - b. D698, Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft³ (600 kN-m/m³)).
 - c. D4253, Standard Test Methods for Maximum Index Density and Unit Weight of Soils Using a Vibratory Table.
 - d. D4254, Standard Test Methods for Minimum Index Density and Unit Weight of Soils and Calculation of Relative Density.
- B. Qualifications: Hire an independent soils laboratory to conduct in-place moisture-density tests for backfilling to assure that all work complies with this Specification Section.

1.3 DEFINITIONS

A. Excavation: All excavation will be defined as unclassified.

1.4 SUBMITTALS

- A. Shop Drawings:
 - 1. Product technical data including:
 - a. Acknowledgement that products submitted meet requirements of standards referenced.
 - b. Manufacturer's installation instructions.
 - 2. Submit respective pipe or conduit manufacturer's data regarding bedding methods of installation and general recommendations.
 - 3. Submit sieve analysis reports on all granular materials.
- B. Informational Submittals:
 - 1. Trench shield (trench box) certification if employed:
 - a. Specific to Project conditions.
 - b. Re-certified if members become distressed.
 - c. Certification by registered professional structural engineer, registered in the state where the Project is located.
 - d. Engineer is not responsible to, and will not, review and approve.

1.5 SITE CONDITIONS

- A. Avoid overloading or surcharge a sufficient distance back from edge of excavation to prevent slides or caving.
 - 1. Maintain and trim excavated materials in such manner to be as little inconvenience as possible to public and adjoining property owners.

- B. Provide full access to public and private premises and fire hydrants, at street crossings, sidewalks and other points as designated by Owner to prevent serious interruption of travel.
- C. Protect and maintain bench marks, monuments or other established points and reference points and if disturbed or destroyed, replace items to full satisfaction of Owner and controlling agency.
- D. Verify location of existing underground utilities.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Backfill Material:
 - 1. As approved by Engineer.
 - a. Free of rock cobbles, roots, sod or other organic matter, and frozen material.
 - b. Moisture content at time of placement: 3 percent plus/minus of optimum moisture content as specified in accordance with ASTM D698.
 - 2.
 - 3. Flowable fill:
 - a. Description: Flowable fill shall be a mixture of cement, fly ash, fine sand, water, and air having a consistency which will flow under a very low head.
 - b. Material characteristics:
 - 1) The approximate quantities of each component per cubic yard of mixed material shall be as follows:
 - a) Cement (Type I or II): 50 LBS.
 - b) Fly ash: 200 LBS.
 - c) Fine sand: 2,700 LBS.
 - d) Water: 420 LBS.
 - e) Air content: 10 percent.
 - 2) Actual quantities shall be adjusted to provide a yield of 1 cubic yard with the materials used.
 - 3) Approximate compressive strength should be 85 to 175 psi.
 - 4) Fine sand shall be an evenly graded material having not less than 95 percent passing the No. 4 sieve and not more than 5 percent passing the No. 200 sieve.

PART 3 - EXECUTION

3.1 GENERAL

A. Remove and dispose of unsuitable materials as directed by Geotechnical Engineer to site provided by Contractor.

3.2 EXCAVATION

- A. Unclassified Excavation: Remove rock excavation, clay, silt, gravel, hard pan, loose shale, and loose stone as directed by Geotechnical Engineer.
- B. Excavation for Appurtenances:
 - 1. 12 IN (minimum) clear distance between outer surface and embankment.
- C. Groundwater Dewatering:
 - 1. Where groundwater is, or is expected to be, encountered during excavation, install a dewatering system to prevent softening and disturbance of subgrade to allow pipe, bedding and backfill material to be placed in the dry, and to maintain a stable trench wall or side slope.
 - 2. Groundwater shall be drawn down and maintained at least 3 FT below the bottom of any trench or manhole excavation prior to excavation.
 - 3. Review soils investigation before beginning excavation and determine where groundwater is likely to be encountered during excavation.

10030203

- a. Employ dewatering specialist for selecting and operating dewatering system.
- 4. Keep dewatering system in operation until dead load of pipe, structure and backfill exceeds possible buoyant uplift force on pipe or structure.
- 5. Dispose of groundwater to an area which will not interfere with construction operations or damage existing construction.
- 6. Install groundwater monitoring wells as necessary.
- 7. Shut off dewatering system at such a rate to prevent a quick upsurge of water that might weaken the subgrade.
- D. Trench Excavation:

а

- 1. Excavate trenches by open cut method to depth and/or length shown on Drawings and necessary to accommodate work.
 - Support existing utility lines where proposed work crosses at a lower elevation.
 - 1) Stabilize excavation to prevent undermining of existing utility.
- 2. Open trench outside buildings, units, and structures:
 - a. No more than the distance between two manholes, structures, units, or 300 LF, whichever is less.
 - b. Field adjust limitations across roadways as per Drawings and adjust limitations as weather conditions dictate.
- 3. Any trench or portion of trench, which is opened and remains idle for five (5) calendar days, or longer, as determined by the Owner, may be directed to be immediately refilled, without completion of work, at no additional cost to Owner.
 - a. Said trench may not be reopened until Owner is satisfied that work associated with trench will be prosecuted with dispatch.
- 4. Observe following trenching criteria:
 - a. Trench size:
 - 1) Excavate width to accommodate free working space.
 - 2) Maximum trench width at top of pipe or conduit may not exceed outside diameter of utility service by more than the following dimensions:

OVERALL DIAMETER OF UTILITY SERVICE	EXCESS DIMENSION
33 IN and less	18 IN
more than 33 IN	24 IN

- 3) Cut trench walls vertically from bottom of trench to 1 FT above top of pipe, conduit, or utility service.
- 4) Keep trenches free of surface water runoff.
 - a) Include cost in Bid.
 - b) No separate payment for surface water runoff pumping will be made.
- E. Trenching for Electrical Installations:
 - 1. Observe the preceding Trench Excavation paragraph in PART 3 of this Specification Section.
 - 2. Modify for electrical installations as follows:
 - a. Open no more than 600 LF of trench in exterior locations for trenches more than 12 IN but not more than 30 IN wide.
 - b. Any length of trench may be opened in exterior locations for trenches which are 12 IN wide or less.
 - c. Do not over excavate trench.
 - d. Cut trenches for electrical runs with minimum 30 IN cover, unless otherwise specified or shown on Drawings.
 - e. See Division 26 for additional requirements.
- F. Flowable Fill:
 - 1. Flowable fill shall be:

- a. Discharged from a mixer by any means acceptable to the Engineer into the area to be filled.
- b. Placed in 4 FT maximum lifts to the elevations indicated.
 - 1) Allow 12 HR set-up time before placing next lift or as approved by the Engineer.
 - 2) Contractor shall place flowable fill lifts in such a manner as to prevent flotation of the pipe.
- 2. Flowable fill shall not be placed on frozen ground.
- 3. Subgrade on which flowable fill is placed shall be free of disturbed or softened material and water.
- 4. Conform to appropriate requirements of Specification Section 31 23 00.
- 5. Flowable fill batching, mixing, and placing may be started if weather conditions are favorable, and the air temperature is 34 DegF and rising.
- 6. At the time of placement, flowable fill must have a temperature of at least 40 DegF.
- 7. Mixing and placing shall stop when the air temperature is 38 DegF or less and falling.
- 8. Each filling stage shall be as continuous an operation as is practicable.
- 9. Contractor shall prevent traffic contact with flowable fill for at least 24 HRS after placement, until flowable fill is hard enough to prevent rutting by construction equipment, or as specifically indicated on the Drawings.
- 10. Flowable fill shall not be placed until water has been controlled or groundwater level has been lowered in conformance with the requirements of the preceding Groundwater Dewatering paragraph in PART 3 of this Specification Section.

3.3 PREPARATION OF FOUNDATION FOR PIPE LAYING

- A. Over-Excavation:
 - 1. Backfill and compact to 90 percent of maximum dry density per ASTM D698.
 - 2. Backfill with granular bedding material as option.

3.4 BACKFILLING METHODS

- A. Do not backfill until tests to be performed on system show system is in full compliance with specified requirements.
- B. Carefully Compacted Backfill:
 - 1. Furnish where indicated on Drawings, specified for trench embedment conditions and for compacted backfill conditions up to 12 IN above top of pipe or conduit.
 - 2. Comply with the following:
 - a. Place backfill in lifts not exceeding 8 IN (loose thickness).
 - b. Hand place, shovel slice, and pneumatically tamp all carefully compacted backfill.
 - c. Observe specific manufacturer's recommendations regarding backfilling and compaction.
 - d. Compact each lift to specified requirements.
- C. Common Trench Backfill:
 - 1. Perform in accordance with the following:
 - a. Place backfill in lift thicknesses capable of being compacted to densities specified.
 - b. Observe specific manufacturer's recommendations regarding backfilling and compaction.
 - c. Avoid displacing joints and appurtenances or causing any horizontal or vertical misalignment, separation, or distortion.
- D. Water flushing for consolidation is not permitted.
- E. Backfilling for Electrical Installations:
 - 1. Observe the preceding Carefully Compacted Backfill paragraph or Common Trench Backfill paragraph in PART 3 of this Specification Section or when approved by the Engineer.
 - 2. Modify for electrical installation as follows:

10030203

a. Observe notes and details on electrical drawings for fill in immediate vicinity of direct burial cables.

3.5 COMPACTION

- A. General:
 - 1. Place and assure bedding, backfill, and fill materials achieve an equal or higher degree of compaction than undisturbed materials adjacent to the work.
 - 2. In no case shall degree of compaction below minimum compactions specified be accepted.
- B. Compaction Requirements:
 - 1. Unless noted otherwise on Drawings or more stringently by other Specification Sections, comply with following minimum trench compaction criteria.
 - a. Carefully compacted backfill:

LOCATION	SOIL TYPE	COMPACTION DENSITY
All applicable areas	Cohesive soils	95 percent of maximum dry density by ASTM D698
	Cohesionless soils	75 percent relative density by ASTM D4253 and ASTM D4254

b. Common trench backfill:

LOCATION	SOIL TYPE	COMPACTION DENSITY
Under pavements, roadways, surfaces within highway right-of- ways	Cohesive soils	95 percent of maximum dry density by ASTM D698
	Cohesionless soils	60 percent of relative density by ASTM D4253 and ASTM D4254
Under turfed, sodded, plant seeded, nontraffic areas	Cohesive soils	85 percent of maximum dry density by ATM D698
	Cohesionless soils	40 percent of relative density by ASTM D4253 and ASTM D4254

3.6 FIELD QUALITY CONTROL

- A. Testing:
 - 1. Perform in-place moisture-density tests as directed by the Owner.
 - 2. Perform tests through recognized testing laboratory approved by Owner.
 - 3. Costs of "Passing" tests paid by Owner.
 - 4. Perform additional tests as directed until compaction meets or exceeds requirements.
 - 5. Cost associated with "Failing" tests shall be paid by Contractor.
 - 6. Reference to Engineer in this Specification Section will imply Geotechnical Engineer when employed by Owner and directed by Engineer to undertake necessary inspections as approvals as necessary.
 - 7. Assure Owner has immediate access for testing of all soils related work.
 - 8. Ensure excavations are safe for testing personnel.