

Notice

Basic Information

**Estimated Contract Value (USD)** \$1.00 (Not shown to suppliers)  
**Reference Number** 0000416336  
**Issuing Organization** Dallas County  
**Owner Organization**  
**Project Type** IFB - Invitation for Bid (Formal)  
**Project Number** 2026-018-7103  
**Title** Emergency Power Generator Replacement, Medlock Residential Treatment Center  
**Source ID** PU.AG.USA.2438.C21221001  
**Piggyback Solicitation** No

Details

**Location** Dallas County, Texas  
**Description** To replace the emergency power generator for the Lyle B. Medlock Residential Treatment Center. Construction will occur in phases, and the general contractor will coordinate all equipment deliveries, materials deliveries, demolition activities, and shutdowns with Dallas County.

Dates

**Publication** 03/12/2026 03:00 PM CDT  
**Question Acceptance Deadline** 04/09/2026 03:00 PM CDT  
**Questions are submitted online** Yes  
**Closing Date** 04/23/2026 02:00 PM CDT

**Prebid Conference** 03/24/2026 10:00 AM CDT  
**Onsite Visit** 03/24/2026 12:30 PM CDT

Contact Information

Marina Valley  
 214-653-7618  
 marina.valley@dallascounty.org

Bonding Requirements

- Bid Bond 5.00 %

Pre-Bidding Events

**Event Type** Prebid Conference  
**Attendance** Recommended  
**Event date** 03/24/2026 10:00 AM CDT  
**Location** Microsoft Teams  
**Event Note**

**PRE-BID MEETING LINK:**

<https://gcc02.safelinks.protection.outlook.com/?url=https%3A%2F%2Fteams.microsoft.com%2Fmeet%2F29107954087976%3Fp%3DpW0PNhD7nkXGpsmRFu&data=05%7C02%7CMarina.Valley%40dallascounty.org%7C301f40a75afc4a0441c008de7b063c1a%7C51adcfad72f1479cb28f52412e04014b%7C0%7C0%7C639083463858977305%7CUnknown%7CTWFpbGZsb3d8eyJFbXB0eU1hcGkiOnRydWUsIlYiOiilwLjAuMDAwMCIsIlAiOiJXaW4zMlslkFOljoITWFlpbCIsIdUljoyfQ%3D%3D%7C0%7C%7C%7C&sdata=5hnviEmzvMSoelFXeMV%2BOgZmAujCu6EnzrlgWLjvQml%3D&reserved=0>

**MICROSOFT TEAMS:**

Meeting ID: 291 079 540 879 76

OR

**DIAL IN BY PHONE:** 1-469-208-1731, ID: 724808486#

**Event Type** Onsite Visit  
**Attendance** Recommended  
**Event date** 03/24/2026 12:30 PM CDT  
**Location** Lyle B. Medlock Youth Residential Treatment Center Road, Dallas, TX 75241  
**Event Note**

**Bid Submission Process**

**Bid Submission Type**

**Pricing**

**Pricing**

**Bid Documents List**

Electronic or Physical Bid Submission

Lump sum

Lump sum

Item Name	Description	Mandatory	Limited to 1 file
Bid Documents	Defined in the solicitation	Yes	No
W9	W-9 form must be signed in 2026	Yes	No
Reference Letters	3 letters of reference, 3 years minimum of continuous operation	Yes	No
SBE Forms	Attachment S - Small Business Enterprise (SBE) Forms must be submitted with bid	Yes	No
Bid Security or Bid Bond	Bid Security or Bid Bond	Yes	No

## Documents

### Documents

Document	Size	Uploaded Date	Language
DALLAS COUNTY STANDARD TERMS AND CONDITIONS IFB (1).pdf [pdf]	342 Kb	12/20/2024 02:00 PM CST	English
SBE_Language_for_IFB_2.24.24_ATTACHMENT_S.pdf [pdf]	536 Kb	12/19/2024 11:15 AM CST	English
2026-018-7103 IFB Emergency Power Generator Replacement, - Medlock Residential Treatment Center.pdf [pdf]	288 Kb	03/11/2026 06:18 PM CDT	English
Exhibit A - Medlock Generator -100% CD - Specbook.pdf [pdf]	6 Mb	03/11/2026 06:18 PM CDT	English
Exhibit B - Medlock Generator - 100% CD Drawings.pdf [pdf]	9 Mb	03/11/2026 06:18 PM CDT	English
Exhibit C - Cost Template Generic_030926_R2.pdf [pdf]	680 Kb	03/11/2026 06:18 PM CDT	English
Exhibit D - Uniformat Level II Form - Work Sheet_030926.pdf [pdf]	628 Kb	03/11/2026 06:18 PM CDT	English

## Categories

### Selected Categories

NIGP Categories (5)	
981	<b>RENTAL OR LEASE OF GENERAL EQUIPMENT (HVAC, ATHLETIC, FIRE AND POLICE PROTECTION, ETC.)</b>
98143	<b>Generator Rental or Lease</b> Generator Rental or Lease
285	<b>ELECTRICAL EQUIPMENT AND SUPPLIES (EXCEPT CABLE AND WIRE)</b>
28539	<b>Generators, Stationary Type (Not Automotive)</b> Generators, Stationary Type (Not Automotive)
28537	<b>Generators, Portable, Engine Driven (Including Fog and Mist Types)</b> Generators, Portable, Engine Driven (Including Fog and Mist Types)
690	<b>POWER GENERATION EQUIPMENT, ACCESSORIES, AND SUPPLIES</b>
69043	<b>Generators, Over 25 MW, Power Plant, Including Parts and Accessories (Also see 285-37,39)</b> Generators, Over 25 MW, Power Plant, Including Parts and Accessories (Also see 285-37,39)
060	<b>AUTOMOTIVE AND TRAILER EQUIPMENT AND PARTS</b>
06036	<b>Electrical Accessories: Alternators, Ammeters, Distributors, Generators, Regulators, Starters, etc.</b> Electrical Accessories: Alternators, Ammeters, Distributors, Generators, Regulators, Starters, etc.

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## Courtesy Email

### Sent using email addresses

admin@compassdallas.com;angelacrefrigeration@yahoo.com;apexfacilitiesllc@gmail.com;bmanetta@argentassociates.com;cj.hood@sbcglobal.net;d  
bcelectric@yahoo.com;demandtechnow@gmail.com;francis.kamgang@f2gsolutions.com;gary@atlanticblowers.com;gulnara@dallasdigitalsigns.com;g  
usb@deltaelectricalandcontrols.com;hector@atcitexas.com;jackie.clayborn@oncnational.com;jason@brotherstelecom.com;jazon@azaelectrical.com;  
jen@crosselectriccompany.com;joe.muro@advancomm.com;kevinf@dfwelectricgroup.com;lucas@brookfieldsolutions.us;michelle@denalics.com;nguz  
man@almaneiec.com;ooaxaca@basecominc.com;patrick@arigoldelectric.com;pfarragut@admiralcom.com;sampatino83@gmail.com;stiller@dmitechin  
c.com;sue@actc.com;support@displaytvs.com;tbritian@ao-ind.com;tracys@dennis-electric.com

## **DALLAS COUNTY STANDARD TERMS AND CONDITIONS**

By returning the Bid Proposal with a price quote, vendors certify and agree that:

1. All charges – wages, salaries, taxes including payroll taxes, benefits, insurance, overhead, fees, permits, licenses, fees, labor, personnel, service, supervision, documentation, administration, training, implementation, materials, supplies, delivery, transportation, shipping , freight, fuel surcharges, mileages, parking, tolls, travel time, and all other associated cost direct and indirect including incidentals necessary to provide the goods and services outlined in this solicitation specified or implied are to be included in bid proposal cost. Services and Inside Delivery will be F.O.B.: Dallas County as indicated on each individual purchase order.

2. **TEXAS GOVERNMENT CODE CHAPTER 2271 VERIFICATION – BOYCOTT ISRAEL**

Effective September 1, 2017, the State of Texas requires all governmental entity, state agency or political subdivision (which includes counties) to obtain written verification from the Company that their Company does NOT boycott Israel and will not boycott Israel during the life of this contract, agreement or purchase order (hereafter referred to as “Contract”). By accepting this Contract, the Company (Professional or other applicable term defining the contracting party) verifies that it does not Boycott Israel, and agrees that during the term of this Contract will not Boycott Israel as that term is defined in Texas Government Code Section 808.001, as amended." The County cannot execute a contract for goods and services without this declaration. Please refer to Texas Government Code, Subtitle F, Title 10, Government Code Chapter 2270.

*(a) This section applies only to a contract that:*

*(1) is between a governmental entity and a company with 10 or more full-time employees; and*

*(2) has a value of \$100,000 or more that is to be paid wholly or partly from public funds of the governmental entity.*

3. **CONFLICT OF INTEREST QUESTIONNAIRE (CIQ) FORM**

Effective January 1, 2006, Chapter 176 of the Texas Local Government Code requires that any vendor or person considering doing business with a local government entity disclose in the Questionnaire Form CIQ, the vendor or person's affiliation or business relationship that might cause a conflict of interest with a local government entity. By law, this questionnaire must be filed with the records administrator of Dallas County no later than the 7th business day after the date the person becomes aware of facts that require the statement to be filed. See Section 176.006, Local Government Code. A person commits an offense if the person violates Section 176.006, Local Government Code. An offense under this section is a Class C misdemeanor. By submitting a response to this request, the vendor represents that it is in compliance with the requirements of Chapter 176 of the Texas Local Government Code. Contractor shall complete and file the Conflict of Interest Questionnaire with the Dallas County Clerk at 1201 Elm Street, 21<sup>st</sup> Floor, Dallas, Texas 75270.

4. **CERTIFICATE OF INTERESTED PARTIES FORM 1295**

In 2015, the Texas Legislature adopted House Bill 1295, which added section 2252.908 of the Government Code. The law states that a governmental entity or state agency may not enter into certain contracts with a business entity unless the business entity submits a disclosure of interested parties form to the governmental entity or state agency at the time the business entity submits the signed contract to the governmental entity or state agency. The form discloses any interested parties who have a controlling interest (10% or more ownership) in the business entity and those who actively participate in facilitating the contract or negotiate the terms of the contract (broker, intermediary, advisor, and/or attorney), if any. The disclosure requirement applies to a contract entered into on or after January 1, 2016.

The Texas Ethics Commission was required to adopt rules necessary to implement that law, prescribe the disclosure of interested parties form, and post a copy of the form on the commission's website. The commission adopted the Certificate of Interested Parties form (Form 1295) on October 5, 2015 and new rules (Chapter 46) on November 30, 2015.

The "Certificate of Interested Parties" form must be completed on the Texas Ethics Commission website, printed, signed, and submitted to the County by the authorized agent of the Business Entity with acknowledgment that disclosure is made under oath and under penalty of perjury prior to final contract execution.

To obtain additional information on HB 1295, to learn more about Texas Ethics Commission process to create a new account or to complete an electronic version of Form1295 for submission with a signed contract, please go to the following website: <https://www.ethics.state.tx.us/tec/1295-Info.htm>

Instructional Videos for Business Entities on how to file online can be found at [https://www.ethics.state.tx.us/whatsnew/elf\\_info\\_form1295.htm](https://www.ethics.state.tx.us/whatsnew/elf_info_form1295.htm)

The identification number (section 3 of the form) to be used on the 1295 for this procurement is the IFB solicitation number.

5. **TITLE VI ASSURANCES/COMPLIANCE POLICY**

The County, in accordance with the provisions of Title VI of the Civil Rights Act of 1964 (78 Stat. 252, 42 U.S.C. §§ 2000d to 2000d-4) and the Regulations, hereby notifies all bidders that it will affirmatively ensure that any contract entered into pursuant to this advertisement, disadvantaged business enterprises will be afforded full and fair opportunity to submit bids in response to this invitation and will not be discriminated against on the grounds of race, color, or national origin in consideration for an award.

Pursuant to Title VI requirements, any entity or person that enters into a contract with Dallas County including, but not limited to prime contractors, sub-contractors, and sub-recipients, may not discriminate on the basis of race, color, national origin, age, sex, disability, or religion in their selection and retention of subcontractors (including consultants), in connection with any federally funded program or activity (including any program or activity undertaken/funded by a Dallas County Division/Department that receives federal funds).

6. **TEXAS GOVERNMENT CODE CHAPTER 2252 ATTESTATION**

By entering into this Contract, Contractor attests that Contractor is not a company that is identified on a list prepared and maintained by the Texas State Comptroller under Section 2252.153, Tex. Gov't Code, as a company known to have contracts with or provide supplies or services to a foreign terrorist organization as designated by the U.S. Secretary of State.

7. **PRE-AWARD SURVEY**

After bid opening and before award, County may perform a pre-award survey of the bidder's facilities and equipment to be used in the performance of work under this solicitation. Bidder agrees to allow all reasonable requests for inspection of his or her facilities.

8. After bid opening and before award Dallas County reserves the right to request the bidder to provide, but not necessarily limited to, the following forms:

- a. Texas Government Code Chapter 2270 Verification Form
- b. Texas Government Code Chapter 2252 Certification Form
- c. 1295 Form
- d. W-9 Form

9. The bid award shall be based on, but not necessarily limited to, the following factors:

- e. Unit Price
- f. Total Bid Price
- g. Delivery Date
- h. Results of Testing Samples
- i. Special Needs and Requirements of Dallas County
- j. Dallas County's Experience with Products Bid
- k. Vendor's Past Performance Record with Dallas County
- l. Dallas County's Evaluation of Vendor's Ability
- m. Estimated Costs for Supplies, Maintenance, etc.
- n. Estimated Surplus Value
- o. Small Business Enterprise completed forms
- p. Dallas County reserves the right to award to a primary and secondary vendor(s).

Dallas County shall award this contract to the responsive bidder(s) offering the lowest and best bid in accordance to Local Government Code 262.021(5-a) who comply with all of the requirements, terms and conditions prescribed herein. Dallas County reserves the right to reject any or all bids in whole or in part, to make multiple awards, partial awards, award by item by item basis, award by types, award by sections, or lump sum total, and waive any immaterial deviations in the bid as may be considered in the best interest of the County.

10. **INVOICING/BILLING**

Invoices will be submitted to the Dallas County Auditor's Office. All billings must have appropriate supporting documentation before such billings will be approved. Billing shall cover goods and services not previously invoiced. Vendor shall reimburse the Dallas County for any monies paid to Contractor for goods or services not provided or when goods/services provided do

not meet the contract agreement or solicitation requirements. Payments made by the County shall not preclude the right of the County from thereafter disputing any items involved or billed under the contract agreement or solicitation and shall not be construed as acceptance of any part of the goods or services. Contractor understands and agrees that any funds paid under this contract are contingent upon satisfactory delivery of the Services as described in this contract and subject to routine processing. No payment, on any basis, will be made for unsatisfactory work.

Contractor agrees to submit complete, fully documented and accurate itemized statement of invoices with appropriate/applicable attachments and documentation, as required by the County for all goods, services, and work performed **following acceptance of goods, services or work by the County.**

At minimum, the original invoices submitted against the IFB, must reference all of the following information:

- a. Contractor/Vendor Name
- b. Contractor/Vendor Address
- c. Contractor/Vendor Contact Information
- d. Contractor/Vendor Telephone Number and Fax Number
- e. Contractor/Vendor Remittance to Address
- f. Invoice Date
- g. Invoice Number (uniquely numbered, no duplicates)
- h. Valid Dallas County Purchase Order Number must appear on all itemized invoices and packing slips
- i. Solicitation Number
- j. Date of Services or Date Purchase
- k. Description of Services and Goods
- l. Cost of Services and Goods

Invoices and support documentation are to be sent to:

Original Invoice: Dallas County Auditor's Office  
Attn: Accounts Payable  
500 Elm Street, Suite 4200  
Dallas, TX 75202  
214.653.6478  
[Accounts.Payable@dallascounty.org](mailto:Accounts.Payable@dallascounty.org)

Copy of invoice(s) shall be sent to: REQUESTING USER DEPARTMENT NAME AND ADDRESS INDICATED ON THE PURCHASE ORDER

All invoices must reference a Dallas County Purchase Order Number

Payment will be made upon receipt and acceptance by the County of completed services, goods and/or products ordered and receipt of a valid invoice, in accordance with the Texas Government

Code, Chapter 2251. The County will incur no penalty for late payment if payment is made within thirty (30) or fewer days from the statement if there is an uncontested billing. Any payment not made within thirty (30) days of its due date shall bear interest in accordance with Chapter 2251 of the Texas Government Code. Invoices received without all the required supporting documentation and information will not be processed and will be returned to the Contractor unpaid for correction.

11. If applicable, a packing list or other suitable shipping documents shall accompany each shipment and shall show:
  - (a) Name and address of vendor
  - (b) Name and address of receiving department
  - (c) Dallas County Purchase Order number and
  - (d) Description of material shipped, including item numbers, quantity, number of containers, and package number, if any.

12. **ACH ELECTRONIC PAYMENTS**

*ACH Electronic Payments*

Dallas County offers ACH vendor and supplier payment services for all vendors and suppliers providing goods, services or products to Dallas County.

Dallas County is moving away from making payments by paper checks and we are strongly encouraging vendors and suppliers to accept electronic payments. Below is the option that is currently available in lieu of a paper check. Dallas County has chosen the Paymode-X ACH payment service through Bank of America for this efficient form of payment.

There is no cost or fee to the vendor or supplier of any kind resulting from the acceptance of an ACH payment from Dallas County via PaymodeX. This allows Dallas County to directly deposit invoice payments into the vendor's bank account along with complete remittance information that can be accessed at any time.

For more information regarding Paymode-X, please visit our website at: <http://portal.paymode.com/dallascounty/> or call customer service @ 877.443.6944 or contract the Dallas County Auditor's Office – Account Payable Division at 214.653.6473.

13. Upon request by Dallas County, bidders agree to furnish samples and/or demonstrations of products bid, as applicable. The product(s) requested will be furnished at no additional cost to Dallas County and will be of sufficient amounts and/or time frames agreed by County and bidder to ensure effective testing of the products(s). Any testing product used beyond the agreed upon amount or time frame may be considered for payment by Dallas County, if in the best interest of the County. Any product that fails testing shall be considered sufficient reason to reject the bid or product. Any product used by Dallas County, during the contract period that does not perform as specified and/or approved during testing shall be considered grounds for cancellation of the contract.
14. Whenever an article or material is defined by describing a proprietary product or by using the name of a manufacturer, the term "or equal" if not inserted shall be implied. The specified article or material shall be understood as descriptive and not restrictive. As determined by Dallas County, equal is considered as articles or materials which can effectively and economically

perform the required task; is comparative in quality and performance and, if required, is acceptably similar or matches the specified structural design.

If the amount shown in words and its equivalent in figures do not agree, the written words shall be binding. Ditto marks are not considered writing or printing and shall not be used.

15. The Contractor shall be considered an Independent Contractor and not an agent, servant, employee, or representative of the County in the performance of the work. No term or provision hereof or act of the Contractor shall be construed as changing that status.
16. The Contractor agrees that it will protect, defend, indemnify, and save whole and harmless the County and all of its officers, agents, and employees from and against all claims, demands, causes or action, damages, judgments, loss and expenses, including attorney's fees, of whatsoever nature, character, or description that any person or entity has or may have arising from or on account of any injuries or damages (including but not restricted to death) received or sustained by any person, persons, or property, on account of, arising out of, or in connection with the performance of the work, including without limiting the generality of the foregoing, any negligent act or omission of the Contractor or any agent, servant, employee or sub-contractor of the Contractor in the execution or performance of this Contract. Contractor further agrees to protect, indemnify and hold County harmless against and from any and all claims and against and from any and all loss, cost, damage, judgments or expense, including attorney's fees arising out the breach of any of the requirements and provisions of this contract of any failure of Contractor, its employees, officers, agents, contractors, invitees, or assigns in any respect to comply with and perform all the requirements and provisions hereof.
17. The Contractor agrees, during the performance of the work, to comply with all applicable codes and ordinances of the appropriate City, County or the State of Texas as they may apply, as these laws may now read or as they may hereafter be changed or amended.
18. The Contractor shall obtain from the appropriate City, Dallas County or the State of Texas the necessary permit(s), if any, required by the ordinances of the City, County or State for the performance of the Work.
19. The Contractor shall not sell, assign, transfer or convey this Contract, in whole or in part, without the prior written consent of the County.
20. Should Dallas County authorize the original awardee to subcontract (assign) any portion of this contract, the original awardee will maintain the ultimate legal responsibility for all services according to contract specifications. In the event of a subcontract, the original awardee must maintain a continuous effective business relationship with the subcontractor(s) including, but not limited to, regular payments of all monies owed to any subcontractor. Failure to comply with these requirements, in whole or part, will result in termination of this contract and/or legal ramifications, due to nonperformance.

Should Dallas County authorize the original contractor to transfer this contract, in whole or part, the secondary contractor will maintain all the legal responsibilities set forth in the context of this contract.

21. In case any one or more of the provisions contained in this Contract shall for any reason be held to be invalid, illegal, or unenforceable in any respect, such invalidity, illegality, or unenforceability shall not affect any other provision thereof and this Contract shall be considered

as if such invalid, illegal, or unenforceable provision had never been contained herein.

22. The parties herein agree that this Contract shall be enforceable in Dallas County, Texas, and if legal action is necessary to enforce it, exclusive venue shall lie in Dallas County, Texas.
23. This Contract shall be governed by and construed in accordance with the laws of the State of Texas and all applicable Federal Laws.
24. **Scanned or Re-typed Response:**

If in its response, bidder/offeror either electronically scans, re-types, or in some way reproduces the County's published bid or proposal specifications, then in the event of any conflict between the terms and provisions of the County's published bid or proposal specifications, or any portion thereof, and the terms and provisions of the response made by bidder/offeror, the County's bid or proposal specifications as published shall control.

Furthermore, if an alteration of any kind to the County's published bid or proposal specifications is only discovered after the contract is executed and is or is not being performed; the contract is subject to immediate cancellation.

25. This Contract embodies the complete agreement of the parties hereto, superseding all oral or written previous and contemporary agreements between the parties and relating to matters herein, and except as otherwise provided herein cannot be modified without written agreement of the parties.
26. Multi-year service/lease-purchase agreements or any continuing contracts are solicited and awarded based on governmental fiscal funding. If for any reason, funds are not appropriated to continue the service/lease- purchase agreement, the said agreement/contract shall be automatically terminated on the expiration date or date in which the funds have been eliminated. Any/all services/leased equipment will be removed from the respective county department/facilities without penalty to Dallas County. Any/all charges incurred as a result of this action are the responsibility of the contractor.
27. Contractors are not officially authorized to begin work and/or deliver items covered under this agreement until formal approval and/or a signed contract is executed by the proper county authorities. Dallas County accepts no liability, of any kind, for products/services delivered/furnished without proper authorization.
28. Except for proposals received under Local Government Code 262.030 and/or 262.0295, in accordance with the aforementioned statutes, Dallas County will uphold the confidentiality of bidder trade secrets to the extent allotted by law. All confidential information must be clearly identified and separated, by the bidder and prior to submission of the proposal.
29. **OPEN RECORDS**

All responses submitted to Dallas County become the property of Dallas County and are subject to the Public Information Act (Texas Government Code Chapter 552). The interested

firms/individuals should familiarize themselves with the provisions of that Act. In no event shall Dallas County, or any of its agents, representatives, consultants, directors, officers, or employees, be liable to a firm/individual for the disclosure of all or any portion of a response submitted pursuant to the IFB.

If a firm/individual has special concerns about information that it desires to make available to Dallas County, but which it believes constitutes a trade secret, proprietary information or other information excepted from disclosure, such firm/individual should specifically and conspicuously designate ((i.e. mark confidential) each page of that information, which the Bidder believes, should not be disclosed outside Dallas County. Disclosure of requested information will be subject to the Texas Public Information Act.

30. **TERMINATION**

The County may, at its option and without prejudice to any other remedy to which it may be entitled at law or in equity, or elsewhere under this contract, terminate this Contract, in whole or part, by giving 10 days advance written notice thereof to the Contract with the understanding that all (products/services) being (delivered/performed) under this Contract shall cease upon the date specified in such notice. The County shall compensate the Contractor in accordance with the terms of this contract for the (products/services) (delivered/performed) prior to the date specified in such notice.

31. **TERMINATION FOR DEFAULT OR NON-PERFORMANCE**

Default, material breach, or non-performance of the bidder in terms of specifications or non-compliance with the terms of this contract shall be a basis for termination of the contract by the County. Termination in whole or in part, by the County may be made at its option and without prejudice to any other remedy to which it may be entitled at law or in equity, or elsewhere under this Contract, by giving ten (10) days' advance written notice setting forth the nature of the material failure or non-performance to the Contractor and/or bidder with the understanding that all work being performed under this contract shall cease upon the date specified in such notice. The termination will not be effective if the material failure is fully cured prior to the end of the stated in written notice NOT LESS THAN TEN (10) day period.

Termination under this will not relieve Contractor from liability for any default or breach under this contract agreement or any other act or omission of Contractor.

The County shall not pay for work, equipment, services or supplies which are unsatisfactory. Contractor may be given a reasonable opportunity prior to termination to correct any deficiency. This however shall in no way be construed as negating the basis for termination for non-performance. In addition and as authorized by Commissioners Court, vendors terminated for non-performance will be disbarred from award consideration on future county solicitation for a period of not less than thirteen (13) months.

32. **MONETARY RESTITUTION**

In the event the contract is prematurely terminated due to default, non-performance and/or withdrawal by the contractor, Dallas County reserves the right to seek monetary restitution (to include but not limited to; withholding of monies owed) from the contractor to cover costs for interim services and/or to cover the difference of a higher cost (difference between termination vendor's rate and new company's rate) beginning the date of vendor's termination through the contract expiration date. In the event a civil suit is filed to enforce this provision, Dallas County will seek its attorney's fees and cost of suit from the Contractor.

33. **NON-EXCLUSIVITY**

This contract and/or agreement is non-exclusive and shall not in any way preclude Dallas County from entering into similar agreements and/or arrangements with other Vendors, Contractors, or from acquiring similar, equal or like goods and/or services from other entities or sources including state contracts.

34. **NEPOTISM**

No person (1) who is an employee, agent, consultant, officer, or official of the contractor and who exercises or has exercised any functions or responsibilities with respect to assisted contract activities; or (2) who is in a position to participate in a decision-making process or gains inside information with regard to such activities, may obtain a personal or financial interest or benefit, direct or indirect, in any contract, subcontract, or agreement with respect thereto, or the proceeds thereunder, either for themselves or those with whom they have family or business ties, during their tenure.

35. **RIGHT TO PROTEST**

Vendors aggrieved in connection with a specific solicitation, evaluation, or the award of any bid, purchase order, or contract, may formally protest to the Purchasing Director only if the Vendor has reason to believe that, with respect to a specific solicitation, (a) there was a material violation of state or federal statutory requirements, County Purchasing Department rules and regulations, or this Code of Ethics (including the Restricted Contact Period), or (b) the procurement process gave an unfair advantage or unfair disadvantage to one or more Vendors.

*Procurement processes that may give an unfair advantage or disadvantage to one or more Vendors include, but are not limited to, the following:*

- i. The specification unfairly limits competition for no legitimate purpose;
- ii. The contract award is compromised by improprieties in post-award negotiations;
- iii. The evaluation factors or criteria are applied in a manner that is different than disclosed in

the solicitation; and

iv. There are irregularities in the receipt or opening of solicitation responses.

*Protests must be in written form and must contain the following information (if applicable):*

i. The protesting Vendor's name, address, telephone number, fax number, and email address;

ii. The identifying number of the solicitation and/or contract;

iii. The date the Vendor become aware of the facts forming the basis of the protest;

iv. A detailed statement of the factual grounds for the protest, including copies of any relevant documents or evidence and the statute, rule, or regulation that was violated, if applicable; and

v. A sworn certification that the protest is brought in good faith and for good cause. If a protest is based on an ambiguity or a problem in a solicitation, and is made after the solicitation response deadline, it must also include a certification that the protesting Vendor was not aware of the ambiguity or problem (and did not have an opportunity to ask for clarification or a correction) before the solicitation response deadline.

Protests must timely raise all claims and describe the evidence supporting those claims with specificity. Any claims that are not timely raised may be deemed waived. In the event of a protest during a solicitation response period, a protesting Vendor who wishes to continue in the solicitation process during such protest must still submit a bid or proposal according to the rules set forth in the solicitation.

Protests, including any protest appeals requests, must be sent by mail or email to the Dallas County Purchasing Director at Founders Square, 900 Jackson St., 6th Floor, Suite 680 Dallas, Texas 75202 or [Michael.Frosch@dallascounty.org](mailto:Michael.Frosch@dallascounty.org). Mail-in requests must be postmarked and email requests must be received by the Purchasing Director no later than (a) five (5) business days after the date that the protesting Vendor knew or should have known of the facts giving rise to the protest, or (b) before the contract is awarded, if the Vendor is aware of the facts giving rise to the protest prior to the contract award, whichever is earlier.

**It is the responsibility of the Vendor to ensure that solicitation protests are delivered to the Purchasing Director within the time period stated herein. Protests that are late or delivered to an incorrect address or individual, or that otherwise do not comply with these rules (including providing the sworn certification as described above), will be declared invalid.**

*Written Decision.* All protests will be initially reviewed by the Purchasing Director, who must rule on the protest and provide a written decision, including the reasons for the decision and the decision date, to the protesting Vendor within ten (10) business days (the “Written Decision”). Any appeal of the Written Decision must be made within five (5) business days of the receipt thereof.

*Appeals Process.* Appeals of the Written Decision should be sent to the Purchasing Director at the address above, who shall notify the Appeals Committee, consisting of the County Administrator, the County Auditor, and the County Budget Director. The Purchasing Director shall serve as staff to the Appeals Committee and will be present at the Appeals Hearing. The protesting Vendor shall be notified of the time and place of the Appeals Hearing and will be provided an opportunity to present arguments. The documentary evidence at the Appeals Hearing is limited to the documentary evidence submitted for the original protest unless, for good cause shown, the Appeals Committee grants authority for the protesting Vendor to provide additional documentary evidence. The protesting Vendor shall seek approval to submit additional documentary evidence for good cause as soon as possible, but no later than (a) five (5) days before the hearing, or (b) within seventy-two (72) hours from when the protesting Vendor knew or should have known about the additional evidence, whichever period is shorter. The request should include copies of the additional documents that the protesting Vendor seeks authority to use at the hearing. The Appeals Committee may appoint an independent hearing examiner to conduct the hearing and provide a written recommendation, if needed. A written final decision, including the reasons for the final decision and the decision date, will be provided to the protesting Vendor within ten (10) business days of the Appeals Hearing (the “Final Decision”). Requests for an appeal of the Final Decision must be mailed or emailed to the Purchasing Director within five (5) business days of the Final Decision, who will notify the Commissioners Court of the request.

A Commissioners’ Hearing may take place at the discretion of the Commissioners Court. A single vote of a Commissioner on the Commissioners Court is required for a Hearing to be granted. The Commissioners may, at any time during the process, review the written record of the previous decisions on the matter. All decisions of the Commissioners Court, including whether to allow a Commissioners’ Hearing, are final.

*Right to Appear before the Commissioners Court.* All individuals and entities have the right to an appearance before the Commissioners Court subject to the rules of the Court, this Code of Ethics, and, during an Active Solicitation, the Restricted Contact Period provisions in Section 6 herein. However, a protesting Vendor does not have an automatic right to a Commissioners’ Hearing on any protest appeal under this Code of Ethics, which will be granted only at the discretion of the Commissioners Court.

*Notification.* Protest hearings are open to the public. Public notification of any hearings, including Appeals Hearings and Commissioners’ Hearings, shall be posted on the Dallas County Purchasing website at [www.dallascounty.org/departments/purchasing](http://www.dallascounty.org/departments/purchasing)

*Solicitations and Contracts Pending.* Filing a protest under this Section will not trigger an automatic stay of any procurement process or contract award. It is in the discretion of the Purchasing Director and the Commissioners Court whether to stay any procurement process or contract award with respect to any Vendor protest. Whether a stay is granted shall not compromise any protesting Vendor’s right to the protest procedures outlined herein.

*Records.* Records of all protests, including the protest filed, related evidence, and any Written and Final Decisions (including the outcome of any Commissioners' Hearing, if applicable) will be maintained by the Purchasing Department for a period of no less than four (4) years.

36. Contractors are required to comply with the Equal Employment Opportunity Act requiring that no person shall be discriminated against on the basis of race, color, religion, sex or national origin in all phases of employment during the performance of this Contract. The successful bidder shall take affirmative action to ensure that applicants are employed and treated during employment, without regard to their race, age, color, religion, sex or national origin. This action shall include, but not be limited to, employment, upgrading, demotion, transfer, recruitment, advertising, layoff, termination, compensation and selection for training. The successful bidder shall state to all employees and advertisements that all employees and qualified applicants will receive consideration for employment without regard to race, color, age, religion, sex, or natural origin.
37. No official or employee shall have any financial interest, direct or indirect, in any contract with the County or be financially interested, directly or indirectly, in the sale to the County of any land, materials, supplies or services, except on behalf of the County as an official or employee. Any violation of this section, with knowledge, express or implied, of the person or corporation contracting with the County shall render the contract involved voidable by the Commissioners Court of Dallas County. It is the responsibility of the contractor during all phases of the contract process to notify the County in writing of any potential conflict of interest.
38. In the best interest of the County, as determined by the Dallas County Commissioners Court, any bidder/proposer who is currently involved, either directly or indirectly, with any litigation against or involving Dallas County may be disqualified and/or not considered for an award.
39. Pursuant to Sec. 9.001 of the Texas Business Organization Code, non-Texas entities, including, but not limited to corporations, limited partnerships, and limited liability companies must have an application for registration filed with the Texas Secretary of State and shall provide to Dallas County a Certificate of Status issued by the Texas Secretary of State that serves as official evidence of the entity's existence or authority to transact business in Texas. To transact business with Dallas County, all entities must be in legal compliance pursuant to applicable laws, and shall provide to Dallas County evidence of said compliance.
40. Vendor hereby assigns to purchaser any and all claims for overcharges associated with this contract which arise under the antitrust laws of the United States, 15 USCA Section 1 et seq., and which arise under the antitrust laws of the State of Texas, Tex. Bus. & Com. Code, Section 15.01, et seq.
41. Where applicable, MSDS Forms must be provided with delivered products. In addition WITHOUT EXCEPTION, within 30 days after award, the successful bidder(s) MUST furnish Material Safety Data Sheets for all applicable awarded contract items to: Erin Spargo, Ph.D., Southwestern Institute of Forensic Sciences/Office of the Medical Examiner Facility, 2355 Stemmons Freeway, Dallas, Texas 75207. Dallas County reserves the right to withhold payments owed and/or terminate the contract due to non-performance if the aforementioned documents are not provided accordingly.

42. **INTERLOCAL AGREEMENT (City/State Participation Program)**

In accordance with Article 791.025 of the Texas Government Code, governmental agencies (local, state) may request to utilize County contract by executing an interlocal agreement with Dallas County to do so. Vendors are to indicate on the bid proposal page whether they are willing to extend pricing from this contract to other governmental agencies in accordance with the outlined specifications. Dallas County is indemnified against any and all claims that may arise from Interlocal Agreements entered into by the Contractor and governmental agencies.

43. **FEDERAL DEBARRED VENDORS**

No products and/or services utilizing Federal funds may be procured from vendors that are listed on the Federal Excluded Parties List aka System for Award Management (SAM). Government requirements for non-procurement suspension and debarment are contained in the OBM guidance 2CFR, part 180 that implements Executive Orders 12549 and 12689 Debarment and Suspension. Dallas County reserves the right to reject from award consideration and/or terminate any contract with any vendor found to be suspended, ineligible and/or debarred as outlined herein.

44. **TWELVE (12) MONTH WAITING PERIOD FOR EMPLOYMENT OF CERTAIN FORMER COUNTY EMPLOYEES**

In accordance with the County's Transparency Policy, any firm awarded a contract for the Procurement of goods or services shall be prohibited from hiring any individual who has previously worked for the County and in that capacity either evaluated, recommended, approved, monitored, or managed a contract involving that firm no sooner than twelve months after that individual has ceased to work for or be employed by the County. Failure to adhere to such a contractual requirement may result in the termination of the contract with the County.

IFB

ATTACHMENT S  
SBE PROGRAM AND FORMS



## SBE LANGUAGE

### 7.0 SMALL BUSINESS ENTERPRISE (SBE) PROGRAM

#### 7.1. Definitions.

- 7.1.1. The term “**Commercially Useful Function**” is defined as a business that is directly responsible for providing the supplies or services to Dallas County as required by the solicitation or request quotes, bids or proposals. A firm is considered to perform a commercially useful function when responsible for the execution of a distinct element of the work of a contract and carries out its responsibilities by actually performing, managing and supervising the work involved. Example: a business that stocks sufficient quantities of supplies in direct inventory which is being held for sale or resale, to cover anticipated future demands for the suppliers is considered to be performing a commercially useful function.
- 7.1.2. A “**Contractor**” is defined as one who participates, through a contract or any other contractual agreement in a County funded contract opportunity for work, labor, services, supplies, equipment, materials, goods or any combination of the aforementioned. For purposes of this Section, a Contractor is any individual, company, or other entity seeking to do work for Dallas County regardless of the method used to procure the services or products, including but not limited to bid or solicitation. A Contractor includes but is not limited to a contractor, consultant, or vendor.
- 7.1.3. The term “**Director of Small Business Enterprise**” shall mean the Director of the County’s Office of Small Business Enterprise and/or her/his designee.
- 7.1.4. The term “**Contract Administration**” shall mean the County Purchasing Department and/or his or her designee.
- 7.1.5. The “**Contract Administration Supervisor**” shall mean the Purchasing Director and/or his or her designee.
- 7.1.6. **Equal Employment Opportunity Requirements.** It is the policy of Dallas County to ensure non-discrimination in the award and administration of contracts. The Contractor or Subcontractor shall not discriminate on the basis of race, color, national origin, disability, veteran status, religion, or sex in the performance of any Dallas County contract.
- 7.1.7. **Good Faith Effort Plan.** The plan submitted with a Submittal detailing the Respondent’s efforts to achieve the set aspirational goal or documenting the Good Faith Efforts to meet the goals for all elements the Solicitation. A Good Faith Effort Plan must be submitted with a Submittal for any Dallas County projects in which goals have been established.
- 7.1.8. **Metropolitan Statistical Area (MSA).** The Dallas County MSA includes the following counties: Dallas, Tarrant, Denton and Collin.
- 7.1.9. **Small Business Enterprise.** It is the policy of Dallas County to support the growth and development of Small Business Enterprise (“SBE”) and ensure that SBEs have an equal opportunity to compete for and participate in Dallas County contracts. Thus, Dallas County Commissioners Court has created the

Office of Small Business Enterprise to establish and oversee a Diversity Program to ensure that SBEs have an equal opportunity to compete for and participate in Dallas County contracts. It is Dallas County's intent to:

- Ensure nondiscrimination in the award and administration of Dallas County contracts;
- Create a level playingfield on which small businesses can compete fairly for Dallas County contracts; and
- Ensure that only firms who attempt in good faith to meet the SBE good faith efforts are considered for applicable contract awards.

Consequently, the contractor shall carry out applicable requirements of the good faith effort in its proposal/bid hereunder and, if awarded the contract, the award and administration of the Contract.

## 7.2 SBE Goals, Good Faith Efforts and Eligibility.

The Director of Small Business Enterprise and the Contract Administration Supervisor sets the annual SBE participation contracting/subcontracting aspirational SBE goals for each contract. The contracting/subcontracting goals for this contract will be based on meeting or exceeding the **minimum aspirational SBE goal of 40%**, unless good cause exists for failing to meet the goal. The SBE aspirational goal is based on the total dollar amount of the contract.

To be recognized as an SBE, firms (contractors and/or subcontractors):

- a) Must be certified as an SBE by the following County approved entities: North Texas Regional Certification Agency (NCTRCA), DFW Minority Supplier Development Council and/or the Women's Business Council of Southwest, at the time of the proposal/bid submission. Other certifications are not acceptable;
- b) To be recognized by the County as a **qualified SBE firm**, as defined pursuant to Section 3 of the Small Business Act and relevant regulations, an SBE is a firm for which the gross revenues or number of employees averaged over the past three years, inclusive of any affiliates, is as defined by 13 C.F.R. Sec. 121.201; and
- c) Must also perform a commercially useful function on the project and have a local presence in Dallas County Metropolitan Statistical Area (MSA) in order to be counted for SBE points. The MSA includes the following counties: Dallas, Tarrant, Denton and Collin.

## 7.3 Utilization

The aspirational SBE or certified sub-contractor goal is expressed as a percentage of the total dollar amount of the contract going to SBE or certified Sub-Contractor for those areas which the Contractor has sub-contracted or anticipates sub-contracting. The aspirational goal shall also apply to contract amendments that require work beyond the scope of services originally required to accomplish the project.

The Respondent agrees to employ good faith efforts through the award of subcontractors to eligible SBEs and certified firms to the fullest extent possible.

Dallas County's Good Faith Effort Plan (GFEP) will be used to document SBE participation. However, all subcontractors and/or suppliers, whether certified or not, must be listed in the GFEP. The information provided

in the GFEP Form will be utilized in the development of the final contract/agreement. The GFEP Form can be found in the attachments. This form is required and considered to be a part of the response to the IFB.

**Should the Good Faith Effort Plan or any of the specified documents listed below be incomplete, not signed, and/or not submitted, the bid can be deemed non-responsive.**

**7.4 Each Contractor must include with its proposal/bid, the following documents:**

- Completed and signed **Good Faith Effort Plan**, executed by an authorized representative;
- Completed and signed **Small Business Utilization Affidavit**, executed by an authorized representative; and
- A signed and executed **Subcontractor Intent Form**, executed by an authorized representative (prime and subcontractor).

***Note: All forms must be complete in their entirety and submitted as part of a Respondent's submittal.***

The County reserves the right to accept or reject any certified firm and in its sole discretion is not bound by the certifying bodies' determination, if the County has a concern regarding the eligibility of the firm to meet SBE guidelines or standards. A Contractor whose proposed certified firm is rejected may contest in writing to the Office of Small Business Enterprise, in accordance with the SBE Policy. The denial of SBE certification by the Office of Small Business Enterprise is excluded from the Dallas County Purchasing Code of Ethics Protests Procedure and is exclusively governed by the appeal process set forth in the SBE Policy.

**7.5 SBE Reporting.** The Contractor and its subcontractors are required to electronically submit subcontractor payment information using the County's Compliance Reporting System (CRS), accessed through a link on the Dallas County SBE webpage. The Contractor and all subcontractors will be provided a unique log-in credential and password to access Compliance Reporting System.

Training on the use of the system will be provided by both Dallas County's CRS Support Staff and by the Office for Small Business Enterprise. Additional information and free online training for CRS can be found at <https://dallascounty.diversitycompliance.com>. After the prime receives payment from the County, electronic submittals will require data entry of the amount paid to each subcontractor listed on the Contractor's Good Faith Effort Plan.

**7.6 Contracting.** If awarded the contract, the Contractor agrees to be bound by the policies and guidelines set forth in the County's SBE Policy, which may be incorporated into the contract. If a conflict exists between the SBE section of the solicitation and the County SBE Policy, the language in the solicitation governs.

**MANDATORY  
SBE SOLICITATION ATTACHMENTS**



## SMALL BUSINESS UTILIZATION AFFIDAVIT

It is the policy of Dallas County to encourage the inclusion of qualified Small Business Enterprises (SBEs) to the greatest extent feasible on the County's construction, procurement and professional services contracts. Neither the County, nor its Contractors and their subcontractors shall discriminate on the basis of race, age, color, religion, national origin, or sex in the award and performance of contracts. In consideration of this policy, Dallas County has adopted the Small Business Enterprise Policy for all County contracts.

### **Small Business Enterprise Participation Goals**

The solicitation bidding plan establishes subcontracting goals and requirements for all prospective bidders to ensure reasonable degree of SBE meaningful business utilization and participation in County contracts. It is the goal of Dallas County that a certain percentage of work under each contract be executed by one or more SBEs. For the purposes of participation percentages, Dallas County does not include amounts paid to the prime by the sub-contractor.

The apparent proposer shall agree to meet the established goals or must demonstrate and document a "good faith effort" to include SBEs in subcontracting opportunities. The apparent proposer who fails to adequately document good faith efforts to subcontract or purchase significant material supplies from SBEs may be denied award of the contract by Dallas County based on the contractor's failure to be a "responsive" or "responsible" bidder.

By signing below, I agree to provide Dallas County, Small Business Enterprise Department a completed copy of all required forms. I understand that, for the purpose of SBE subcontracting participation, any amounts paid to the prime from the sub-contractor should not be included in the above listed participation amount. Finally, I understand that if I fail to provide all of the required documents within five (5) business days after notification, my bid may be deemed "non-responsive" and I may be denied award of the contract.

Solicitation Number: \_\_\_\_\_

Company Name: \_\_\_\_\_

\_\_\_\_\_  
Typed or Printed Name of Certifying Official of Company

\_\_\_\_\_  
Date

\_\_\_\_\_  
Signature of Certifying Official of Company

\_\_\_\_\_  
Title



### Small Business Enterprise Program Utilization Form

Solicitation/Project Name: \_\_\_\_\_ Solicitation #: \_\_\_\_\_

Firm Name: \_\_\_\_\_ Firm Phone # \_\_\_\_\_

Firm Address: \_\_\_\_\_ City: \_\_\_\_\_ State: \_\_\_\_\_ Zip: \_\_\_\_\_

Compliance Contact: \_\_\_\_\_ Phone #: \_\_\_\_\_ Email Address: \_\_\_\_\_

Is Your Firm Certified: \_\_\_\_\_ Certifying Agency: DFWMSDC \_\_\_\_\_ NCTRCA \_\_\_\_\_ WBC-Southwest \_\_\_\_\_ Other: \_\_\_\_\_

Total Bid Amount: \_\_\_\_\_ Amount self-performed: \_\_\_\_\_ Percentage self-performed: \_\_\_\_\_

#### Utilization Plan

List the firms that will be utilized on the project. Provide copies of correspondence.

<b>SBE certified subcontractors/suppliers</b>									
Firm Name & SBE Certification #	Tier	Person Contacted & Date	Address	Phone & Email Address	Type of Work	NAICS Code	Local or Non-Local	Dollar Amount	% of contract
							<b>Total</b>	<b>\$</b>	<b>%</b>



<b>Non SBE certified subcontractors/suppliers</b>									
Firm Name	Tier	Person Contacted & Date	Address	Phone & Email Address	Type of Work	NAICS Code	Local or Non-Local	Dollar Amount	% of Total Contract
							<b>Total</b>	<b>\$</b>	<b>%</b>

Prime Printed Name: \_\_\_\_\_ Title: \_\_\_\_\_ Signature: \_\_\_\_\_ Date: \_\_\_\_\_

**For Use by SBE Office Only**

SBE Compliance Officer: \_\_\_\_\_ Date: \_\_\_\_\_

SBE Notes:



### Good Faith Efforts Form

The Good Faith Efforts Form must be fully completed if the aspirational goal is **not** met.

1. Did you speak with or receive assistance from a staff member in the Small Business Enterprise

Department? \_\_\_\_\_ (Y/N) Name of staff member \_\_\_\_\_

2. Did you utilize a Dallas County SBE vendor list? If not, please explain?

Vendor List Accessed	Date of Access

3. Did you provide written notice to potential SBE subcontractors, suppliers, and vendors? Written notice should include plans, specifications, subcontractor/supplier opportunities, and deadline for submission to respondent no less than 7 days before bid submission. Please provide copies of all correspondence, including accepted and rejected SBE bids or proposals, i.e. letters, memos, emails and phone calls.

Firm Name & Address	Phone #	Person Contacted & Date	Type of Work	NAICS Code	SBE Certification No.	Response to Solicitation	Bid/Quote Amount	Company Selected (Y or N)

4. If applicable, did you participate in the pre-bid meeting? \_\_\_\_\_



5. Did you identify and select specific work items to be performed and/or procurement to be fulfilled by SBEs? Please subdivide total contract work into smaller portions or quantities to permit maximum active participation by SBEs.

1.	2.	3.
4.	5.	6.

6. Did you advertise in trade publications or with local advocacy organizations? The advertisement must identify and describe subcontracting opportunities in detail, including a contact person and deadlines. Please provide a copy.

Publication Name	Date of Publication

Prime Printed Name: \_\_\_\_\_

Title: \_\_\_\_\_

Signature: \_\_\_\_\_

Date: \_\_\_\_\_

**Small Business Enterprise**

[Records Building](#) - 500 Elm Street, Suite 0300, Dallas, TX 75202

Telephone: (214) 653-6021 | E-Mail: [sbe@dallascounty.org](mailto:sbe@dallascounty.org)



DALLAS COUNTY
SUBCONTRACTOR INTENT FORM

To: Dallas County - Small Business Enterprise Department

Date:

Project Name:

Solicitation #:

Subcontractor on the project will provide the following good(s)/service(s):

to Prime Contractor on the project

SBE subcontractor is certified by the following agency: DFW Minority Supplier Development Council NCTRCA Women's Business Council SW

SBE Certification #: (Certification must be kept current/valid for the entire duration of this contract. Failure to comply with this provision could be subject to removal from contract.)

For the purposes of SBE subcontracting participation, Dallas County does not include amounts paid to the prime by the sub-contractor.

Total Contract Amount for prime: \$ Estimated Work Start Date:

Sub Participation Amount: \$ % Estimated Work End Date:

The undersigned intends to enter into a formal agreement with the subcontractor listed, conditioned upon being awarded the Dallas County contract. The undersigned understands that, for the purpose of SBE subcontracting participation, any amounts paid to the prime from the sub-contractor should not be included in the above listed participation amount. Before any subcontractor/supplier substitutions are made, the prime contractor must submit an SBE Substitution Request Form to The SBE Department for approval. Failure to comply with these provisions could result in termination of the contract, sanctions against the prime contractor, and/or ineligibility for future Dallas County contracts. The subcontractor's participation will be entered in B2GNow, Dallas County's compliance system, based upon this intent form.

Officer's Signature (Prime Contractor)

Officer's Signature (Subcontractor)

Printed Name (Prime Contractor)

Printed Name (Subcontractor)

Title (Prime Contractor)

Title (Subcontractor)

Date

Date

Please select or list all Chambers or Advocacy groups you are a member of:

Table with 3 columns: Organization Name, Prime, Sub. Rows include Greater Dallas Asian American Chamber of Commerce, Greater Dallas Black Chamber of Commerce, Greater Dallas Hispanic Chamber of Commerce, U.S. Pan Asian American Chamber of Commerce, Asian Contractors Association, Regional Black Contractors Association, and Regional Hispanic Contractors Association.

**Solicitation Number No.: 2026-018-7103 Pre-Bid Meeting Date: 03/24/2026 @ 10:00 a.m. (CST)**  
**Project Title: Emergency Power Generator Replacement, Medlock Residential Treatment Center**  
**Bid Due Date: 04/23/2026 @ 2:00 p.m. (CST)**



## **INVITATION FOR BID**

## Scope of Work/Specifications

### I. Introduction, Purpose and Intent

The intent of this Invitation for Bid is to establish a one-time contract with a general contractor to replace the emergency power generator for the Lyle B. Medlock Residential Treatment Center. Construction will occur in phases, and the general contractor will coordinate all equipment deliveries, materials deliveries, demolition activities, and shutdowns with Dallas County. The work associated with this project includes, but is not limited to the following:

- Demolition of the facility’s existing emergency generator.
- Installation of new emergency generator, structural foundation pad, and maintenance platform.
- Installation of auxiliary electrical equipment, conduit, and wiring to support the emergency generator system.
- Installation of underground conduit and wiring to accommodate the system.
- Final performance testing of the generator system in accordance with requirements set by manufacturer and NFPA 110.

This project will ensure that the Medlock Residential building is provided with full back up power during power outages to not slow down the building operations.

### II. Specification

Refer to the Medlock Generator 100% CD Specbook (Exhibit A) and the Medlock Generator 100% CD Drawings (Exhibit B)

### III. References & Minimum Qualifications

Dallas County requires bidders to submit reference letters from at least three (3) sources or customers for whom the bidder has provided services of similar size and scope. This requirement applies to all solicitations resulting in a service contract.

- **Letters of Reference:** Bidders must provide three (3) formal letters of reference from previous clients. Each letter must include documentation verifying satisfactory performance and a description of the services rendered.
- **Business Longevity:** Bidders must provide evidence that the firm has been in continuous operation for a minimum of three (3) years.

**Minimum Qualifications:** Start-up companies and newly formed entities do not meet the minimum experience requirements for this solicitation. All bidders must be established entities with the requisite operational history

**Solicitation Number No.: 2026-018-7103 Pre-Bid Meeting Date: 03/24/2026 @ 10:00 a.m. (CST)**  
**Project Title: Emergency Power Generator Replacement, Medlock Residential Treatment Center**  
**Bid Due Date: 04/23/2026 @ 2:00 p.m. (CST)**

**IV. Pre-Bid Meeting Schedule, Questions, and Inquiries**

During the solicitation process bidders are required to limit their communication regarding this project to the Buyer referenced herein. A pre-bid meeting will be held by the County whereby the bidders will have an opportunity to ask the requesting department(s) questions and/or obtain clarification. The pre-bid meeting will be the only time when bidder and requesting department(s) will communicate directly, thereafter, all communication associated with this project shall be address through the County’s purchasing platform, (<https://www.bidnetdirect.com/texas/dallas-county>), to the assigned Buyer. The County will respond to all questions by way of addendum which will be posted as part of the solicitation. The County, its agents, and employees shall not be responsible for any information given by way of verbal communication.

Pre-bid conference **March 24, 2026 at 10:00 a.m. (CST)**, the pre-bid meeting will be conducted through a conference call.

**PRE-BID MEETING LINK:**

<https://gcc02.safelinks.protection.outlook.com/?url=https%3A%2F%2Fteams.microsoft.com%2Fmeet%2F29107954087976%3Fp%3DpW0PNhD7nkXGpsmRFu&data=05%7C02%7CMarina.Valley%40dallascounty.org%7C301f40a75afc4a0441c008de7b063c1a%7C51adcfad72f1479cb28f52412e04014b%7C0%7C0%7C639083463858977305%7CUnknown%7CTWFpbGZsb3d8eyJFbXB0eU1hcGkiOnRydWUsIlYiOiIwLjAuMDAwMCIsIlAiOiJXaW4zMmIsIkFOIjoiTWFpbCIldUIjoyfQ%3D%3D%7C0%7C%7C%7C&sdata=5hnviEmzvMSoeIFXeMV%2BOgZmAujCu6EnzrIgWLjvQmI%3D&reserved=0>

**MICROSOFT TEAMS:**

Meeting ID: 291 079 540 879 76

OR

**DIAL IN BY PHONE: 1-469-208-1731, ID: 724808486#**

The deadline for the submission of questions is on **April 09, 2026 at 3:00 p.m. (CST)** through BidNet.

**V. Term and Commencement Date**

This will be a one-time contract with **no renewal options** commencing upon award by Commissioners Court, upon meeting any insurance and/or bonding requirements (if applicable) and/or fully executing the contract (if applicable).

**VI. Award Method**

The County’s intent is to award this solicitation in its **entirety**, but the County reserves the right to award in the method that is most advantageous to the County.

The County reserves the sole discretion to determine whether a solicitation response is responsive. County reserves the right to reject any or all bids and to waive minor irregularities or discrepancies in any solicitation response as may be in the best interest of County. Late bids will not be considered for award.

**Solicitation Number No.: 2026-018-7103 Pre-Bid Meeting Date: 03/24/2026 @ 10:00 a.m. (CST)**  
**Project Title: Emergency Power Generator Replacement, Medlock Residential Treatment Center**  
**Bid Due Date: 04/23/2026 @ 2:00 p.m. (CST)**

For this solicitation the bidder must bid on all lines to be considered responsive.

Upon expiration of the Contract, the Contractor agrees to hold over under the terms and conditions of this contract for such a period of time as is reasonably necessary to re-solicit (not to exceed 90 calendar days unless mutually agreed on in writing).

## **VII. Bid Submittal and Exception Requirements**

To be considered for award, the bid response must be submitted by **April 23, 2026** at 2:00 p.m. (CST). Bid responses shall be submitted electronically through BidNet, the County’s online public solicitation platform (<https://www.bidnetdirect.com/texas/dallas-county>). Although the County prefers submissions in electronic form, a bidder may elect to submit their bid in hard copy. To submit in hard copy, the vendor may deliver or ship to: Dallas County Purchasing Department, Records Building 500 Elm Street, Suite 5500, Dallas, Texas 75202. When submitting a bid in hard copy, the County requires **two (2)** duplicate hardcopies (one original and one copy) to be submitted.

Any exceptions to the specifications/scope of work and/or terms and conditions shall be included in the solicitation response and shall appear in its own tab. Exception shall reference the page number, section and language for which exception is taken. The County reserves the right to reject any exception not in the best interest to the County or may lead the bid to be considered nonresponsive and not considered for award.

Note: On December 19, 2024, Dallas County implemented a new public solicitation platform and will be posting all solicitations for goods, services, and construction through BidNet. Vendors seeking to do business with Dallas County will be required to register, use this link to begin your registration. (<https://www.bidnetdirect.com/texas/dallas-county>). By registering, vendors will be able to receive, at no cost, solicitation notices, view open solicitations, and submit their response online to desired business opportunities.

## **VIII. Communication**

Upon release of the solicitation and during the process, vendors /firms and their employees of related companies as well as paid or unpaid personnel acting on their behalf shall not contact or participate in any type of contact in relation to this solicitation with Dallas County employees, department heads and/or elected officials. Such contact may result in the vendor being disqualified. All questions and request for information related to this solicitation must be coordinated through Marina Valley.

All questions regarding this solicitation are to be submitted in writing to **Marina Valley**, Dallas County Purchasing Department via **BidNet** (<https://www.bidnetdirect.com/texas/dallas-county>), the County’s procurement platform. If the bidder does not have access to the County’s solicitation platform, the bidder may submit their questions in writing via email to [marina.valley@dallascounty.org](mailto:marina.valley@dallascounty.org). Please reference the IFB Solicitation number in the subject of the email.

All questions, comments and requests for clarification must reference the IFB solicitation number on all correspondence to Dallas County. Any oral communications shall be considered unofficial and non-binding.

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Only written responses to written communication shall be considered official and binding upon the County. The County reserves the right, at its sole discretion, to determine appropriate and adequate responses to the written comments, questions, and requests for clarification.

**NOTE: All addenda and/or any other correspondence (general information, question and responses) to this IFB will be made available exclusively through the Dallas County website for retrieval. Bidders are solely responsible for frequently checking this website for updates to this IFB. Addenda can be located at the following web address: <http://www.dallascounty.org/departments/purchasing/currentbids.php> (go to the appropriate IFB number, click on the appropriate hyperlink to view and/or download solicitation.)**

## **IX. Location and Invoicing**

The County shall pay invoices in 30 days. In order for the County to pay invoices in 30 days, the vendor's invoice must be correct, and reflect the work or goods delivered to the County. The 30 days begin when the County has received a correct invoice reflecting the work or goods delivered. If the County receives an invoice that is not correct and/or reflective of work or goods that have been delivered, the County will request a corrected invoice and the 30-day period will begin once the correct invoice has been received. All work described in the vendor invoice must have been delivered in compliance with the terms of the contract.

Invoices shall be submitted monthly to the County for payment, unless both parties agree to alternative arrangement based on project milestones. Each invoice submitted for payment shall include, at a minimum, the following information:

- Name and address of the department for which services were provided
- Purchase order number
- Contact information of County staff who placed order (name, phone number, department)
- Date of order or Service
- Detailed description of each service
- Price of good or services (charges for all services covered by PO/contract are to be separately stated and explained)
- Unit pricing
- Total cost of goods/services

Submitting invoices without the above information may cause delays in payment processing. Incorrect invoices or invoices sent to the wrong address will delay payment. Vendors who fail to follow these instructions risk having the contract with the County cancelled. Invoices must be submitted via email to: [DC-Invoices@dallascounty.org](mailto:DC-Invoices@dallascounty.org)

## **X. Documents Submitted with Bid**

1. Attachment S - Small Business Enterprise (SBE) Forms must be submitted with bid.

## **XI. Opening of Bids**

Bid reading shall be conducted at 2:30pm (CST) on the day the bids are due. The reading will be conducted via a live meeting online at (insert bid opening link here). Bids will be publicly opened in compliance with public bid opening statutory requirements.

**XII. Review of Bids**

1. The County will review bids complying with the due date and time to determine whether bids are responsive and responsible and whether the bid meets minimum requirements.
2. The County may conduct all necessary inquiries or investigations, including but not limited to, contacting references to verify the statements, documents, and information submitted in connection with the bid.
3. Please be aware that Dallas County may use sources of information not supplied by the bidder concerning the abilities to perform this work or meet the minimum requirements. Such sources may include current or past customers of the organization; current or past suppliers; articles from industry newsletters or other publications or from non-published sources made available to Dallas County.

**XIII. Bid Pricing**

1. Bid pricing shall be **firm** for the entire contract unless otherwise stated herein. Costs not included or calculated in the applicable unit prices as bid will not be paid by the County, regardless of the intentions of the bidder when the bid was submitted and regardless that those costs were actually incurred.

**XIV. Insurance Requirements**

Any Contractor or Vendor that conducts business with Dallas County, whether it is for goods and/or services, must maintain lawful worker's compensation/self-insured employee coverage requirements and adequate liability limitations

Within ten (10) days after contract award or prior to the commencement of any work or delivery, the Purchasing Agent requires the successful Contractor(s)/Vendor(s) to submit verification of the following coverage. The insurance coverages, except Workers Compensation and Professional Liability, required by this Contract, shall name Dallas County and its elected and appointed boards, officers, officials, agents, representatives, directors, employees and volunteers, as additional insured(s) (as the interest of each insured may appear).

Contractor at its own expense, consistent with its status as an independent contractor will carry, purchase and maintain insurance coverage, the minimum insurance coverage set forth immediately below, with companies authorized to do insurance business in the State of Texas or eligible surplus lines insurers operating in accordance with the *Texas Insurance Code*, having an A.M. Best Rating of "A" or better, and in amounts not less than the following minimum limits of coverage:

The policies may provide coverage, which contains deductibles or self-insured retention. Such deductibles and/or self-insured retention shall not be applicable with respect to the coverage provided to Dallas County under such policies. The Contractor shall be solely responsible for all deductibles and/or self-insured retention.

All insurance required herein shall be maintained in full force and effect throughout the term of this contract, including all extensions or renewals.

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- 1.1. Workers Compensations and Employer’s Liability Insurance or self-insured employee in the amount and in compliance with the provisions as provided for by Texas Law as established by the Texas Workers Compensation Act, Title 5, Subtitle A, Texas Labor Code for all his employees assigned to operate or work under this Contract. In the event the Contractor elects to sublet any work, Contractor shall require Sub-Contractors to provide Workers’ Compensation Insurance for all of the latter’s employees unless the Contractor affords such employees protection. Contractors shall be responsible for workers’ compensation insurance for subcontractors or sub-lessees who directly or indirectly provide service under Dallas County contract.

Workers’ Compensation Insurance with statutory limits, and Employer’s Liability Insurance with limits of not less than \$500,000:

Employers Liability - Each Accident	\$500,000
Employers Liability - Each Employee	\$500,000
Employers Liability - Policy Limit	\$500,000

Policies under this Section shall apply to State of Texas and include the following endorsements in favor of Dallas County:

- a. Waiver of Subrogation
- b. Thirty (30) day Notice of Cancellation

- 1.2. Commercial General Liability: Contract shall maintain Commercial General Liability Insurance coverage must include the following: (a) Premises; (b) Operations; (c) Independent Contractor’s Protective Liability; (d) Products and Completed Operations; (e) Medical Expense; (f) Personal and Advertising Injury; (g) Contractual Liability; (h) Broad form property damage, to include fire legal liability. Such insurance shall carry in an amount not less than One Million and 00/100 (\$1,000,000.00) for bodily injury (including death), property damage, and blanket contractual coverage per occurrence with a general aggregate of Two Million and 00/100 (\$2,000,000.00) and products and completed operations aggregate of Two Million and 00/100 (\$2,000,000.00).

Policies under this Section shall apply to State of Texas and include the following endorsements in favor of Dallas County:

- a. Waiver of Subrogation
- b. Thirty (30) day Notice of Cancellation
- c. Additional Insureds: Dallas County and its elected and appointed boards, officers, officials, agents, representatives, directors, employees and volunteers.

- 1.3. Automobile Liability Insurance: Contractor shall maintain Automobile Liability Insurance covering all owned, hired and non-owned automobiles used in connection with work with limits not less than Five Hundred Thousand 00/100 (\$500,000.00) Combined Single Limit of Liability for Bodily Injury and Property Damage. Such insurance is to include coverage for loading and unloading hazards.

Policies under this Section shall apply to State of Texas and include the following endorsements in favor of Dallas County:

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- a. Waiver of Subrogation
  - b. Thirty (30) day Notice of Cancellation
  - c. Additional Insureds: Dallas County and its elected and appointed boards, officers, officials, agents, representatives, directors, employees and volunteers.
- 1.4. Builders Risk Insurance: Contractor shall maintain during the term of this contract, at its own expense, All Builders Risk Insurance in the amount equal to one hundred percent (100%) of the initial contract amount plus values of subsequent modifications and change orders. Covered perils shall include but not be limited to: Contractor's labor and workmanship, materials, fixtures, equipment, defects, fire, wind, lightning, and other weather-related hazards, damage, extended coverage, vandalism, and malicious mischief, and theft.
- Policies under this Section are subject to the laws of the State of Texas and include the following endorsements in favor of Dallas County
- a. Name Dallas County as loss payee as its interest may appear
  - b. Thirty (30) day Notice of Cancellation
- 1.5. Bid Security or Bid Bond (for contracts in excess of \$100,000): All bids shall be accompanied by a cashier's check, certified check, or a bid bond in an amount of not less than five percent (5%) of the total bid. All cashier's check or certified check shall be made payable without conditions to Dallas County and must reference the IFB number on the check or bond. Bid bond executed by a solvent corporate surety or corporate sureties which are on the approved list of the United States Department of Treasury (Federal register Circular 570 - "Companies Holding Certificates of Authority as Acceptable Sureties on Federal Bonds and Acceptable Reinsuring Companies", Sections 9304 through 9308 of Title 31 of the United States Code. Surety Companies Acceptable on Federal Bonds. The Surety must also be duly authorized to do business in the State of Texas.
- 1.6. Performance Bond (for contracts in excess of \$50,000): Contractor within ten (10) days after contract award or prior to the commencement of any work or delivery services under this contract Contractor shall furnish to the County a Performance Bond in the amount equal to one hundred percent (100%) of the contract amount, executed by a solvent corporate surety or corporate sureties which are on the approved list of the United States Department of Treasury (Federal register Circular 570 - "Companies Holding Certificates of Authority as Acceptable Sureties on Federal Bonds and Acceptable Reinsuring Companies", Sections 9304 through 9308 of Title 31 of the United States Code. Surety Companies Acceptable on Federal Bonds. The Surety must also be duly authorized to do business in the State of Texas.
- 1.7. Payment or Material and Labor Bond (for contracts in excess of \$25,000): Contractor within ten (10) days after contract award or prior to the commencement of any work or delivery services under this contract Contractor shall furnish to the County a Payment or Material and Labor Bond in the amount equal to one hundred percent (100%) of the contract amount, executed by a solvent corporate surety or corporate sureties which are on the approved list of the United States Department of Treasury (Federal register Circular 570 - "Companies Holding Certificates of Authority as Acceptable Sureties on Federal Bonds and Acceptable Reinsuring Companies",

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Sections 9304 through 9308 of Title 31 of the United States Code. Surety Companies Acceptable on Federal Bonds. The Surety must also be duly authorized to do business in the State of Texas.

The bonds must clearly and prominently display on the bond or on an attachment to the bond the name, mailing address, physical address, and telephone number, including the area code, of the surety company to which any notice of claim should be sent, or the toll-free telephone number maintained by the Texas Department of Insurance under Chapter 521.051 of the Texas Insurance Code, and a statement that the address of the surety company to which any notice of claim should be sent may be obtained from the Texas Department of Insurance by calling the toll free telephone number.

In the event the contract is prematurely terminated due to Contractor's breach and/or nonperformance of the contract, the County reserves the right to act on the performance bond and/or seek monetary restitution. In the event civil suit is filed to enforce this provision, County will seek its attorney's fees and costs of suit from Contractor which amount Contractor shall pay in the event that County prevails in such action.

All bonds shall be delivered to the Dallas County Purchasing Agent located at 500 Elm Street, 5<sup>th</sup> Floor, Suite 5500, Dallas, Texas 75202. No work shall be authorized until the bond has been submitted to Dallas County Purchasing Agent.

Contractor agrees that, with respect to the above-referenced insurance, all insurance contracts/policies will contain the following required provisions:

- a. Endorsement: Except Workers Compensation and Professional Liability, name Dallas County and its elected and appointed boards, officers, officials, agents, representatives, directors, employees and volunteers as additional insured(s) (as the interest of each insured may appear) as to all applicable coverage;
- b. Endorsement: Provide for thirty (30) days prior written notice will be given to the County for cancellation, non-renewal or material reduction/change in coverage provided under all policies, except in cases of cancellation for non-payment, in the event of which notice shall be provided as required by state law to Dallas County;
- c. Endorsement: Contractor agrees to waive subrogation against Dallas County, its officers and employees for injuries, including death, property damage or any other loss;
- d. Provide for endorsement that the "other insurance" clause shall not apply to County where County is the additional insured on the policy;
- e. All insurance required herein shall be maintained in full force and effect until all work or services required to be performed under the terms of the contract is satisfactorily completed and formally accepted;
- f. All insurance coverage shall be on a per occurrence basis, if coverage is written on a claims-made basis, the retroactive date shall be prior to or coincide with the date of the Contract and the certificate of insurance shall state that the coverage is claims-made and indicate the retroactive date. The coverage shall be continuous for the duration of the contract agreement and for not less than two (2) years following the end of the contract agreement. Coverage, including renewals, shall have the same retroactive date as the original policy applicable to the contract agreement;

- g. Contractor shall be solely responsible for the deductible and/or self-insured retention for any loss;
- h. Contractor insurance policies coverage shall be written on a primary basis and non-contributory with any other insurance coverages and/or self-insurance carried by Dallas County;
- i. Default/Cumulative Rights/Mitigation. It is not a waiver of default if the non-defaulting party fails to immediately declare a default or delays in taking any action. The rights and remedies provided by this contract agreement are cumulative, and either Party's use of any right or remedy will not preclude or waive its right to use any other remedy. These rights and remedies are in addition to any other rights the Parties may have by law, statute, ordinance or otherwise. Contractor has a duty to mitigate damages.
- j. Approval and acceptance of Contractor's services and work by County shall not constitute nor be deemed a release of the responsibility and liability of Contractor for the accuracy and competency of Contractor's services or work; nor shall such approval and acceptance be deemed to be an assumption of such responsibility by the County for any defect, error or omission in the services performed by Contractor in this regard;
- k. Contractor shall provide that all provisions of this contract agreement concerning liability, duty and standard of care, shall be underwritten by contractual liability coverage sufficient to include obligation within applicable policies;
- l. Contractor and their freight contractors must be prepared to show coverage verification prior to entering upon County premises;
- m. Failure to comply with lawful requirements or adequate liability requirements may result in delay of payments, subject to the orders of the Commissioners Court, not to exceed a period of up to two years from the termination of this contract agreement, or cancellation of this contract agreement or both (Dallas County Commissioners Court Order 2003-1792, September 30, 2003);
- n. Insurance Certificates: The certificates of insurance shall list County as the certificate holder. Any and all copies of Certificates of Insurance shall reference any applicable (Bid Number, Commissioners Court Order Number, or contract number for which the insurance is being supplied). All insurance policies or duly executed certificates for the same required to be carried by Contractor under this contract agreement, together with satisfactory evidence of the payment of the premium thereof, shall be delivered to the: Dallas County Purchasing Agent located at 500 Elm Street, Suite 5500, Dallas, Texas 75202; and
- o. All insurance required to be carried by Contractor or subcontractors under this contract agreement shall be acceptable to the County in form and content, in its sole discretion. All policies shall be issued by an insurance company acceptable and satisfactory to County and authorized to do business in the State of Texas. Acceptance of or the verification of insurance by County shall not relieve or decrease the liability of Contractor.

## 2. Insurance Lapse

In the event successful firm fails to maintain insurance as required by this contract, successful firm shall immediately cure such lapse in insurance coverage at successful firm's sole expense and pay County in full for all costs and expenses incurred by County under this contract as a result of such failure to maintain insurance by successful firm, including costs and reasonable attorney's fees relating to County's attempt to cure such lapse in insurance coverage. Such costs and attorney's

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fees, not to exceed fifteen hundred and 00/100 dollars (\$1,500.00), shall be automatically deducted from monies or payments owed to successful firm by County. Moreover, the County shall retain five percent (5%) of the value of the Contract that shall be placed into an account from monies or payments owed to Contractor by County to cover County’s potential exposure to liability during the period of such lapse. The five percent (5%) retainage shall be held by County until six (6) months after the date lapse in coverage is cured or Term of the Contract has ended or has otherwise been terminated, canceled or expired and shall be released if no claims are received or lawsuits filed against County for any matter that should have been covered by the required insurance. The County shall retain the funds if a claim is received or lawsuit and use the funds to defend, pay costs of defense or settle the claim.

**XV. Rejection or Acceptance of Bids**

The County reserves the right to accept or reject in part or in whole any bids submitted. The Purchasing Agent will recommend to Commissioners Court award to the lowest responsive and responsible bidder as determined by the Purchasing Agent.

**XVI. Late and Withdrawn Bids**

All bids must be submitted no later than the bid due date and time established by this solicitation. Bid arriving after the due date and time will not be accepted. Late bids delivered by carrier will be return to the bidder unopened.

A bidder has the right to withdraw their bid prior to the bid due date and time, thereafter, the bidder shall submit a formal request to the Dallas County Purchasing Agent requesting to withdraw their bid.

**XVII. Confidentiality**

Any information deemed confidential, shall be clearly noted as such on each page of the solicitation response by the bidder. County cannot guarantee it will not be compelled to disclose all or part of any public record under the Texas Open Record Act. Respondents who include information in a bid that is legally protected as trade secret or confidential shall clearly indicate the information which constitutes a trade secret or confidential information by marking that part of the bid “trade secret” or “confidential” at the appropriate place. If a request is made under the Texas Open Records Act to inspect information designated as trade secret or confidential in a bid, the bidder shall, upon request, immediately furnish sufficient written reasons and information as to why the information designated as a trade secret or confidential should be protected from disclosure to Attorney General of Texas for final determination.

**XVIII. Disqualification of Bidders**

Bidders may be disqualified for, but not limited to, the following reasons:

- Reason to believe collusion exists among the bidders
- The bidder is involved in any litigation against Dallas County
- The bidder is in arrears on an existing contract or has failed to perform on a previous contract with Dallas County

**XIX. Permits Required by Law**

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Contractor shall comply with all requirements of federal, state, and local statutory requirements and regulations pertinent to or affecting any phase of this contract.

## **XX. Records and Audit**

The Contractor shall keep accurate records of all components of invoices to the County as they relate to this contract. These records shall be retained for a minimum of two years after the conclusion of the Contract. The County reserves the right to audit any records it deems necessary for the execution of this Contract.

## **XXI. Assignment of Contract**

The Contractor shall not assign, transfer, sublet, convey or otherwise dispose of the Contract of any part therein or its right, title or interest therein or its power to execute the same to any other persons, firm, partnership, company or corporation without the prior written consent of the County. Should the Contractor assign, transfer, sublet, convey or otherwise dispose of its right, title or interest or any part thereof in violation of this section, the County may, at its discretion, cancel the Contract and all rights, title and interest of the Contractor shall therein cease and terminate, and the Contractor shall be declared in default.

## **XXII. Default by Contractor**

The following events shall be deemed to be events of default by Contractor under the Contract:

- Contractor shall become insolvent, or shall make a transfer in fraud of creditors, or shall make an assignment for the benefit of creditors;
- Contractor attempts to assign the Contract without the prior written consent of the County;
- Contractor shall fail to perform, keep or observe any term, provision or covenant of the Contract;  
or
- Contractor fails to properly and timely pay Contractor personnel, suppliers or other contractors and the failure impacts the County in any manner.

In the event a default occurs, the Director shall give the Contractor written notice of the default. If the default is not corrected to the satisfaction and approval of the Director within the time specified in such notice, the County may immediately cancel the Contract. At the direction of the Director, the Contractor shall vacate the facility, if applicable, and shall have no right to further operate under the Contract.

The Contractor, in accepting the Contract, agrees that the County shall not be liable to prosecution for damages or lost anticipated profits if the County cancels or terminates the Contract.

No Waiver: No waiver by the County of any default or breach of any covenant, condition, or stipulation shall be treated as a waiver of any subsequent default or breach of the same or any other covenant, condition, or stipulation.

## **XXIII. Termination**

The County may terminate this agreement in whole or in part by giving thirty days written notice thereof to Contractor. The County will compensate Contractor in accordance with the terms of the agreement for all goods and services delivered and accepted prior to the effective date of such termination notice.

**XXIV. Miscellaneous**

1. After executing the contract or issuance of a purchase order, no consideration will be given to any claim of misunderstanding.
2. Bidders shall submit with their bid, the required Contractor’s qualification statement with supporting information as stated herein along with all other supporting documentation requested.
3. Bidders shall thoroughly familiarize themselves with the provisions of these specifications/scope of work.
4. A bid may be disqualified if the corporation or individual bidder is in arrears or in default to the County for delinquent taxes or assessments or on any debt or contract, whether as defaulter or bondsman; or who has defaulted upon any obligation to the County by failing to perform satisfactorily any previous agreement or Contract within the past seven years. Also, bidders may be disqualified for poor prior performance on similar Contracts with other entities.
5. The Contractor agrees to abide by the rules and regulations as prescribed herein. The Contractor will, in all solicitations or advertisements for personnel to perform services under the Contract, state that all qualified applicants will receive consideration for employment without regard to race, color, religion, gender, or national origin.
6. If either party hereto is prevented from completing its obligations under the Contract by act of God, strike, lockout, material or labor restrictions by any governmental authority, civil riot, flood, or any other cause beyond the control of the parties hereto, then such party shall be excused from such performance for such period of time as is reasonably necessary after such occurrence to remedy the effects thereof.
7. The section headings in these Specifications are for convenience in reference and are not intended to define or limit the scope of any of the conditions, terms or provisions of these specifications.
8. Should any question arise as to the proper interpretation of the terms and conditions of these specifications, the decision of the department director and/or Purchasing Agent or his authorized representative shall be final.

**XXV. Indemnity**

The selected bidder agrees to defend, indemnify and hold the County, its officers, agents and employees, harmless against any and all claims, lawsuits, judgments, costs, and expenses for personal injury (including death), property damage or other harm for which recovery of damages is sought, suffered by any person or persons, that may arise out of or be occasioned by the selected bidder’s breach of any of the terms or provisions of the contract, or by any other negligent or strictly liable act or omission of the selected bidder, its officers, agents, employees, or subcontractors, in the performance of the contract; except that the indemnity provided for in this paragraph shall not apply to any liability resulting from the sole negligence or fault of the County, its officers, agents, or employees and in the event of joint and concurrent negligence or fault of the selected bidder(s) and County, responsibility, and indemnity, if any, shall be apportioned comparatively in accordance with the laws of the State of Texas, without waiving any governmental immunity available to the County under Texas law and without waiving any

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defenses of the parties under Texas law. The provisions of this paragraph are solely for the benefit of the parties hereto and are not intended to create or grant any rights, contractual or otherwise, to any other person or entity.

## **XXVI. Development Costs**

Neither Dallas County nor its representatives shall be liable for any expenses incurred in connection with preparing a response to this IFB. Respondents are encouraged to prepare their bids simply and economically, providing a straightforward and concise description of your firm's ability to meet the requirements of the IFB.

## **XXVII. Certificate of Interested Parties (Form 1295)**

Section 2252.908 of the Texas Government Code: An Act Addressing Disclosure of Interested Parties.

Effective January 1, 2016, Dallas County, must comply with the "Disclosure of Interest Parties, requirements established under Section 2252.908 of the Texas Government Code as implemented by the Texas Ethics Commission. Briefly stated, all contracts requiring an action or vote by the governing body of the entity or agency before the contract may be signed (regardless of the dollar amount) or that has a value of at least \$1 million will require the on-line completion of Form 1295 "Certificate of Interested Parties", in accordance with Texas Government Code Statute §2252.908. Form 1295 is also required for any and all contract amendments, extensions or renewals. All business entities are required to complete and file electronically with the Texas Ethics Commission using the online filing application.

**Step 1:** Business Entity completes Form 1295 in electronic format on the Texas Ethics Commission website: ([https://www.ethics.state.tx.us/whatsnew/elf\\_info\\_form1295.htm](https://www.ethics.state.tx.us/whatsnew/elf_info_form1295.htm))

**Step 2:** Upon receipt of a completed Interested Parties Disclosure Form, Texas Ethics Commission issues a Certification of Filing to the Business Entity and the Business Entity download(s), print, sign(s) and notarize(s) Form 1295. An authorized agent of the business entity will need to sign the printed copy of the form and have the form notarized.

**Step 3:** At the time of submission of the solicitation to Dallas County the Business Entity must submit the completed notarized Form 1295 with the Certification of Filing with their contract (i.e.: bid, rfp, rfq, soq, etc.) to Dallas County. Upon receipt, Dallas County may proceed with the award and/or execution of the contract.

**Step 4:** Not later than the 30th day after the date the contract has been signed by all parties, Dallas County must notify the Texas Ethics Commission (in electronic format) of the receipt of (1) Form 1295, and (2) the Certification of Filing.

**Step 5:** Not later than the 7th business day after receipt of the above notice, Texas Ethics Commission makes the disclosure available to the public by posting the disclosure on its website.

**County Offices and Departments submitting contracts to Commissioners Court for award/execution are responsible for acknowledging and filing the Form 1295.**

### Definitions:

(a) "Contract" includes an amended, extended, or renewed contract.

(b) "Business entity" includes an entity through which business is conducted with a governmental entity or state agency, regardless of whether the entity is a for-profit or nonprofit entity. The term does not include a governmental entity or state agency.

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(c)“Controlling interest” In accordance with the Texas Ethics Commission, Chapter 46.3(c) and applicable to Texas Government Code §2252.908 - (1) an ownership interest or participating interest in a business entity by virtue of units, percentage, shares, stock, or otherwise that exceeds 10 percent; (2) membership on the board of directors or other governing body of a business entity of which the board or other governing body is composed of not more than 10 members; or (3) service as an officer of a business entity that has four or fewer officers, or service as one of the four officers most highly compensated by a business entity that has more than four officers.

(d)“Interested party” (1) a person who has a controlling interest in a business entity with whom a governmental entity or state agency contracts; or (2) a person who actively participates in facilitating a contract or negotiating the terms of a contract with a governmental entity or state agency, including a broker, intermediary, adviser, or attorney for the business entity.

(e)“Intermediary” for purposes of this rule, means, a person who actively participates in the facilitation of the contract or negotiating the contract, including a broker, adviser, attorney, or representative of or agent for the business entity who:

- (1) receives compensation from the business entity for the person’s participation;
- (2) communicates directly with the governmental entity or state agency on behalf of the business entity regarding the contract; and
- (3) is not an employee of the business entity.

To obtain additional information on Section 2252 and to learn more about the Texas Ethics Commission process to create a new account or to complete an electronic version of Form 1295 for submission with a signed contract, please go to the following website:

<https://www.ethics.state.tx.us/tec/1295-Info.htm>

Instructional Videos for Business Entities on how to file online can be found at:

[https://www.ethics.state.tx.us/whatsnew/elf\\_info\\_form1295.htm](https://www.ethics.state.tx.us/whatsnew/elf_info_form1295.htm)

## **XXVIII. Conflict of Interest**

No County elected or appointed official or representative, or any employees shall have any financial interest, direct or indirect, in any contract with the County or be financially interested, directly or indirectly, in the sale to the County of any land, materials, supplies, goods or services, except on behalf of the County as an official or employee. Any violation of this Section, with knowledge, expresses or implied, of the person or corporation contracting with the County shall render this Agreement involved voidable by the Commissioners Court of Dallas County. It is the responsibility of Contractor during all phases of this Agreement to notify the County in writing of any potential conflict of interest. Contractor covenants that neither it nor any member of its corporation presently has any interest or shall acquire any interest, direct or indirect, which would conflict in any manner or degree with the performance of this Agreement. Contractor further covenants that in the performance of this Agreement no person having such interest shall be employed or appointed by Contractor.

## **XXIX. Small Business Enterprise (SBE) Program**

See Attachment S – Small Business Enterprise Program (SBE) and SBE forms

## Questions & Answers

**Buyer Organization** Dallas County  
**Question Acceptance Deadline** 04/09/2026 03:00 PM CDT  
**Closing Date** 04/23/2026 02:00 PM CDT

No	Vendor Name	Question/Answer	Question Date	Answer Date
Q1	Stewart & Stevenson	<p><b>Question: Rolls-Royce mtu</b> (by <i>Trey Rutschman</i>)            Would Rolls-Royce mtu be an acceptable manufacturer of generator set?</p> <p><b>No answer has been provided for this question yet.</b></p>	03/12/2026 03:32 PM CDT	
Q2	Energy Systems	<p><b>Question: Substitution Request – Generator</b> (by <i>Bobby Messer</i>)            We are requesting approval to bid using Generac as an equal alternate manufacturer for the diesel engine generator. We are prepared to provide full technical documentation upon request. Please advise if this substitution is approved or if additional information is needed prior to the bid date.</p> <p><b>No answer has been provided for this question yet.</b></p>	03/12/2026 05:44 PM CDT	

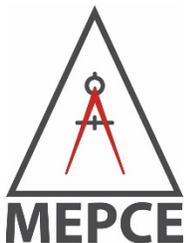


# Lyle B. Medlock Youth Treatment Center Generator Replacement

## Specifications

Lyle B. Medlock Youth Treatment Center  
1576 E Langdon Rd  
Dallas, TX 75241

Services Provided By:



MEPCE  
6341 Campus Circle Drive E  
Irving, TX 75038  
972.870.9060

# Medlock Generator Replacement

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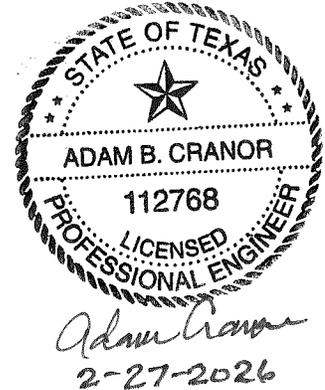
### DIVISION 00

001153	Request for Qualifications
002600	Procurement Substitution Procedures
004113	Bid Form
004322	Unit Prices Form
004323	Alternates Form
006000	Project Forms

STRUCTURAL ENGINEER  
FRANK W NEAL & ASSOCIATES INC  
FIRM F-296  
RESPONSIBLE FOR DIVISION 03 SPECIFICATIONS

### DIVISION 01

011000	Summary
012500	Substitution Procedures
012600	Contract Modification Procedures
012900	Payment Procedures
013100	Project Management and Coordination
013200	Construction Progress Documentation
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013300	Submittal Procedures
013516	Alteration Project Procedures
014000	Quality Requirements
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016000	Product Requirements
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017700	Closeout Procedures
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017839	Project Record Documents
017900	Demonstration and Training



ELECTRICAL ENGINEER  
MEPCE, INC.  
FIRM F-4050  
RESPONSIBLE FOR DIVISION 26 SPECIFICATIONS

### DIVISION 03

032000	Concrete Reinforcement
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260500	Common Work Results for Electrical
260519	Low-Voltage Power Conductors and Cables
260526	Grounding and Bonding
260529	Hangers and Supports
260533	Raceways and Boxes
260543	Underground Ducts and Raceways
260544	Sleeves and Sleeve Seals for Raceways and Cabling

260553	Identification
260573.13	Short-Circuit Studies
260573.16	Coordination Studies
260573.19	Arc-Flash Hazard Analysis
262213	Low-Voltage Distribution Transformers
262416	Panelboards
262726	Wiring Devices
262813	Fuses
263213.14	Diesel Engine Generators
263600	Transfer Switches

## SECTION 001153 – REQUEST FOR QUALIFICATIONS

### PART 1 – GENERAL

#### 1.1 PURPOSE, LAWS, AND REGULATIONS

- A. The purpose of the Prequalification Procedure described in this Document is to provide Owner with a mechanism to evaluate and determine whether Prospective Bidders are qualified to participate in the construction of Project. Evaluation will be limited to that office of the Prospective Bidder that is to perform the Work.
- B. Applicable provisions shall be observed in the soliciting, receiving, and evaluating of Prospective Bidders' qualifications.
- C. Applicable provisions shall be observed in bidding, letting, and execution of the Work.
- D. Prospective Bidders are required to comply with these Requirements for Prequalification. Only those Prospective Bidders who have complied with the Requirements for Prequalification and have been determined to be qualified will be eligible to submit construction bids on Project.

#### 1.2 DEFINITIONS

- A. Financial Statement: The requirement for submitting a financial statement as an attachment to AIA Document A305, "Contractor's Qualification Statement", shall be understood to mean a certified annual audit, prepared according to generally acceptable accounting practices and signed by an independent certified public accountant. A Reviewed Statement of Assets and Liabilities, prepared and signed by an independently certified public accountant, is also acceptable. A self-prepared annual compiled financial statement or balance sheet is unacceptable.
- B. Prospective Bidder: A Prospective Bidder is a person or entity who submits a Submittal of Qualifications to Owner.
- C. Project: Generally described in the Advertisement for Bids.

#### 1.3 PREQUALIFICATION DOCUMENTS

- A. Prequalification Documents: Consist of the Advertisement for Prequalification of Bidders; this Request for Qualifications document; AIA Document A305, "Contractor's Qualification Statement"; and additional documents issued by Owner.
- B. Obtaining Prequalification Documents: Prospective Bidders may obtain complete sets of the Prequalification Documents from the issuing office designated in the Advertisement for Prequalification of Bidders. Prospective Bidders shall use complete sets of Prequalification

Documents in preparing their submittal. Owner assumes no responsibility for errors or misinterpretations resulting from the use of incomplete sets of Prequalification Documents.

- C. Interpretation or Correction of Prequalification Documents: If the Prospective Bidder is in doubt as to the interpretation of any part of the Prequalification Documents or finds discrepancies in or omissions from any part of the Prequalification Documents, it must submit a written Request for Interpretation thereof no later than seven days prior to acceptance of Submittals of Qualifications. Address all communications to Owner.

#### 1.4 PREQUALIFICATION PROCEDURES

A. Form of Prequalification Submittal:

1. Submittals of Prequalification must be submitted in duplicate on AIA Document A305, "Contractor's Qualification Statement," properly executed and with all items filled out ink or typed, and all additional data, attachments, and forms provided. Do not change or add words to the Qualification Statement or forms. All signatures must be original (and sealed if a corporation) and must be notarized and sealed by a Notary Public.

B. Modification to Requirements for Prequalification:

1. Clarifications, alterations, or changes made by Owner to the Requirements for Prequalification shall be in writing only. Verbal information is not valid or binding.
2. Modifications will be mailed or delivered to those Prospective Bidders having obtained Prequalification Documents from the issuing office.

C. Submission of Prequalification Documents:

1. Each Submittal of Prequalification shall be delivered to the location indicated in the Advertisement for Prequalification on or before the day and hour set for receipt of Submittals. Each Submittal of Prequalification shall be submitted in an opaque, sealed envelope marked in the lower left-hand corner as follows:
  - a. Bidder's Prequalification Statement for Medlock Generator Replacement.
  - b. Prospective Bidder's Name.
  - c. Prospective Bidder's Address.
  - d. Contractor's License No.
  - e. Date and Time for Submittal.
2. If not delivered in person, this envelope shall be enclosed in a second envelope for posting to the location indicated for receipt of bids. This envelope shall be addressed as follows:
  - a. Bidder's Prequalification Statement for Medlock Generator Replacement.
  - b. Date and Time for Submittal.
  - c. Dallas County
  - d. Owner's Address
  - e. Contractor's License No. (In return address).
3. Include a completed copy of the Prequalification Checklist attached to the cover of the Submittal.
4. It is the sole responsibility of the Prospective Bidder to ensure that its submittal is received by the submittal date and time. No faxed or e-mail submittal or modification of a submittal will be considered. No submittal submitted after the time fixed for receiving

submittals will be considered; late submittals will be returned to the Prospective Bidder unopened.

5. Owner reserves the right to waive any informality and to request additional information from Prospective Bidders, at Owner's discretion.

D. Attachments:

1. Prospective Bidders shall complete all required forms and attachments described in the Prequalification Documents, entering "Not Applicable" where information does not apply. Absence of any of the forms included in the Prequalification Documents will be reason for possible disqualification.

E. Status of Prospective Bidders:

1. Proprietors submitting bids shall indicate their status as proprietors.
2. Prospective Bidders submitting qualifications for partnerships shall indicate their status as partners and shall submit a certified copy of the power of attorney authorizing the executor of the submittal to bind the partnership.
3. Prospective Bidders submitting qualifications for corporations shall indicate their status as corporations and shall submit a certified copy of the board of directors' authorization for the Prospective Bidder to bind the corporation and shall affix the corporate seal on the submittal.
4. Prospective Bidders shall provide the following:
  - a. Names and addresses of proprietors, of all members of a partnership, or of the corporation's officers.
  - b. Name of jurisdiction where the partnership is registered or where the corporation is incorporated. Corporations must be licensed to do business in Project state at the time of executing the Contract.

## 1.5 WITHDRAWAL

- A. A Qualification Statement may be withdrawn on personal request received from the Prospective Bidder.

## 1.6 PREQUALIFICATION CRITERIA

- A. Prospective Bidders must demonstrate the following to the satisfaction of Owner:
  1. Proper license under the laws and regulations governing their respective trade(s).
  2. Capacity to provide Performance Bond, Labor and Material Payment Bond, and Insurance in a form acceptable to Owner in amounts adequate to bond the Work based on the scope indicated in the Advertisement for Prequalifications.
  3. Applicable experience of firm as described in the Contractor's Qualification Statement, including the following:
    - a. Experience of Firm: The firm in its current organization shall have successfully completed minimum of five projects of similar type, quality, and scope, including a minimum of two within the last three years. The firm shall have a record of project completion, credit record, record of judgment claims, arbitration proceedings, and suits pending or outstanding acceptable to Owner.

- b. Experience of Firm Officers: The firm officers shall have personal record of project completion acceptable to Owner.
  - c. Experience of Project and Field Management Staff to Be Committed by the Prospective Bidder to Carry Out the Work: The assigned project manager and field superintendent must have successfully completed minimum of three projects of similar type, quality, and scope.
  - d. For purposes of this submittal, reference to "key individuals" as described in the Contractor's Qualification Statement shall be understood to mean the principal in charge, the project manager(s), and the project field superintendent(s) committed by the Prospective Bidder to carry out the Work of this Project. Prospective Bidder by submitting qualifications of key individuals agrees that Owner reserves the right to approve or reject subsequent reassignment of key individuals.
  - e. For purposes of this submittal, "successful completion" shall be understood to mean completion of project within project schedule and budget. Provide additional information indicating reasons why any referenced project did not meet project schedule or project budget.
  - f. For purposes of this Qualification, "similar project" shall be understood to include the following project elements:
    - I. Steam System Installation, Demolition, Refurbishment, Testing, & Startup.
    - II. Renovation/addition work on occupied sites.
4. Adequate financial resources, including ability to secure materials and labor necessary for completion of the Work and other work in hand, within the anticipated contract times, and reflecting the anticipated retainage from progress payments.
  5. Work-in-hand capacity, such that the Prospective Bidder demonstrates adequate work under contract to continue its business operations at least at their current level, at the same time indicating the capability to carry out Owner's scope of work.
  6. Adequate organization to complete work of the scope anticipated, including firm management, project management, field superintendence, and field engineering and quality control.
  7. Acceptable past performance as indicated by firm's references, including ability to meet contract time and to monitor, manage, and communicate interim scheduling requirements, to carry out required quality-control activities, to properly prepare interim and final payment requests, and to successfully complete project close-out requirements.
  8. Acceptable documentation of firm's ability to comply with Owner's Minority-owned business enterprise/woman-owned business enterprise (MBE/WBE) requirements. Prospective Bidders shall contact Owner to obtain copies of requirements.
  9. Acceptable documentation of firm's employee screening practices as indicated by affidavit describing background check procedures for firm's employees and requirements for same incorporated in firm's subcontracts.
- B. Consideration of qualifications may be withheld if the Qualification Statement shows any unexplained erasures, omissions, alterations of form, additional payments not called for, added restrictions or qualifying conditions, or other irregularities of any kind.
- C. Owner may make such investigations as it deems necessary to determine the ability of the Prospective Bidder to perform the Work, and the Prospective Bidder shall furnish to Owner all such information for this purpose as Owner may request. Owner reserves the right to withhold qualification if the evidence submitted by or investigation of such Prospective Bidder fails to

satisfy Owner that such Prospective Bidder is properly qualified to carry out the obligations of the Project. The determination of which bidders are prequalified is not protestable, except as allowed by law.

- D. Prequalification Submittal and data contained therein is considered privileged and confidential and will not be disclosed to any outside party except as required by law.

## 1.7 BONDS AND INSURANCE

- A. The Prospective Bidder shall provide as part of the Submittal of Qualifications evidence of its ability to furnish below:
  - 1. Performance Bond, a Payment Bond, and a Labor and Material Bond, each in the amount of 100 percent of the Contract Sum, with a corporate surety authorized to transact business in Project's jurisdiction.
  - 2. Satisfactory certificates of insurance in the amount and types required by statute, but not less than the following:
    - a. Professional design errors and omissions insurance endorsement for delegated design by Contractor's professional engineer.
    - b. Workers' Compensation insurance provisions: statutory limits.
    - c. Commercial General Liability insurance provisions: at limits established by Owner in Project Contract Documents and including below:

## 1.8 ACCEPTANCE OF QUALIFICATIONS

- A. Prospective bidders will be notified of Owner's determination, within **14** days from the date of submission.
- B. Evaluations will be confidential. Notifications will be publicly available information.
- C. Owner may deny prequalification if it finds one or more of the following:
  - 1. The Prospective Bidder does not have sufficient financial capacity to perform the Work.
  - 2. The Prospective Bidder does not have the appropriate experience to perform the Work, including, but not limited to, having met the experience criteria set forth herein.
  - 3. The Prospective Bidder or any officer, director, or owner thereof has had judgments entered against him within the past five years for the breach of contracts for governmental or nongovernmental construction work including, but not limited to, design-build or construction management contracts.
  - 4. The Prospective Bidder has been in substantial noncompliance with the terms and conditions of prior construction with Owner, or in documented substantial noncompliance with the terms and conditions of prior construction with another public body without good cause.
  - 5. The Prospective Bidder or any officer, director, owner, or chief financial official thereof has been convicted within the past 10 years of a crime related to governmental or nongovernmental construction or contracting.

6. The Prospective Bidder or any officer, director, or owner thereof is currently debarred pursuant to an established debarment procedure from bidding or contracting by any public body, agency of another state, or agency of the Federal Government.
  7. The Prospective Bidder failed to provide to the public body in a timely manner any information required by the public body relevant to the six preceding subparagraphs.
  8. The Prospective Bidder provides false, nonresponsive, misleading, or incomplete information for items required herein.
- D. The acceptance of a Prospective Bidder's qualifications will be a Notice of Prequalification, signed by a duly authorized representative of Owner; no other act by Owner or its agents shall constitute the acceptance of qualifications. The acceptance of a Prospective Bidder's qualifications by Owner does not constitute a contract or promise to award a contract to the Prospective Bidder.

#### 1.9 PROSPECTIVE BIDDER'S CHECKLIST

- A. To assist the Prospective Bidder in properly completing all documentation required, the following checklist is provided for the Prospective Bidder's convenience. The Prospective Bidder is solely responsible for verifying compliance with prequalification requirements.
- B. Attach this complete checklist to the outside of the Submittal envelope.
1. Reviewed the Prequalification Documents, including the Advertisement for Prequalification and Requirements for Prequalification, prior to preparing this submittal.
  2. Prepared AIA Document A305, "Contractor's Qualification Statement," as required by the document instructions and by the Requirements for Prequalification, including all attachments and data required as part of the Qualification Statement, properly notarized.
  3. Attached: Copy of applicable Contractor's license(s).
  4. Attached: Affidavit of Employee Screening.
  5. Attached: Resumes of key individuals.
  6. Attached: Other attachments as necessary to provide information required.
  7. Envelope shows name and address of the Prospective Bidder.
  8. Envelope shows the Prospective Bidder's Contractor's License No.
  9. By submitting notarized statement, the Prospective Bidder certifies that the Bidder can provide executed Performance Bond and Labor and Material Bond meeting requirements given in the Requirements for Prequalification.
  10. By submitting notarized statement, the Prospective Bidder certifies that the Bidder can provide Certificates of Insurance in the amounts indicated in the Requirements for Prequalification.

**END OF DOCUMENT 001153**

## **SECTION 002600 – PROCUREMENT SUBSTITUTION PROCEDURES**

### **PART 1 – GENERAL**

#### **1.1 DEFINITIONS**

- A. Procurement Substitution Requests: Requests for changes in products, materials, equipment, and methods of construction from those indicated in the Procurement and Contracting Documents, submitted prior to receipt of bids.
- B. Substitution Requests: Requests for changes in products, materials, equipment, and methods of construction from those indicated in the Contract Documents, submitted following Contract award. See Section 012500 "Substitution Procedures" for conditions under which Substitution requests will be considered following Contract award.

#### **1.2 QUALITY ASSURANCE**

- A. Compatibility of Substitutions: Investigate and document compatibility of requested substitution with related products and materials. Engage a qualified testing agency to perform compatibility tests recommended by manufacturers.

#### **1.3 PROCUREMENT SUBSTITUTIONS**

- A. Procurement Substitutions, General: By submitting a bid, the Bidder represents that its bid is based on materials and equipment described in the Procurement and Contracting Documents, including Addenda. Bidders are encouraged to request approval of qualifying substitute materials and equipment when the Specifications Sections list materials and equipment by product or manufacturer name.
- B. Procurement Substitution Requests will be received and considered by Owner when the following conditions are satisfied, as determined by Engineer; otherwise, requests will be returned without action:
  - 1. Extensive revisions to the Contract Documents are not required.
  - 2. Requested changes are in keeping with the general intent of the Contract Documents, including the level of quality of the Work represented by the requirements therein.
  - 3. The request is fully documented and properly submitted.

#### **1.4 SUBMITTALS**

- A. Procurement Substitution Request: Submit to Owner's Representative. Procurement Substitution Request must be made in writing by prime contract Bidder only in compliance with the following requirements:

1. Requests for substitution of materials and equipment will be considered if received no later than 10 days prior to date of bid opening.
  2. Submittal Format: Submit three copies of each written Procurement Substitution Request, using form bound in Project Manual.
- B. Engineer's Action:
1. Engineer may request additional information or documentation necessary for evaluation of the Procurement Substitution Request. Engineers will notify all bidders of acceptance of the requested substitute by means of an Addendum to the Procurement and Contracting Documents.
- C. Engineer's approval of a substitute during bidding does not relieve Contractor of the responsibility to submit required shop drawings and to comply with all other requirements of the Contract Documents.

**END OF SECTION 002600**

**SECTION 004113 - BID FORM**

1.1 BID INFORMATION

- A. Bidder: \_\_\_\_\_.
- B. Prime Contract: \_\_\_\_\_.
- C. Project Name: Medlock Generator Replacement
- D. Project Location: 1576 E Langdon Rd, Dallas, TX 75241
- E. Owner: Dallas County
- F. Engineer: MEPCE
- G. Engineer Project Number: 31.00539

1.2 CERTIFICATIONS AND BASE BID

- A. Base Bid, Single-Prime (All Trades) Contract: The undersigned Bidder, having carefully examined the Procurement and Contracting Requirements, Conditions of the Contract, Drawings, Specifications, and all subsequent Addenda, as prepared by MEPCE and Engineer's consultants, having visited the site, and being familiar with all conditions and requirements of the Work, hereby agrees to furnish all material, labor, equipment and services, including all scheduled allowances, necessary to complete the construction of the above-named project, according to the requirements of the Procurement and Contracting Documents, for the stipulated sum of:
  - 1. \_\_\_\_\_ Dollars  
(\$ \_\_\_\_\_).
  - 2. The above amount may be modified by amounts indicated by the Bidder on the attached Document 004322 "Unit Prices Form" and Document 004323 "Alternates Form."

1.3 BID GUARANTEE

- A. The undersigned Bidder agrees to execute a contract for this Work in the above amount and to furnish surety as specified within 10 days after a written Notice of Award, if offered within 60 days after receipt of bids, and on failure to do so agrees to forfeit to Owner the attached cash, cashier's check, certified check, U.S. money order, or bid bond, as liquidated damages for such failure, in the following amount constituting five percent (5%) of the Base Bid amount above:
  - 1. \_\_\_\_\_ Dollars  
(\$ \_\_\_\_\_).
- B. In the event Owner does not offer Notice of Award within the time limits stated above, Owner will return to the undersigned the cash, cashier's check, certified check, U.S. money order, or bid bond.

1.4 SUBCONTRACTORS AND SUPPLIERS

- A. The following companies shall execute subcontracts for the portions of the Work indicated:
  - 1. Plumbing Work: \_\_\_\_\_.
  - 2. Electrical Work: \_\_\_\_\_.

1.5 ACKNOWLEDGEMENT OF ADDENDA

- A. The undersigned Bidder acknowledges receipt of and use of the following Addenda in the preparation of this Bid:
  - 1. Addendum No. 1, dated \_\_\_\_\_.
  - 2. Addendum No. 2, dated \_\_\_\_\_.
  - 3. Addendum No. 3, dated \_\_\_\_\_.
  - 4. Addendum No. 4, dated \_\_\_\_\_.

1.6 CONTRACTOR'S LICENSE

- A. The undersigned further states that it is a duly licensed contractor, for the type of work to be performed, in Dallas County and the state of Texas, and that all fees, permits, etc., pursuant to submitting this bid have been paid in full.

1.7 SUBMISSION OF BID

- A. Respectfully submitted this \_\_\_\_ day of \_\_\_\_\_, 2025.
- B. Submitted By: \_\_\_\_\_ (Name of bidding firm or corporation).
- C. Authorized Signature: \_\_\_\_\_ (Handwritten signature).
- D. Signed By: \_\_\_\_\_ (Type or print name).
- E. Title: \_\_\_\_\_ (Owner/Partner/President/Vice President).
- F. Witnessed By: \_\_\_\_\_ (Handwritten signature).
- G. Attest: \_\_\_\_\_ (Handwritten signature).
- H. By: \_\_\_\_\_ (Type or print name).
- I. Title: \_\_\_\_\_ (Corporate Secretary or Assistant Secretary).
- J. Street Address: \_\_\_\_\_.
- K. City, State, Zip: \_\_\_\_\_.
- L. Phone: \_\_\_\_\_.

M. License No.: \_\_\_\_\_.

N. Federal ID No.: \_\_\_\_\_ (Affix Corporate Seal Here).

**END OF SECTION 004113**

## SECTION 004322 - UNIT PRICES FORM

### 1.1 BID INFORMATION

- A. Bidder: \_\_\_\_\_.
- B. Prime Contract: \_\_\_\_\_.
- C. Project Name: Medlock Generator Replacement
- D. Project Location: 1576 E Langdon Rd, Dallas, TX 75241
- E. Owner: Dallas County
- F. Engineer: MEPCE
- G. Engineer Project Number: 31.00539

### 1.2 BID FORM SUPPLEMENT

- A. This form is required to be attached to the Bid Form.
- B. The undersigned Bidder bids on the amounts below be added to or deducted from the Contract Sum on performance and measurement of the individual items of Work and for adjustment of the quantity given in the Unit-Price Allowance for the actual measurement of individual items of the Work.
- C. If the unit price does not affect the Work of this Contract, the Bidder shall indicate "NOT APPLICABLE."

### 1.3 UNIT PRICES

- A. Unit-price descriptions below are model text for illustration purposes.
  - 1. Unit-Price No. 1: Removal of soil and replacement with satisfactory soil material.
    - a. \_\_\_\_\_ dollars (\$ \_\_\_\_\_) per unit.
  - 2. Unit-Price No. 2: Rock excavation and replacement with satisfactory soil material.
    - a. \_\_\_\_\_ dollars (\$ \_\_\_\_\_) per unit.
  - 3. Unit-Price No. 3: Cutting and patching of concrete floor slabs.
    - a. \_\_\_\_\_ dollars (\$ \_\_\_\_\_) per unit.
  - 4. Unit-Price No. 4: Miscellaneous and structural steel.
    - a. \_\_\_\_\_ dollars (\$ \_\_\_\_\_) per unit.
  - 5. Unit-Price No. 5: Elevator jack hole rock.
    - a. \_\_\_\_\_ dollars (\$ \_\_\_\_\_) per unit.
  - 6. Unit-Price No. <Insert unit-price number>: <Insert unit-price item>.
    - a. \_\_\_\_\_ dollars (\$ \_\_\_\_\_) per unit.

1.4 SUBMISSION OF BID SUPPLEMENT

- A. Respectfully submitted this \_\_\_\_ day of \_\_\_\_\_, 2025
- B. Submitted By: \_\_\_\_\_ (Insert name of bidding firm or corporation).
- C. Authorized Signature: \_\_\_\_\_ (Handwritten signature).
- D. Signed By: \_\_\_\_\_ (Type or print name).
- E. Title: \_\_\_\_\_ (Owner/Partner/President/Vice President).

**END OF SECTION 004322**

## SECTION 004323 - ALTERNATES FORM

### 1.1 BID INFORMATION

- A. Bidder: \_\_\_\_\_.
- B. Prime Contract: \_\_\_\_\_.
- C. Project Name: Medlock Generator Replacement
- D. Project Location: 1576 E Langdon Rd, Dallas, TX 75241
- E. Owner: Dallas County
- F. Engineer: MEPCE
- G. Engineer Project Number: 31.00539

### 1.2 BID FORM SUPPLEMENT

- A. This form is required to be attached to the Bid Form.

### 1.3 DESCRIPTION

- A. The undersigned Bidder requests for the amount below be added to or deducted from the Base Bid if alternates are accepted by Owner. Amounts listed for each alternate include costs of related coordination, modification, or adjustment.
- B. Cost-Plus-Fee Contract: Alternate price given below includes adjustment to Contractor's Fee.
- C. If the alternate does not affect the Contract Sum, the Bidder shall indicate "NO CHANGE."
- D. If the alternate does not affect the Work of this Contract, the Bidder shall indicate "NOT APPLICABLE."
- E. The Bidder shall be responsible for determining from the Contract Documents the affects of each alternate on the Contract Time and the Contract Sum.
- F. Owner reserves the right to accept or reject any alternate, in any order, and to award or amend the Contract accordingly within 60 days of the Notice of Award unless otherwise indicated in the Contract Documents.
- G. Acceptance or non-acceptance of any alternates by the Owner shall have no effect on the Contract Time unless the "Schedule of Alternates" Article below provides a formatted space for the adjustment of the Contract Time.

1.4 SCHEDULE OF ALTERNATES

PART 2 – Revise "Alternate No." Paragraph below to correspond to scheduled alternates.

- A. Alternate No. <Insert number>: <Insert title of alternate>:
  - 1. ADD \_\_\_ DEDUCT \_\_\_ NO CHANGE \_\_\_ NOT APPLICABLE \_\_\_.
  - 2. \_\_\_\_\_ Dollars (\$\_\_\_\_\_).

PART 3 – Retain subparagraph below if provision for adjustment of the Contract Time for the alternate is required.

- 1. ADD \_\_\_ DEDUCT \_\_\_ calendar days to adjust the Contract Time for this alternate.

3.2 SUBMISSION OF BID SUPPLEMENT

- A. Respectfully submitted this \_\_\_ day of \_\_\_\_\_, 2025.
- B. Submitted By: \_\_\_\_\_ (Insert name of bidding firm or corporation).
- C. Authorized Signature: \_\_\_\_\_ (Handwritten signature).
- D. Signed By: \_\_\_\_\_ (Type or print name).
- E. Title: \_\_\_\_\_ (Owner/Partner/President/Vice President).

**END OF SECTION 004323**

## **SECTION 006000 – PROJECT FORMS**

### **PART 1 – GENERAL**

#### **1.1 FORM OF AGREEMENT AND GENERAL CONDITIONS**

- A. The following form of Owner/Contractor Agreement and form of the General Conditions shall be used for Project:
  - 1. AIA Document A101 "Standard Form of Agreement between Owner and Contractor Where the Basis of Payment is a Stipulated Sum."
    - a. The General Conditions for Project are AIA Document A201, "General Conditions of the Contract for Construction."

#### **1.2 ADMINISTRATIVE FORMS**

- A. Copies of AIA standard forms may be obtained from the American Institute of Architects; <https://www.aiacontractdocs.org>; (800) 942-7732.
- B. Preconstruction Forms:
  - 1. Form of Performance Bond and Labor and Material Bond: AIA Document A312 "Performance Bond and Payment Bond."
  - 2. Form of Certificate of Insurance: AIA Document G715 "Supplemental Attachment, ACORD Certificate of Insurance."
- C. Information and Modification Forms:
  - 1. Form for Requests for Information (RFIs): AIA Document G716 "Request for Information (RFI)."
  - 2. Form of Request for Bids: AIA Document G709
  - 3. Change Order Form: AIA Document G701 "Change Order."
  - 4. Form of Architect's Memorandum for Minor Changes in the Work: AIA Document G710 "Architect's Supplemental Instructions."
  - 5. Form of Change Directive: AIA Document G714 "Construction Change Directive."
- D. Payment Forms:
  - 1. Schedule of Values Form: AIA Document G703 "Continuation Sheet."
  - 2. Payment Application: AIA Document G702 "Application and Certificate for Payment and Continuation Sheet."
  - 3. Form of Contractor's Affidavit: AIA Document G706 "Contractor's Affidavit of Payment of Debts and Claims."
  - 4. Form of Affidavit of Release of Liens: AIA Document G706A "Contractor's Affidavit of Payment of Release of Liens."
  - 5. Form of Consent of Surety: AIA Document G707 "Consent of Surety to Final Payment."

**END OF SECTION 006000**

## SECTION 011000 – SUMMARY

### PART 1 – GENERAL

#### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

#### 1.2 SUMMARY

- A. Section Includes:
  - 1. Project information.
  - 2. Work covered by Contract Documents.
  - 3. Phased construction.
  - 4. Work performed by Owner.
  - 5. Multiple Work Packages.
  - 6. Work under Owner's separate contracts.
  - 7. Future work not part of this Project.
  - 8. Owner's product purchase contracts.
  - 9. Owner-furnished/Contractor-installed (OFICI) products.
  - 10. Owner-furnished/Owner-installed (OFOI) products.
  - 11. Contractor-furnished/Owner-installed (CFOI) products.
  - 12. Contractor's use of site and premises.
  - 13. Coordination with occupants.
  - 14. Work restrictions.
  - 15. Specification and Drawing conventions.
  - 16. Miscellaneous provisions.

#### 1.3 DEFINITIONS

- A. Work Package: A group of specifications, drawings, and schedules prepared by the design team to describe a portion of the Project Work for pricing, permitting, and construction.

#### 1.4 PROJECT INFORMATION

- A. Project Identification:
  - 1. Project Location: 1576 E Langdon Rd, Dallas, TX 75241
- B. Owner:
  - 1. Owner's Representative: Deo Matukanga, deo.matukanga@dallascounty.org
- C. Engineer: MEPCE
  - 1. Engineer's Representative: Brendan Foley, bfoley@mepce.com

- D. Web-Based Project Software: Project software will be used for purposes of managing communication and documents during the construction stage.
  - 1. See Section 013100 "Project Management and Coordination." for requirements for using web-based Project software.

#### 1.5 WORK COVERED BY CONTRACT DOCUMENTS

- A. The Work of Project is defined by the Contract Documents and includes, but is not limited to, the following:
  - 1. Demolition of the facility's existing emergency generator
  - 2. Installation of new emergency generator, structural pad, and maintenance platform
  - 3. Installation of auxiliary electrical equipment, conduit, and wiring to support the emergency generator system
  - 4. Installation of underground conduit and wiring to accommodate system
  - 5. Other Work indicated in the Contract Documents.
  - 6. **Final performance testing of the generator system will be by the Contractor. Refer to "260500 – Common Work Results for Electrical" section for more details.**
- B. Type of Contract:
  - 1. Project will be constructed under a single prime contract.

#### 1.6 PHASED CONSTRUCTION

- A. Construct the Work in phases, with each phase substantially complete as indicated below. The contractor will coordinate all equipment deliveries, materials deliveries, demolition activities, and shutdowns with Owner. Shutdowns will only occur on weekends, with the contractor notifying the Owner a minimum of **21 days** before the shutdown will occur.
  - 1. Phase 1: Installation of new emergency generator
    - a. Commencement of Construction:
      - I. Notice to Proceed: Work of this phase shall commence within 14 days after the Notice to Proceed.
    - b. Substantial Completion:
      - I. Within 21 days after commencement of construction of this phase.
  - 2. Phase 2: Install all new feeder conduits/conductors for new and re-feeds. Prepare all new feeder infrastructure for backfeed/refeed of existing equipment as outlined.
    - a. Commencement of Construction:
      - I. Notice to Proceed: Work of this phase shall commence within 14 days after the Substantial Completion of Phase 1.
    - b. Substantial Completion:
      - I. Within 21 days after commencement of construction of this phase.
  - 3. Phase 3: Perform testing and startup of all new equipment to ensure readiness for connection to existing building systems and equipment.
    - a. Commencement of Construction:
      - I. Notice to Proceed: Work of this phase shall commence within 14 days after the Substantial Completion of Phase 2.
    - b. Substantial Completion:

- I. Within 21 days after commencement of construction of this phase.
  4. Phase 4: Switch over and make all required feeder modifications to new and existing equipment.
    - a. Commencement of Construction:
      - I. Notice to Proceed: Work of this phase shall commence within 14 days after the Substantial Completion of Phase 3.
    - b. Substantial Completion:
      - I. Within 21 days after commencement of construction of this phase.
  5. Phase 5: Commission new systems, equipment, and feeders.
    - a. Commencement of Construction:
      - I. Notice to Proceed: Work of this phase shall commence within 14 days after the Substantial Completion of Phase 4.
    - b. Substantial Completion:
      - I. Within 21 days after commencement of construction of this phase.
  6. Phase 6: Remove abandoned systems, including existing old generator and abandoned conduits/conductors.
    - a. Commencement of Construction:
      - I. Notice to Proceed: Work of this phase shall commence within 14 days after the Substantial Completion of Phase 5.
    - b. Substantial Completion:
      - I. Within 21 days after commencement of construction of this phase.
- B. Construction Phasing Plan Requirements
1. The Contractor shall develop a comprehensive Construction Phasing Plan tailored to the project site conditions, sequencing requirements, and operational restraints. This plan shall be coordinated with the Owner and all affected stakeholders.
  2. Construction Phasing Plan shall address access limitations, utility interruptions, equipment delivery logistics, protection of occupied areas, and limited installation schedule due to shutdowns.
  3. The Contractor's phasing plan shall incorporate and expand upon preliminary phasing guidance provided in the Contract Documents.
  4. The final Construction Phasing Plan shall be submitted for review and acceptance within 30 days of Notice to Proceed and shall be fully integrated into the Contractor's overall Construction Schedule.
  5. Updates to the phasing plan shall be provided as required to reflect field conditions and Owner directives.

## 1.7 WORK PERFORMED BY OWNER

- A. Cooperate fully with Owner, so work may be carried out smoothly, without interfering with or delaying Work under this Contract or work by Owner. Coordinate the Work of this Contract with work performed by Owner.

## 1.8 CONTRACTOR'S USE OF SITE AND PREMISES

- A. Restricted Use of Site: Contractor shall have limited use of Project site for construction operations as indicated on Drawings by the Contract limits and as indicated by requirements of this Section.
  - 1. All personnel performing Work in this Project must complete the following through Dallas County Juvenile Department:
    - a. Child Abuse Registration Background Check
    - b. Fingerprint Scanning
- B. Limits on Use of Site: Limit use of Project site to Work in areas indicated. Do not disturb portions of Project site beyond areas in which the Work is indicated.
  - 1. Driveways, Walkways and Entrances: Keep driveways, loading areas, and entrances serving premises clear and available to Owner, Owner's employees, and emergency vehicles at all times. Do not use these areas for parking or for storage of materials.
    - a. Schedule deliveries to minimize use of driveways and entrances by construction operations.
    - b. Schedule deliveries to minimize space and time requirements for storage of materials and equipment on-site.
  - 2. Limit on Use of Site: Confine construction operations to areas defined by Owner.
  - 3. Contractor personnel shall not enter any youth-occupied or patient-care areas without prior approval and escort by designated facility staff. Access to these areas shall be strictly limited to scheduled work activities and only during approved time windows. Unauthorized access to certain areas is grounds for immediate removal from the project and site.
- C. Condition of Existing Building: Maintain portions of existing building affected by construction operations in a weathertight condition throughout construction period. Repair damage caused by construction operations.
- D. Condition of Existing Grounds: Maintain portions of existing grounds, landscaping, and hardscaping affected by construction operations throughout construction period. Repair damage caused by construction operations.
- E. Asbestos-Containing Materials and Lead-Based Paint: Contractor is responsible for identification, testing, abatement, and disposal of asbestos-containing materials and lead-based paint in accordance with applicable federal, state, and local regulations. Contractor shall ensure abatement activities are completed prior to commencement of any demolition work.

## 1.9 COORDINATION WITH OCCUPANTS

- A. Full Owner Occupancy: Owner will occupy Project site and adjacent building(s) during entire construction period. Cooperate with Owner during construction operations to minimize conflicts and facilitate Owner usage. Perform the Work so as not to interfere with Owner's day-to-day operations. Maintain existing exits unless otherwise indicated.
  - 1. Maintain access to existing walkways, corridors, and other adjacent occupied or used facilities. Do not close or obstruct walkways, corridors, or other occupied or used

- facilities without written permission from Owner and approval of authorities having jurisdiction.
2. Notify Owner not less than twenty-one (21) days in advance of activities that will affect Owner's operations.

#### 1.10 WORK RESTRICTIONS

- A. Comply with restrictions on construction operations.
  1. Comply with limitations on use of public streets, work on public streets, rights of way, and other requirements of authorities having jurisdiction.
- B. On-Site Work Hours: Limit work to between 7 a.m. to 4:00 p.m., Monday through Friday, unless otherwise indicated. Work hours may be modified to meet Project requirements if approved by Owner and authorities having jurisdiction.
  1. Work in Existing Building: Personnel must be escorted at all times by Owner's Facilities Department. Equipment rooms are locked and will be granted access to personnel by Owner.
  2. All contractor personnel entering a youth-care zone must be always accompanied by a facility-assigned escort.
  3. Hours for Utility Shutdowns: Coordinate utility shutdowns fourteen days in advance with Owner. Utility Shutdowns must occur outside of facility's operating hours.
- C. Existing Utility Interruptions: Do not interrupt utilities serving facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging for temporary utility services according to requirements indicated:
  1. Notify Owner not less than fourteen days in advance of proposed utility interruptions.
  2. Obtain Owner's written permission before proceeding with utility interruptions.
- D. Noise, Vibration, Dust, and Odors: Coordinate operations that may result in high levels of noise and vibration, dust, odors, or other disruption to Owner occupancy with Owner.
  1. Notify Owner not less than seven days in advance of proposed disruptive operations.
  2. Obtain Owner's written permission before proceeding with disruptive operations.
- E. Smoking and Controlled Substance Restrictions: Use of tobacco products, alcoholic beverages, and other controlled substances on Owner's property is not permitted.
- F. Employee Identification: Provide identification tags for Contractor personnel working on Project site. Require personnel to use identification tags at all times.
- G. Employee Screening: Comply with Owner's requirements for drug and background screening of Contractor personnel working on Project site.
  1. Maintain list of approved screened personnel with Owner's representative.

## 1.11 SPECIFICATION AND DRAWING CONVENTIONS

- A. Specification Content: The Specifications use certain conventions for the style of language and the intended meaning of certain terms, words, and phrases when used in particular situations. These conventions are as follows:
1. Imperative mood and streamlined language are generally used in the Specifications. The words "shall," "shall be," or "shall comply with," depending on the context, are implied where a colon (:) is used within a sentence or phrase.
  2. Text Color: Text used in the Specifications, including units of measure, manufacturer and product names, and other text may appear in multiple colors or underlined as part of a hyperlink; no emphasis is implied by text with these characteristics.
  3. Hypertext: Text used in the Specifications may contain hyperlinks. Hyperlinks may allow for access to linked information that is not residing in the Specifications. Unless otherwise indicated, linked information is not part of the Contract Documents.
  4. Specification requirements are to be performed by Contractor unless specifically stated otherwise.
- B. Division 00 Contracting Requirements: General provisions of the Contract, including General and Supplementary Conditions, apply to all Sections of the Specifications.
- C. Division 01 General Requirements: Requirements of Sections in Division 01 apply to the Work of all Sections in the Specifications.
- D. Drawing Coordination: Requirements for materials and products identified on Drawings are described in detail in the Specifications. One or more of the following are used on Drawings to identify materials and products:
1. Terminology: Materials and products are identified by the typical generic terms used in the individual Specifications Sections.
  2. Abbreviations: Materials and products are identified by abbreviations scheduled on Drawings and published as part of the U.S. National CAD Standard.
  3. Keynoting: Materials and products are identified by reference keynotes referencing Specification Section numbers found in this Project Manual.

### **PART 2 – PRODUCTS (Not Used)**

### **PART 3 – EXECUTION (Not Used)**

**END OF SECTION 011000**

## SECTION 012500 - SUBSTITUTION PROCEDURES

### PART 1 – GENERAL

#### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

#### 1.2 SUMMARY

- A. Section includes administrative and procedural requirements for substitutions.
- B. Related Requirements:
  - 1. Document 002600 "Procurement Substitution Procedures" for requirements for substitution requests prior to award of Contract.

#### 1.3 DEFINITIONS

- A. Substitutions: Changes in products, materials, equipment, and methods of construction from those required by the Contract Documents.
  - 1. Substitutions for Cause: Changes proposed by Contractor that are required due to changed Project conditions, such as unavailability of product, regulatory changes, or unavailability of required warranty terms.
  - 2. Substitutions for Convenience: Changes proposed by Contractor or Owner that are not required to meet other Project requirements but may offer advantage to Contractor or Owner.

#### 1.4 ACTION SUBMITTALS

- A. Substitution Requests: Submit documentation identifying product or fabrication or installation method to be replaced. Include Specification Section number and title and Drawing numbers and titles.
  - 1. Substitution Request Form: Use form acceptable to Owner.
  - 2. Documentation: Show compliance with requirements for substitutions and the following, as applicable:
    - a. Statement indicating why specified products, fabrication or installation method cannot be provided, if applicable.
    - b. Coordination of information, including a list of changes or revisions needed to other parts of the Work and to construction performed by Owner and separate contractors that will be necessary to accommodate proposed substitution.
    - c. Detailed comparison of significant qualities of proposed substitutions with those of the Work specified. Include annotated copy of applicable Specification Section.

Significant qualities may include attributes, such as performance, weight, size, durability, visual effects, sustainable design characteristics, warranties, and specific features and requirements indicated. Indicate deviations, if any, from the Work specified.

- d. Product Data, including drawings and descriptions of products and fabrication and installation procedures.
  - e. Samples, where applicable or requested.
  - f. Certificates and qualification data, where applicable or requested.
  - g. List of similar installations for completed projects, with project names and addresses as well as names and addresses of Engineers and owners.
  - h. Material test reports from a qualified testing agency, indicating and interpreting test results for compliance with requirements indicated.
  - i. Research reports evidencing compliance with building code in effect for Project.
  - j. Detailed comparison of Contractor's construction schedule using proposed substitutions with products specified for the Work, including effect on the overall Contract Time. If specified product or method of construction cannot be provided within the Contract Time, include letter from manufacturer, on manufacturer's letterhead, stating date of receipt of purchase order, lack of availability, or delays in delivery.
  - k. Cost information, including a proposal of change, if any, in the Contract Sum.
  - l. Contractor's certification that proposed substitution complies with requirements in the Contract Documents, except as indicated in substitution request, is compatible with related materials and is appropriate for applications indicated.
  - m. Contractor's waiver of rights to additional payment or time that may subsequently become necessary because of failure of proposed substitution to produce indicated results.
3. Engineer's Action: If necessary, Engineer will request additional information or documentation for evaluation within seven days of receipt of a request for substitution. Engineer will notify Contractor through Owner of acceptance or rejection of proposed substitution within 15 days of receipt of request, or seven days of receipt of additional information or documentation, whichever is later.
- a. Forms of Acceptance: Change Order, Construction Change Directive, or Engineer's Supplemental Instructions for minor changes in the Work.
  - b. Use product specified if Engineer does not issue a decision on use of a proposed substitution within time allocated.

## 1.5 QUALITY ASSURANCE

- A. Compatibility of Substitutions: Investigate and document compatibility of proposed substitution with related products and materials. Engage a qualified testing agency to perform compatibility tests recommended by manufacturers.

## 1.6 PROCEDURES

- A. Coordination: Revise or adjust affected work as necessary to integrate work of the approved substitutions.

## 1.7 SUBSTITUTIONS

- A. Substitutions for Cause: Submit requests for substitution immediately on discovery of need for change, but not later than 15 days prior to time required for preparation and review of related submittals.
1. Conditions: Engineer will consider Contractor's request for substitution when the following conditions are satisfied. If the following conditions are not satisfied, Engineer will return requests without action, except to record noncompliance with these requirements:
    - a. Requested substitution is consistent with the Contract Documents and will produce indicated results.
    - b. Substitution request is fully documented and properly submitted.
    - c. Requested substitution will not adversely affect Contractor's construction schedule.
    - d. Requested substitution has received necessary approvals from authorities having jurisdiction.
    - e. Requested substitution is compatible with other portions of the Work.
    - f. Requested substitution has been coordinated with other portions of the Work.
    - g. Requested substitution provides specified warranty.
    - h. If requested substitution involves more than one contractor, requested substitution has been coordinated with other portions of the Work, is uniform and consistent, is compatible with other products, and is acceptable to all contractors involved.
- B. Substitutions for Convenience: Engineer will consider requests for substitution if received within 60 days after the Notice to Proceed. Requests received after that time may be considered or rejected at discretion of Engineer.
1. Conditions: Engineer will consider Contractor's request for substitution when the following conditions are satisfied. If the following conditions are not satisfied, Engineer will return requests without action, except to record noncompliance with these requirements:
    - a. Requested substitution offers Owner a substantial advantage in cost, time, energy conservation, or other considerations, after deducting additional responsibilities Owner must assume. Owner's additional responsibilities may include compensation to Engineer for redesign and evaluation services, increased cost of other construction by Owner, and similar considerations.
    - b. Requested substitution does not require extensive revisions to the Contract Documents.
    - c. Requested substitution is consistent with the Contract Documents and will produce indicated results.
    - d. Substitution request is fully documented and properly submitted.
    - e. Requested substitution will not adversely affect Contractor's construction schedule.
    - f. Requested substitution has received necessary approvals from authorities having jurisdiction.
    - g. Requested substitution is compatible with other portions of the Work.
    - h. Requested substitution has been coordinated with other portions of the Work.
    - i. Requested substitution provides specified warranty.

- j. If requested substitution involves more than one contractor, requested substitution has been coordinated with other portions of the Work, is uniform and consistent, is compatible with other products, and is acceptable to all contractors involved.

**PART 2 – PRODUCTS (Not Used)**

**PART 3 – EXECUTION (Not Used)**

**END OF SECTION 012500**

## **SECTION 012600 - CONTRACT MODIFICATION PROCEDURES**

### **PART 1 – GENERAL**

#### **1.1 RELATED DOCUMENTS**

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

#### **1.2 SUMMARY**

- A. Section includes administrative and procedural requirements for handling and processing Contract modifications.
- B. Related Requirements:
  - 1. Section 012500 "Substitution Procedures" for administrative procedures for handling requests for substitutions made after the Contract award.
  - 2. Section 013100 "Project Management and Coordination" for requirements for forms for contract modifications provided as part of web-based Project management software.

#### **1.3 MINOR CHANGES IN THE WORK**

- A. Engineer will issue through Owner supplemental instructions authorizing minor changes in the Work, not involving adjustment to the Contract Sum or the Contract Time, on AIA Document G710.

#### **1.4 PROPOSAL REQUESTS**

- A. Owner-Initiated Proposal Requests: Owner will issue a detailed description of proposed changes in the Work that may require adjustment to the Contract Sum or the Contract Time. If necessary, the description will include supplemental or revised Drawings and Specifications.
  - 1. Work Change Proposal Requests issued by Owner are not instructions either to stop work in progress or to execute the proposed change.
  - 2. Within time specified in Proposal Request after receipt of Proposal Request, submit a quotation estimating cost adjustments to the Contract Sum and the Contract Time necessary to execute the change.
    - a. Include a list of quantities of products required or eliminated and unit costs, with total amount of purchases and credits to be made. If requested, furnish survey data to substantiate quantities.
    - b. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.
    - c. Include costs of labor and supervision directly attributable to the change.

- d. Include an updated Contractor's construction schedule that indicates the effect of the change, including, but not limited to, changes in activity duration, start and finish times, and activity relationship. Use available total float before requesting an extension of the Contract Time.
  - e. Quotation Form: Use forms acceptable to Owner.
- B. Contractor-Initiated Proposals: If latent or changed conditions require modifications to the Contract, Contractor may initiate a claim by submitting a request for a change to Owner.
- 1. Include a statement outlining reasons for the change and the effect of the change on the Work. Provide a complete description of the proposed change. Indicate the effect of the proposed change on the Contract Sum and the Contract Time.
  - 2. Include a list of quantities of products required or eliminated and unit costs, with total amount of purchases and credits to be made. If requested, furnish survey data to substantiate quantities.
  - 3. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.
  - 4. Include costs of labor and supervision directly attributable to the change.
  - 5. Include an updated Contractor's construction schedule that indicates the effect of the change, including, but not limited to, changes in activity duration, start and finish times, and activity relationship. Use available total float before requesting an extension of the Contract Time.
  - 6. Comply with requirements in Section 012500 "Substitution Procedures" if the proposed change requires substitution of one product or system for product or system specified.
  - 7. Proposal Request Form: Use form acceptable to Owner.

## 1.5 CHANGE ORDER PROCEDURES

- A. On Owner's approval of a Work Change Proposal Request, Owner will issue a Change Order for signatures of Owner and Contractor on AIA Document G701.

## 1.6 CONSTRUCTION CHANGE DIRECTIVE

- A. Construction Change Directive: Owner may issue a Construction Change Directive on AIA Document G714. Construction Change Directive instructs Contractor to proceed with a change in the Work, for subsequent inclusion in a Change Order.
  - 1. Construction Change Directive contains a complete description of change in the Work. It also designates method to be followed to determine change in the Contract Sum or the Contract Time.
- B. Documentation: Maintain detailed records on a time and material basis of work required by the Construction Change Directive.
  - 1. After completion of change, submit an itemized account and supporting data necessary to substantiate cost and time adjustments to the Contract.

## 1.7 WORK CHANGE DIRECTIVE

- A. Work Change Directive: Owner may issue a Work Change Directive on EJCDC Document C-940. Work Change Directive instructs Contractor to proceed with a change in the Work, for subsequent inclusion in a Change Order.
  - 1. Work Change Directive contains a complete description of change in the Work. It also designates method to be followed to determine change in the Contract Sum or the Contract Time.
  
- B. Documentation: Maintain detailed records on a time and material basis of work required by the Work Change Directive.
  - 1. After completion of change, submit an itemized account and supporting data necessary to substantiate cost and time adjustments to the Contract.

### **PART 2 – PRODUCTS (Not Used)**

### **PART 3 – EXECUTION (Not Used)**

**END OF SECTION 012600**

## **SECTION 012900 - PAYMENT PROCEDURES**

### **PART 1 – GENERAL**

#### **1.1 RELATED DOCUMENTS**

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

#### **1.2 SUMMARY**

- A. Section includes administrative and procedural requirements necessary to prepare and process Applications for Payment.
- B. Related Requirements:
  - 1. Section 012600 "Contract Modification Procedures" for administrative procedures for handling changes to the Contract.
  - 2. Section 013200 "Construction Progress Documentation" for administrative requirements governing the preparation and submittal of the Contractor's construction schedule.

#### **1.3 DEFINITIONS**

- A. Schedule of Values: A statement furnished by Contractor allocating portions of the Contract Sum to various portions of the Work and used as the basis for reviewing Contractor's Applications for Payment.

#### **1.4 SCHEDULE OF VALUES**

- A. Coordination: Coordinate preparation of the schedule of values with preparation of Contractor's construction schedule. Cost-loaded Critical Path Method Schedule may serve to satisfy requirements for the schedule of values.
  - 1. Coordinate line items in the schedule of values with items required to be indicated as separate activities in Contractor's construction schedule.
  - 2. Submit the schedule of values to Engineer through Owner at earliest possible date, but no later than seven days before the date scheduled for submittal of initial Applications for Payment.
  - 1. Subschedules for Phased Work: Where the Work is separated into phases requiring separately phased payments, provide subschedules showing values coordinated with each phase of payment.
- B. Format and Content: Use Project Manual table of contents as a guide to establish line items for the schedule of values. Provide at least one line item for each Specification Section.
  - 1. Identification: Include the following Project identification on the schedule of values:

- a. Project name and location.
  - b. Owner's name.
  - c. Owner's Project number.
  - d. Name of Engineer.
  - e. Engineer's Project number.
  - f. Contractor's name and address.
  - g. Date of submittal.
2. Arrange schedule of values consistent with format of AIA Document G703.
  3. Arrange the schedule of values in tabular form, with separate columns to indicate the following for each item listed:
    - a. Related Specification Section or division.
    - b. Description of the Work.
    - c. Name of subcontractor.
    - d. Name of manufacturer or fabricator.
    - e. Name of supplier.
    - f. Change Orders (numbers) that affect value.
    - g. Dollar value of the following, as a percentage of the Contract Sum to nearest one-hundredth percent, adjusted to total 100 percent. Round dollar amounts to whole dollars, with total equal to Contract Sum.
      - I. Labor.
      - II. Materials.
      - III. Equipment.
  4. Provide a breakdown of the Contract Sum in enough detail to facilitate continued evaluation of Applications for Payment and progress reports. Provide multiple line items for principal subcontract amounts more than five percent of the Contract Sum.
  5. Provide a separate line item in the schedule of values for each part of the Work where Applications for Payment may include materials or equipment purchased or fabricated and stored but not yet installed.
    - a. Differentiate between items stored on-site and items stored off-site.
  6. Purchase Contracts: Provide a separate item in the schedule of values for each Purchase contract. Show line-item value of Purchase contract. Indicate Owner payments or deposits, if any, and balance to be paid by Contractor.
  7. Overhead Costs, Proportional Distribution: Include total cost and proportionate share of general overhead and profit for each line item.
  8. Overhead Costs, Separate Line Items: Show cost of temporary facilities and other major cost items that are not direct cost of actual work-in-place as separate line items.
  9. Temporary Facilities: Show cost of temporary facilities and other major cost items that are not direct cost of actual work-in-place as separate line items.
  10. Closeout Costs. Include separate line items under Contractor and principal subcontracts for Project closeout requirements in an amount totaling five percent of the Contract Sum and subcontract amount.
  11. Schedule of Values Revisions: Revise the schedule of values when Change Orders or Construction Change Directives result in a change in the Contract Sum. Include at least one separate line item for each Change Order and Construction Change Directive.

## 1.5 APPLICATIONS FOR PAYMENT

- A. Each Application for Payment following the initial Application for Payment shall be consistent with previous applications and payments, as certified by Engineer and paid for by Owner.
- B. Payment Application Times: The date for each progress payment is indicated in the Owner/Contractor Agreement. The period of construction work covered by each Application for Payment is the period indicated in the Agreement.
  - 1. Submit draft copy of Application for Payment seven days prior to due date for review by Engineer.
- C. Application for Payment Forms: Use AIA Document G702 and AIA Document G703 as form for Applications for Payment.
  - 1. Other Application for Payment forms proposed by the Contractor may be acceptable to Owner. Submit forms for approval with initial submittal of schedule of values.
- D. Application Preparation: Complete every entry on form. Notarize and execute by a person authorized to sign legal documents on behalf of Contractor. Engineer will return incomplete applications without action.
  - 1. Entries shall match data on the schedule of values and Contractor's construction schedule. Use updated schedules if revisions were made.
  - 2. Include amounts for work completed following previous Application for Payment, whether or not payment has been received. Include only amounts for work completed at time of Application for Payment.
  - 3. Include amounts of Change Orders and Construction Change Directives issued before last day of construction period covered by application.
  - 4. Indicate separate amounts for work being carried out under Owner-requested project acceleration.
- E. Stored Materials: Include in Application for Payment amounts applied for materials or equipment purchased or fabricated and stored, but not yet installed. Differentiate between items stored on-site and items stored off-site.
  - 1. Provide certificate of insurance, evidence of transfer of title to Owner, and consent of surety to payment for stored materials.
  - 2. Provide supporting documentation that verifies amount requested, such as paid invoices. Match amount requested with amounts indicated on documentation; do not include overhead and profit on stored materials.
  - 3. Provide summary documentation for stored materials indicating the following:
    - a. Value of materials previously stored and remaining stored as of date of previous Applications for Payment.
    - b. Value of previously stored materials put in place after date of previous Application for Payment and on or before date of current Application for Payment.
    - c. Value of materials stored since date of previous Application for Payment and remaining stored as of date of current Application for Payment.
- F. Transmittal: Submit three signed and notarized original copies of each Application for Payment to Engineer by a method ensuring receipt within 24 hours. One copy shall include waivers of lien and similar attachments if required.

1. Transmit each copy with a transmittal form listing attachments and recording appropriate information about application.
- G. Waivers of Mechanic's Lien: With each Application for Payment, submit waivers of mechanic's lien from entities lawfully entitled to file a mechanic's lien arising out of the Contract and related to the Work covered by the payment.
1. Submit partial waivers on each item for amount requested in previous application, after deduction for retainage, on each item.
  2. When an application shows completion of an item, submit conditional final or full waivers.
  3. Owner reserves the right to designate which entities involved in the Work must submit waivers.
  4. Submit final Application for Payment with or preceded by conditional final waivers from every entity involved with performance of the Work covered by the application who is lawfully entitled to a lien.
  5. Waiver Forms: Submit executed waivers of lien on forms acceptable to Owner.
- H. Initial Application for Payment: Administrative actions and submittals that must precede or coincide with submittal of first Application for Payment include the following:
1. List of subcontractors.
  2. Schedule of values.
  3. Contractor's construction schedule (preliminary if not final).
  4. Products list (preliminary if not final).
  5. Sustainable design action plans, including preliminary project materials cost data.
  6. Schedule of unit prices.
  7. Submittal schedule (preliminary if not final).
  8. List of Contractor's staff assignments.
  9. List of Contractor's principal consultants.
  10. Copies of building permits.
  11. Copies of authorizations and licenses from authorities having jurisdiction for performance of the Work.
  12. Initial progress report.
  13. Report of preconstruction conference.
  14. Certificates of insurance and insurance policies.
  15. Performance and payment bonds.
  16. Data needed to acquire Owner's insurance.
- I. Application for Payment at Substantial Completion: After Engineer issues the Certificate of Substantial Completion, submit an Application for Payment showing 100 percent completion for portion of the Work claimed as substantially complete.
1. Include documentation supporting claim that the Work is substantially complete and a statement showing an accounting of changes to the Contract Sum.
    - a. Complete administrative actions, submittals, and Work preceding this application, as described in Section 017700 "Closeout Procedures."
  2. This application shall reflect Certificate(s) of Substantial Completion issued previously for Owner occupancy of designated portions of the Work.

- J. Final Payment Application: After completing Project closeout requirements, submit final Application for Payment with releases and supporting documentation not previously submitted and accepted, including, but not limited, to the following:
1. Evidence of completion of Project closeout requirements.
  2. Certification of completion of final punch list items.
  3. Insurance certificates for products and completed operations where required and proof that taxes, fees, and similar obligations were paid.
  4. Updated final statement, accounting for final changes to the Contract Sum.
  5. AIA Document G706.
  6. AIA Document G706A.
  7. AIA Document G707.
  8. Evidence that claims have been settled.
  9. Final meter readings for utilities, a measured record of stored fuel, and similar data as of date of Substantial Completion or when Owner took possession of and assumed responsibility for corresponding elements of the Work.
  10. Final liquidated damages settlement statement.
  11. Proof that taxes, fees, and similar obligations are paid.
  12. Waivers and releases.

**PART 2 – PRODUCTS (Not Used)**

**PART 3 – EXECUTION (Not Used)**

**END OF SECTION 012900**

## SECTION 013100 - PROJECT MANAGEMENT AND COORDINATION

### PART 1 – GENERAL

#### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

#### 1.2 SUMMARY

- A. Section includes administrative provisions for coordinating construction operations on Project, including, but not limited to, the following:
  - 1. General coordination procedures.
  - 2. Coordination drawings.
  - 3. RFIs.
  - 4. Digital project management procedures.
  - 5. Web-based Project management software package.
  - 6. Project meetings.
- B. Each contractor shall participate in coordination requirements. Certain areas of responsibility are assigned to a specific contractor.
- C. Related Requirements:
  - 1. Section 013200 "Construction Progress Documentation" for preparing and submitting Contractor's construction schedule.
  - 2. Section 017300 "Execution" for procedures for coordinating general installation and field-engineering services, including establishment of benchmarks and control points.
  - 3. Section 017700 "Closeout Procedures" for coordinating closeout of the Contract.
  - 4. Section 019113 "General Commissioning Requirements" for coordinating the Work with Owner's Commissioning Authority.

#### 1.3 DEFINITIONS

- A. BIM: Building Information Modeling.
- B. RFI: Request for Information. Request from Owner, Engineer, or Contractor seeking information required by or clarifications of the Contract Documents.

#### 1.4 INFORMATIONAL SUBMITTALS

- A. Subcontract List: Prepare a written summary identifying individuals or firms proposed for each portion of the Work, including those who are to furnish products or equipment fabricated to a special design. Include the following information in tabular form:
  - 1. Name, address, telephone number, and email address of entity performing subcontract or supplying products.
  - 2. Number and title of related Specification Section(s) covered by subcontract.
  - 3. Drawing number and detail references, as appropriate, covered by subcontract.
- B. Key Personnel Names: Within 15 days of starting construction operations, submit a list of key personnel assignments, including superintendent and other personnel in attendance at Project site. Identify individuals and their duties and responsibilities; list addresses, cellular telephone numbers, and e-mail addresses. Provide names, addresses, and telephone numbers of individuals assigned as alternates in the absence of individuals assigned to Project.
  - 1. Post copies of list in Project meeting room, in temporary field office, and in prominent location in each built facility. Always keep list current.

#### 1.5 GENERAL COORDINATION PROCEDURES

- A. Coordination: Coordinate construction operations included in different Sections of the Specifications to ensure efficient and orderly installation of each part of the Work. Coordinate construction operations included in different Sections that depend on each other for proper installation, connection, and operation.
  - 1. Schedule construction operations in sequence required to obtain the best results, where installation of one part of the Work depends on installation of other components, before or after its own installation.
  - 2. Coordinate installation of different components to ensure maximum performance and accessibility for required maintenance, service, and repair.
  - 3. Make adequate provisions to accommodate items scheduled for later installation.
- B. Prepare memoranda for distribution to each party involved, outlining special procedures required for coordination. Include such items as required notices, reports, and list of attendees at meetings.
  - 1. Prepare similar memoranda for Owner and separate contractors if coordination of their Work is required.
- C. Administrative Procedures: Coordinate scheduling and timing of required administrative procedures with other construction activities and direction of Project coordinator to avoid conflicts and to ensure orderly progress of the Work. Such administrative activities include, but are not limited to, the following:
  - 1. Preparation of Contractor's construction schedule.
  - 2. Preparation of the schedule of values.
  - 3. Installation and removal of temporary facilities and controls.
  - 4. Delivery and processing of submittals.
  - 5. Progress meetings.
  - 6. Preinstallation conferences.

7. Project closeout activities.
8. Startup and adjustment of systems.

## 1.6 COORDINATION DRAWINGS

- A. Coordination Drawings, General: Prepare coordination drawings according to requirements in individual Sections, and additionally where installation is not completely indicated on Shop Drawings, where limited space availability necessitates coordination, or if coordination is required to facilitate integration of products and materials fabricated or installed by more than one entity.
  1. Content: Project-specific information, drawn accurately to a scale large enough to indicate and resolve conflicts. Do not base coordination drawings on standard printed data. Include the following information, as applicable:
    - a. Use applicable Drawings as a basis for preparation of coordination drawings. Prepare sections, elevations, and details as needed to describe relationships of various systems and components.
    - b. Coordinate the addition of trade-specific information to coordination drawings by multiple contractors in a sequence that best provides for coordination of the information and resolution of conflicts between installed components before submitting for review.
    - c. Indicate functional and spatial relationships of components of Architectural, structural, civil, mechanical, and electrical systems.
    - d. Indicate space requirements for routine maintenance and for anticipated replacement of components during the life of the installation.
    - e. Show location and size of access doors required for access to concealed dampers, valves, and other controls.
    - f. Indicate required installation sequences.
    - g. Indicate dimensions shown on Drawings. Specifically note dimensions that appear to conflict with submitted equipment and minimum clearance requirements. Provide alternative sketches to Engineer indicating proposed resolution of such conflicts. Minor dimension changes and difficult installations will not be considered changes to the Contract.
- B. Coordination Drawing Organization: Organize coordination drawings as follows:
  1. Floor Plans and Reflected Ceiling Plans: Show Architectural and structural elements, and mechanical, plumbing, fire-protection, fire-alarm, and electrical Work. Show locations of visible ceiling-mounted devices relative to acoustical ceiling grid. Supplement plan drawings with section drawings where required to adequately represent the Work.
  2. Plenum Space: Indicate subframing for support of ceiling, and wall systems, mechanical and electrical equipment, and related Work. Locate components within plenums to accommodate layout of light fixtures and other components indicated on Drawings. Indicate areas of conflict between light fixtures and other components.
  3. Mechanical Rooms: Provide coordination drawings for mechanical rooms, showing plans and elevations of mechanical, plumbing, fire-protection, fire-alarm, and electrical equipment.
  4. Structural Penetrations: Indicate penetrations and openings required for all disciplines.

5. Slab Edge and Embedded Items: Indicate slab edge locations and sizes and locations of embedded items for metal fabrications, sleeves, anchor bolts, bearing plates, angles, door floor closers, slab depressions for floor finishes, curbs and housekeeping pads, and similar items.
  6. Mechanical and Plumbing Work: Show the following:
    - a. Sizes and bottom elevations of ductwork, piping, and conduit runs, including insulation, bracing, flanges, and support systems.
    - b. Dimensions of major components, such as dampers, valves, diffusers, access doors, cleanouts and electrical distribution equipment.
    - c. Fire-rated enclosures around ductwork.
  7. Electrical Work: Show the following:
    - a. Runs of vertical and horizontal conduit 1-1/4 inches in diameter and larger.
    - b. Light fixture, exit light, emergency battery pack, smoke detector, and other fire-alarm locations.
    - c. Panel board, switchboard, switchgear, transformer, busway, generator, and motor-control center locations.
    - d. Location of pull boxes and junction boxes, dimensioned from column center lines.
  8. Fire-Protection System: Show the following:
    - a. Locations of standpipes, mains piping, branch lines, pipe drops, and sprinkler heads.
  9. Review: Engineer will review coordination drawings to confirm that, in general, the Work is being coordinated, but not for the details of the coordination, which are Contractor's responsibility. If Engineer determines that coordination drawings are not being prepared in sufficient scope or detail, or are otherwise deficient, Engineer will so inform Contractor, who shall make suitable modifications and resubmit.
  10. Coordination Drawing Prints: Prepare coordination drawing prints according to requirements in Section 013300 "Submittal Procedures."
- C. Coordination Drawing Process: Prepare coordination drawings in the following manner:
1. Schedule submittal and review of Fire Sprinkler, Plumbing, HVAC, and Electrical Shop Drawings to make required changes prior to preparation of coordination drawings.
  2. Commence routing of coordination drawing files with HVAC Installer, who will provide drawing plan files denoting approved ductwork. HVAC Installer will locate ductwork and piping on a single layer, using orange color. Forward drawings to Plumbing Installer.
  3. Plumbing Installer will locate plumbing and equipment on a single layer, using blue color.
  4. Fire Sprinkler Installer will locate piping and equipment, using red color. Fire Sprinkler Installer shall forward drawing files to Electrical Installer.
  5. Electrical Installer will indicate service and feeder conduit runs and equipment in green color. Electrical Installer shall forward drawing files to Communications and Electronic Safety and Security Installer.
  6. Communications and Electronic Safety and Security Installer will indicate cable trays and cabling runs and equipment in purple color. Communications and Electronic Safety and Security Installer shall forward completed drawing files to Contractor.
  7. Contractor shall perform the final coordination review. As each coordination drawing is completed, Contractor will meet with Engineer to review and resolve conflicts on the coordination drawings.

- D. Coordination Digital Data Files: Prepare coordination digital data files according to the following requirements:
1. File Preparation Format: Same digital data software program, version, and operating system as original Drawings.
  2. File Submittal Format: Submit or post coordination drawing files using PDF format.
  3. BIM File Incorporation: Develop and incorporate coordination drawing files into BIM established for Project.
    - a. Perform three-dimensional component conflict analysis as part of preparation of coordination drawings. Resolve component conflicts prior to submittal. Indicate where conflict resolution requires modification of design requirements by Engineer.
  4. Engineer will furnish Contractor one set of digital data files of Drawings for use in preparing coordination digital data files.
    - a. Engineer makes no representations as to the accuracy or completeness of digital data files as they relate to Drawings.
    - b. Contractor shall execute a data licensing agreement in the form of AIA Document C106.

#### 1.7 REQUEST FOR INFORMATION (RFI)

- A. General: Immediately on discovery of the need for additional information, clarification, or interpretation of the Contract Documents, Contractor shall prepare and submit an RFI in the form specified.
1. Engineer will return without response those RFIs submitted to Engineer by other entities controlled by Contractor.
  2. Coordinate and submit RFIs in a prompt manner to avoid delays in Contractor's work or work of subcontractors.
- B. Content of the RFI: Include a detailed, legible description of item needing information or interpretation and the following:
1. Project name.
  2. Owner name.
  3. Owner's Project number.
  4. Name of Engineer
  5. Engineer's Project number.
  6. Date.
  7. Name of Contractor.
  8. RFI number, numbered sequentially.
  9. RFI subject.
  10. Specification Section number and title and related paragraphs, as appropriate.
  11. Drawing number and detail references, as appropriate.
  12. Field dimensions and conditions, as appropriate.
  13. Contractor's suggested resolution. If Contractor's suggested resolution impacts the Contract Time or the Contract Sum, Contractor shall state impact in the RFI.
  14. Contractor's signature.

15. Attachments: Include sketches, descriptions, measurements, photos, Product Data, Shop Drawings, coordination drawings, and other information necessary to fully describe items needing interpretation.
  - a. Include dimensions, thicknesses, structural grid references, and details of affected materials, assemblies, and attachments on attached sketches.
  
- C. RFI Forms: AIA Document G716
  1. Attachments shall be electronic files in PDF format.
  
- D. Engineer's Action: Engineer will review each RFI, determine action required, and respond. Allow seven days for Engineer's response for each RFI. RFIs received by Engineer after 1:00 p.m. will be considered as received the following working day.
  1. The following Contractor-generated RFIs will be returned without action:
    - a. Requests for approval of submittals.
    - b. Requests for approval of substitutions.
    - c. Requests for approval of Contractor's means and methods.
    - d. Requests for coordination information already indicated in the Contract Documents.
    - e. Requests for adjustments in the Contract Time or the Contract Sum.
    - f. Requests for interpretation of Engineer's actions on submittals.
    - g. Incomplete RFIs or inaccurately prepared RFIs.
  2. Engineer's action may include a request for additional information, in which case Engineer's time for response will date from time of receipt by Engineer of additional information.
  3. Engineer's action on RFIs that may result in a change to the Contract Time or the Contract Sum may be eligible for Contractor to submit Change Proposal according to Section 012600 "Contract Modification Procedures."
    - a. If Contractor believes the RFI response warrants change in the Contract Time or the Contract Sum, notify Engineer and Owner in writing within 5 days of receipt of the RFI response.
  
- E. RFI Log: Prepare, maintain, and submit a tabular log of RFIs organized by the RFI number. Submit log weekly. Include the following:
  1. Project name.
  2. Name and address of Contractor.
  3. Name and address of Engineer.
  4. RFI number, including RFIs that were returned without action or withdrawn.
  5. RFI description.
  6. Date the RFI was submitted.
  7. Date Engineer's response was received.
  8. Identification of related Minor Change in the Work, Construction Change Directive, and Proposal Request, as appropriate.
  9. Identification of related Field Order, Work Change Directive, and Proposal Request, as appropriate.
  
- F. On receipt of Engineer's action, update the RFI log and immediately distribute the RFI response to affected parties. Review response and notify Engineer within seven days if Contractor disagrees with response.

## 1.8 DIGITAL PROJECT MANAGEMENT PROCEDURES

- A. Engineer's Data Files Not Available: Engineer will not provide Engineer's BIM model or CAD drawing digital data files for Contractor's use during construction.
- B. Web-Based Project Management Software Package: Provide, administer, and use web-based Project management software package for purposes of hosting and managing Project communication and documentation until Final Completion.
  - 1. Web-based Project management software includes, at a minimum, the following features:
    - a. Compilation of Project data, including Contractor, subcontractors, Engineer, Engineer's consultants, Owner, and other entities involved in Project. Include names of individuals and contact information.
    - b. Access control for each entity for each workflow process, to determine entity's digital rights to create, modify, view, and print documents.
    - c. Document workflow planning, allowing customization of workflow between project entities.
    - d. Creation, logging, tracking, and notification for Project communications required in other Specification Sections, including, but not limited to, RFIs, submittals, Minor Changes in the Work, Construction Change Directives, and Change Orders.
    - e. Track status of each Project communication in real time, and log time and date when responses are provided.
    - f. Procedures for handling PDFs or similar file formats, allowing markups by each entity. Provide security features to lock markups against changes once submitted.
    - g. Processing and tracking of payment applications.
    - h. Processing and tracking of contract modifications.
    - i. Creating and distributing meeting minutes.
    - j. Document management for Drawings, Specifications, and coordination drawings, including revision control.
    - k. Management of construction progress photographs.
    - l. Mobile device compatibility, including smartphones and tablets.
  - 2. Provide up to seven Project management software user licenses for use of Owner, Engineer, and Engineer's consultants. Provide eight hours of software training at Engineer's office for web-based Project software users.
  - 3. At completion of Project, provide digital archive in format that is readable by common desktop software applications in format acceptable to Engineer. Provide data in locked format to prevent further changes.
  - 4. Provide one of the following Project management software packages under their current published licensing agreements:
    - a. Autodesk; Constructware.
    - b. Corecon Technologies, Inc.
    - c. Meridian Systems; Prolog.
    - d. Newforma, Inc.
    - e. Procore Technologies, Inc.
    - f. Viewpoint, Inc.
- C. PDF Document Preparation: Where PDFs are required to be submitted to Engineer, prepare as follows:

1. Assemble complete submittal package into a single indexed file, incorporating submittal requirements of a single Specification Section and transmittal form with links enabling navigation to each item.
2. Name file with submittal number or other unique identifier, including revision identifier.
3. Certifications: Where digitally submitted certificates and certifications are required, provide a digital signature with digital certificate on where indicated.

## 1.9 PROJECT MEETINGS

- A. General: Schedule and conduct meetings and conferences at Project site unless otherwise indicated.
  1. Attendees: Inform participants and others involved, and individuals whose presence is required, of date and time of each meeting. Notify Owner and Engineer of scheduled meeting dates and times a minimum of 10 working days prior to meeting.
  2. Agenda: Prepare the meeting agenda. Distribute the agenda to all invited attendees.
  3. Minutes: Entity responsible for conducting meeting will record significant discussions and agreements achieved. Distribute the meeting minutes to everyone concerned, including Owner, Engineer, within three days of the meeting.
  
- B. Preconstruction Conference: Schedule and conduct a preconstruction conference before starting construction, at a time convenient to Owner and Engineer, but no later than 15 days after execution of the Agreement.
  1. Attendees: Authorized representatives of Owner, Engineer, and their consultants; Contractor and its superintendent; major subcontractors; suppliers; and other concerned parties shall attend the conference. Participants at the conference shall be familiar with Project and authorized to conclude matters relating to the Work.
  2. Agenda: Discuss items of significance that could affect progress, including the following:
    - a. Responsibilities and personnel assignments.
    - b. Tentative construction schedule.
    - c. Phasing.
    - d. Critical work sequencing and long lead items.
    - e. Designation of key personnel and their duties.
    - f. Lines of communications.
    - g. Use of web-based Project software.
    - h. Procedures for processing field decisions and Change Orders.
    - i. Procedures for RFIs.
    - j. Procedures for testing and inspecting.
    - k. Procedures for processing Applications for Payment.
    - l. Distribution of the Contract Documents.
    - m. Submittal procedures.
    - n. Sustainable design requirements.
    - o. Preparation of Record Documents.
    - p. Use of the premises
    - q. Work restrictions.
    - r. Working hours.
    - s. Owner's occupancy requirements.

- t. Procedures for disruptions and shutdowns.
  - u. Construction waste management and recycling.
  - v. Parking availability.
  - w. Office, work, and storage areas.
  - x. Equipment deliveries and priorities.
  - y. First aid.
  - z. Security.
3. Minutes: Entity responsible for conducting meeting will record and distribute meeting minutes.
- C. Preinstallation Conferences: Conduct a preinstallation conference at Project site before each construction activity when required by other Sections and when required for coordination with other construction.
- 1. Attendees: Installer and representatives of manufacturers and fabricators involved in or affected by the installation and its coordination or integration with other materials and installations that have preceded or will follow, shall attend the meeting. Advise Engineer of scheduled meeting dates.
  - 2. Agenda: Review of the progress of other construction activities and preparations for the activity under consideration, including requirements for the following:
    - a. Contract Documents.
    - b. Options.
    - c. Related RFIs.
    - d. Related Change Orders.
    - e. Purchases.
    - f. Deliveries.
    - g. Submittals.
    - h. Sustainable design requirements.
    - i. Review of mockups.
    - j. Possible conflicts.
    - k. Compatibility requirements.
    - l. Time schedules.
    - m. Weather limitations.
    - n. Manufacturer's written instructions.
    - o. Warranty requirements.
    - p. Compatibility of materials.
    - q. Acceptability of substrates.
    - r. Temporary facilities and controls.
    - s. Space and access limitations.
    - t. Regulations of authorities having jurisdiction.
    - u. Testing and inspecting requirements.
    - v. Installation procedures.
    - w. Coordination with other work.
    - x. Required performance results.
    - y. Protection of adjacent work.
    - z. Protection of construction and personnel.
  - 3. Record significant conference discussions, agreements, and disagreements, including required corrective measures and actions.

4. Reporting: Distribute minutes of the meeting to each party present and to other parties requiring information.
  5. Do not proceed with installation if the conference cannot be successfully concluded. Initiate whatever actions are necessary to resolve impediments to performance of the Work and reconvene the conference at earliest feasible date.
- D. Project Closeout Conference: Schedule and conduct a project closeout conference, at a time convenient to Owner and Engineer, but no later than 90 days prior to the scheduled date of Substantial Completion.
1. Conduct the conference to review requirements and responsibilities related to Project closeout.
  2. Attendees: Authorized representatives of Owner, Engineer, and their consultants; Contractor and its superintendent; major subcontractors; suppliers; and other concerned parties shall attend the meeting. Participants at the meeting shall be familiar with Project and authorized to conclude matters relating to the Work.
  3. Agenda: Discuss items of significance that could affect or delay Project closeout, including the following:
    - a. Preparation of Record Documents.
    - b. Procedures required prior to inspection for Substantial Completion and for final inspection for acceptance.
    - c. Procedures for completing and archiving web-based Project software site data files.
    - d. Submittal of written warranties.
    - e. Requirements for preparing operations and maintenance data.
    - f. Requirements for delivery of material samples, attic stock, and spare parts.
    - g. Requirements for demonstration and training.
    - h. Preparation of Contractor's punch list.
    - i. Procedures for processing Applications for Payment at Substantial Completion and for final payment.
    - j. Submittal procedures.
    - k. Coordination of separate contracts.
    - l. Owner's partial occupancy requirements.
    - m. Installation of Owner's furniture, fixtures, and equipment.
    - n. Responsibility for removing temporary facilities and controls.
  4. Minutes: Entity conducting meeting will record and distribute meeting minutes.
- E. Progress Meetings: Conduct progress meetings at weekly intervals.
1. Coordinate dates of meetings with preparation of payment requests.
  2. Attendees: In addition to representatives of Owner and Engineer, each contractor, subcontractor, supplier, and other entity concerned with current progress or involved in planning, coordination, or performance of future activities shall be represented at these meetings. All participants at the meeting shall be familiar with Project and authorized to conclude matters relating to the Work.
  3. Agenda: Review and correct or approve minutes of previous progress meeting. Review other items of significance that could affect progress. Include topics for discussion as appropriate to status of Project.
    - a. Contractor's Construction Schedule: Review progress since the last meeting. Determine whether each activity is on time, ahead of schedule, or behind schedule,

in relation to Contractor's construction schedule. Determine how construction behind schedule will be expedited; secure commitments from parties involved to do so. Discuss whether schedule revisions are required to ensure that current and subsequent activities will be completed within the Contract Time.

- I. Review schedule for next period.
- b. Review present and future needs of each entity present, including the following:
  - I. Interface requirements.
  - II. Sequence of operations.
  - III. Resolution of BIM component conflicts.
  - IV. Status of submittals.
  - V. Status of sustainable design documentation.
  - VI. Deliveries.
  - VII. Off-site fabrication.
  - VIII. Access.
  - IX. Site use.
  - X. Temporary facilities and controls.
  - XI. Progress cleaning.
  - XII. Quality and work standards.
  - XIII. Status of correction of deficient items.
  - XIV. Field observations.
  - XV. Status of RFIs.
  - XVI. Status of Proposal Requests.
  - XVII. Pending changes.
  - XVIII. Status of Change Orders.
  - XIX. Pending claims and disputes.
  - XX. Documentation of information for payment requests.
4. Minutes: Entity responsible for conducting the meeting will record and distribute the meeting minutes to each party present and to parties requiring information.
  - a. Schedule Updating: Revise Contractor's construction schedule after each progress meeting, where revisions to the schedule have been made or recognized. Issue revised schedule concurrently with the report of each meeting.

## **PART 2 – PRODUCTS (Not Used)**

## **PART 3 – EXECUTION (Not Used)**

**END OF SECTION 013100**

## SECTION 013200 - CONSTRUCTION PROGRESS DOCUMENTATION

### PART 1 – GENERAL

#### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

#### 1.2 SUMMARY

- A. Section includes administrative and procedural requirements for documenting the progress of construction during performance of the Work, including the following:
  - 1. Startup construction schedule.
  - 2. Contractor's Construction Schedule.
  - 3. Construction schedule updating reports.
  - 4. Daily construction reports.
  - 5. Material location reports.
  - 6. Site condition reports.
  - 7. Unusual event reports.
- B. Related Requirements:
  - 1. Section 014000 "Quality Requirements" for schedule of tests and inspections.
  - 2. Section 012900 "Payment Procedures" for schedule of values and requirements for use of cost-loaded schedule for Applications for Payment.

#### 1.3 DEFINITIONS

- A. Activity: A discrete part of a project that can be identified for planning, scheduling, monitoring, and controlling the construction Project. Activities included in a construction schedule consume time and resources.
  - 1. Critical Activity: An activity on the critical path that must start and finish on the planned early start and finish times.
  - 2. Predecessor Activity: An activity that precedes another activity in the network.
  - 3. Successor Activity: An activity that follows another activity in the network.
- B. Cost Loading: The allocation of the schedule of values for completing an activity as scheduled. The sum of costs for all activities must equal the total Contract Sum.
- C. CPM: Critical path method, which is a method of planning and scheduling a construction project where activities are arranged based on activity relationships. Network calculations determine the critical path of Project and when activities can be performed.

- D. Critical Path: The longest connected chain of interdependent activities through the network schedule that establishes the minimum overall Project duration and contains no float.
- E. Event: The starting or ending point of an activity.
- F. Float: The measure of leeway in starting and completing an activity.
  - 1. Float time is not for the exclusive use or benefit of either Owner or Contractor, but is a jointly owned, expiring Project resource available to both parties as needed to meet schedule milestones and Contract completion date.
  - 2. Free float is the amount of time an activity can be delayed without adversely affecting the early start of the successor activity.
  - 3. Total float is the measure of leeway in starting or completing an activity without adversely affecting the planned Project completion date.
- G. Resource Loading: The allocation of manpower and equipment necessary for completing an activity as scheduled.

#### 1.4 INFORMATIONAL SUBMITTALS

- A. Format for Submittals: Submit required submittals in the following format:
  - 1. Working electronic copy of schedule file.
  - 2. PDF file.
- B. Startup construction schedule.
  - 1. Submittal of cost-loaded startup construction schedule will not constitute approval of schedule of values for cost-loaded activities.
- C. Startup Network Diagram: Of size required to display entire network for entire construction period. Show logic ties for activities.
- D. Contractor's Construction Schedule: Initial schedule, of size required to display entire schedule for entire construction period.
  - 1. Submit a working digital copy of schedule, using software indicated, and labeled to comply with requirements for submittals.
- E. CPM Reports: Concurrent with CPM schedule, submit each of the following reports. Format for each activity in reports shall contain activity number, activity description, cost and resource loading, original duration, remaining duration, early start date, early finish date, late start date, late finish date, and total float in calendar days.
  - 1. Activity Report: List of activities sorted by activity number and then early start date, or actual start date if known.
  - 2. Logic Report: List of preceding and succeeding activities for each activity, sorted in ascending order by activity number and then by early start date, or actual start date if known.
  - 3. Total Float Report: List of activities sorted in ascending order of total float.
  - 4. Earnings Report: Compilation of Contractor's total earnings from the Notice to Proceed until most recent Application for Payment.

- F. Construction Schedule Updating Reports: Submit with Applications for Payment.
- G. Daily Construction Reports: Submit at weekly intervals.
- H. Material Location Reports: Submit at weekly intervals.
- I. Site Condition Reports: Submit at time of discovery of differing conditions.
- J. Unusual Event Reports: Submit at time of unusual event.
- K. Qualification Data: For scheduling consultant.

## 1.5 QUALITY ASSURANCE

- A. Scheduling Consultant Qualifications: An experienced specialist in CPM scheduling and reporting, with capability of producing CPM reports and diagrams within 24 hours of Engineer's request.

Prescheduling Conference: Conduct conference at Project site to comply with requirements in Section 013100 "Project Management and Coordination." Review methods and procedures related to the preliminary construction schedule and Contractor's Construction Schedule, including, but not limited to, the following:

1. Review software limitations and content and format for reports.
2. Verify availability of qualified personnel is needed to develop and update schedule.
3. Discuss constraints, including phasing, work stages, area separations, interim milestones, and partial owner occupancy.
4. Review delivery dates for Owner-furnished products.
5. Review schedule for work of Owner's separate contracts.
6. Review submittal requirements and procedures.
7. Review time required for review of submittals and resubmittals.
8. Review requirements for tests and inspections by independent testing and inspecting agencies.
9. Review time required for Project closeout and Owner startup procedures, including commissioning activities.
10. Review and finalize list of construction activities to be included in schedule.
11. Review procedures for updating schedule.

## 1.6 COORDINATION

- A. Coordinate Contractor's Construction Schedule with the schedule of values, list of subcontracts, submittal schedule, progress reports, payment requests, and other required schedules and reports.
  1. Secure time commitments for performing critical elements of the Work from entities involved.
  2. Coordinate each construction activity in the network with other activities, and schedule them in proper sequence.

## 1.7 CONTRACTOR'S CONSTRUCTION SCHEDULE

- A. Computer Scheduling Software: Prepare schedules using current version of a program that has been developed specifically to manage construction schedules.
  - 1. Use scheduling component of Project management software package specified in Section 013100 "Project Management and Coordination," for current Windows operating system.
- B. Scheduling Consultant: Engage a consultant to provide planning, evaluation, and reporting, using CPM scheduling.
  - 1. In-House Option: Owner may waive requirement to retain a consultant if Contractor employs skilled personnel with experience in CPM scheduling and reporting techniques. Submit qualifications.
  - 2. Meetings: Scheduling consultant shall attend all meetings related to Project progress, alleged delays, and time impact.
- C. Time Frame: Extend schedule from date established for the Notice to Proceed to date of Final Completion.
  - 1. Contract completion date shall not be changed by submission of a schedule that shows an early completion date, unless specifically authorized by Change Order.
- D. Activities: Treat each floor or separate area as a separate numbered activity for each main element of the Work. Comply with the following:
  - 1. Activity Duration: Define activities so no activity is longer than 21 days, unless specifically allowed by Engineer.
  - 2. Temporary Facilities: Indicate start and completion dates for the following as applicable:
    - a. Securing of approvals and permits required for performance of the Work.
    - b. Temporary facilities.
    - c. Construction of mock-ups, prototypes and samples.
    - d. Owner interfaces and furnishing of items.
    - e. Interfaces with Separate Contracts.
    - f. Regulatory agency approvals.
    - g. Punch list.
  - 3. Procurement Activities: Include procurement process activities for the following long lead-time items and major items, requiring a cycle of more than 60 days, as separate activities in schedule. Procurement cycle activities include, but are not limited to, submittals, approvals, purchasing, fabrication, and delivery.
  - 4. Submittal Review Time: Include review and resubmittal times indicated in Section 013300 "Submittal Procedures" in schedule. Coordinate submittal review times in Contractor's Construction Schedule with submittal schedule.
  - 5. Startup and Testing Time: Include no fewer than 15 days for startup and testing.
  - 6. Commissioning Time: Include no fewer than 15 days for commissioning.
  - 7. Substantial Completion: Indicate completion in advance of date established for Substantial Completion and allow time for Engineer's administrative procedures necessary for certification of Substantial Completion.
  - 8. Punch List and Final Completion: Include not more than 30 days for completion of punch list items and Final Completion.

- E. Constraints: Include constraints and work restrictions indicated in the Contract Documents and as follows in schedule, and show how the sequence of the Work is affected.
1. Phasing: Arrange list of activities on schedule by phase.
  2. Work under More Than One Contract: Include a separate activity for each contract.
  3. Work by Owner: Include a separate activity for each portion of the Work performed by Owner.
  4. Products Ordered in Advance: Include a separate activity for each product. Include delivery date indicated in Section 011000 "Summary." Delivery dates indicated stipulate the earliest possible delivery date.
  5. Owner-Furnished Products: Include a separate activity for each product. Include delivery date indicated in Section 011000 "Summary." Delivery dates indicated stipulate the earliest possible delivery date.
  6. Work Restrictions: Show the effect of the following items on the schedule:
    - a. Coordination with existing construction.
    - b. Limitations of continued occupancies.
    - c. Uninterruptible services.
    - d. Partial occupancy before Substantial Completion.
    - e. Use-of-premises restrictions.
    - f. Provisions for future construction.
    - g. Seasonal variations.
    - h. Environmental control.
  7. Work Stages: Indicate important stages of construction for each major portion of the Work, including, but not limited to, the following:
    - a. Subcontract awards.
    - b. Submittals.
    - c. Purchases.
    - d. Mockups.
    - e. Fabrication.
    - f. Sample testing.
    - g. Deliveries.
    - h. Installation.
    - i. Tests and inspections.
    - j. Adjusting.
    - k. Curing.
    - l. Startup and placement into final use and operation.
    - m. Commissioning.
  8. Construction Areas: Identify each major area of construction for each major portion of the Work. Indicate where each construction activity within a major area must be sequenced or integrated with other construction activities to provide for the following:
    - a. City street access.
    - b. Delivery and movement of equipment.
    - c. Structural completion.
    - d. Temporary enclosure and space conditioning.
    - e. Permanent space enclosure.
    - f. Completion of mechanical installation.
    - g. Completion of electrical installation.
    - h. Substantial Completion.

- F. Milestones: Include milestones indicated in the Contract Documents in schedule, including, but not limited to, the Notice to Proceed, Substantial Completion, and Final Completion.
- G. Cost Correlation: Superimpose a cost correlation timeline, indicating planned and actual costs. On the line, show planned and actual dollar volume of the Work performed as of planned and actual dates used for preparation of payment requests.
  - 1. See Section 012900 "Payment Procedures" for cost reporting and payment procedures.
- H. Upcoming Work Summary: Prepare summary report indicating activities scheduled to occur or commence prior to submittal of next schedule update. Summarize the following issues:
  - 1. Unresolved issues.
  - 2. Unanswered Requests for Information.
  - 3. Rejected or unreturned submittals.
  - 4. Notations on returned submittals.
  - 5. Pending modifications affecting the Work and the Contract Time.
- I. Contractor's Construction Schedule Updating: At monthly intervals, update schedule to reflect actual construction progress and activities. Issue schedule one week before each regularly scheduled progress meeting.
  - 1. Revise schedule immediately after each meeting or other activity where revisions have been recognized or made. Issue updated schedule concurrently with the report of each such meeting.
  - 2. Include a report with updated schedule that indicates every change, including, but not limited to, changes in logic, durations, actual starts and finishes, and activity durations.
  - 3. As the Work progresses, indicate Final Completion percentage for each activity.
- J. Recovery Schedule: When periodic update indicates the Work is 14 or more calendar days behind the current approved schedule, submit a separate recovery schedule indicating means by which Contractor intends to regain compliance with the schedule. Indicate changes to working hours, working days, crew sizes, equipment required to achieve compliance, and date by which recovery will be accomplished.
- K. Distribution: Distribute copies of approved schedule to Engineer, Owner, separate contractors, testing and inspecting agencies, and other parties identified by Contractor with a need-to-know schedule responsibility.
  - 1. Post copies in Project meeting rooms and temporary field offices.
  - 2. When revisions are made, distribute updated schedules to the same parties and post in the same locations. Delete parties from distribution when they have completed their assigned portion of the Work and are no longer involved in performance of construction activities.

## 1.8 STARTUP CONSTRUCTION SCHEDULE

- A. Gantt-Chart Schedule: Submit startup, horizontal, Gantt-chart-type construction schedule within seven days of date established for the Notice to Proceed.

- B. Preparation: Indicate each significant construction activity separately. Identify first workday of each week with a continuous vertical line. Outline significant construction activities for first 90 days of construction. Include skeleton diagram for the remainder of the Work and a cash requirement prediction based on indicated activities.

## 1.9 GANTT-CHART SCHEDULE REQUIREMENTS

- A. Gantt-Chart Schedule: Submit a comprehensive, fully developed, horizontal, Gantt-chart-type, Contractor's Construction Schedule within 30 days of date established for the Notice to Proceed.
  - 1. Base schedule on the startup construction schedule and additional information received since the start of Project.
- B. Preparation: Indicate each significant construction activity separately. Identify first workday of each week with a continuous vertical line.
  - 1. For construction activities that require three months or longer to complete, indicate an estimated completion percentage in **10** percent increments within time bar.

## 1.10 CPM SCHEDULE REQUIREMENTS

- A. Prepare network diagrams using AON (activity-on-node) format.
- B. Startup Network Diagram: Submit diagram within 14 days of date established for Notice to Proceed. Outline significant construction activities for the first 90 days of construction. Include skeleton diagram for the remainder of the Work and a cash requirement prediction based on indicated activities.
- C. CPM Schedule: Prepare Contractor's Construction Schedule using a cost- and resource-loaded, time-scaled CPM network analysis diagram for the Work.
  - 1. Develop network diagram in sufficient time to submit CPM schedule, so it can be accepted for use no later than 60 days after date established for the Notice to Proceed.
    - a. Failure to include any work item required for performance of this Contract shall not excuse Contractor from completing all work within applicable completion dates.
  - 2. Conduct educational workshops to train and inform key Project personnel, including subcontractors' personnel, in proper methods of providing data and using CPM schedule information.
  - 3. Establish procedures for monitoring and updating CPM schedule and for reporting progress. Coordinate procedures with progress meeting and payment request dates.
  - 4. Use "one workday" as the unit of time for individual activities. Indicate nonworking days and holidays incorporated into the schedule to coordinate with the Contract Time.
- D. CPM Schedule Preparation: Prepare a list of all activities required to complete the Work. Using the startup network diagram, prepare a skeleton network to identify probable critical paths.
  - 1. Activities: Indicate the estimated time duration, sequence requirements, and relationship of each activity in relation to other activities. Include estimated time frames for the following activities:

- a. Preparation and processing of submittals.
  - b. Mobilization and demobilization.
  - c. Purchase of materials.
  - d. Delivery.
  - e. Fabrication.
  - f. Utility interruptions.
  - g. Installation.
  - h. Work by Owner that may affect or be affected by Contractor's activities.
  - i. Testing and inspection.
  - j. Commissioning.
  - k. Punch list and Final Completion.
  - l. Activities occurring following Final Completion.
2. Critical Path Activities: Identify critical path activities, including those for interim completion dates. Scheduled start and completion dates shall be consistent with Contract milestone dates.
  3. Processing: Process data to produce output data on a computer-drawn, time-scaled network. Revise data, reorganize activity sequences, and reproduce as often as necessary to produce the CPM schedule within the limitations of the Contract Time.
  4. Format: Mark the critical path. Locate the critical path near center of network; locate paths with most float near the edges.
    - a. Subnetworks on separate sheets are permissible for activities clearly off the critical path.
  5. Cost- and Resource-Loading of CPM Schedule: Assign cost to construction activities on the CPM schedule. Do not assign costs to submittal activities. Obtain Engineer's approval prior to assigning costs to fabrication and delivery activities. Assign costs under main subcontracts for testing and commissioning activities, operation and maintenance manuals, punch list activities, Project record documents, sustainable design documentation, and demonstration and training (if applicable), in the amount of 5 percent of the Contract Sum.
    - a. Each activity cost shall reflect an appropriate value subject to approval by Engineer.
    - b. Total cost assigned to activities shall equal the total Contract Sum.
- E. Contract Modifications: For each proposed contract modification and concurrent with its submission, prepare a time-impact analysis using a network fragment to demonstrate the effect of the proposed change on the overall Project schedule.
- F. Initial Issue of Schedule: Prepare initial network diagram from a sorted activity list indicating straight "early start-total float." Identify critical activities. Prepare tabulated reports showing the following:
1. Contractor or subcontractor and the Work or activity.
  2. Description of activity.
  3. Main events of activity.
  4. Immediate preceding and succeeding activities.
  5. Early and late start dates.
  6. Early and late finish dates.
  7. Activity duration in workdays.
  8. Total float or slack time.

9. Average size of workforce.
  10. Dollar value of activity (coordinated with the schedule of values).
- G. Schedule Updating: Concurrent with making revisions to schedule, prepare tabulated reports showing the following:
1. Identification of activities that have changed.
  2. Changes in early and late start dates.
  3. Changes in early and late finish dates.
  4. Changes in activity durations in workdays.
  5. Changes in the critical path.
  6. Changes in total float or slack time.
  7. Changes in the Contract Time.
- H. Value Summaries: Prepare two cumulative value lists, sorted by finish dates.
1. In first list, tabulate activity number, early finish date, dollar value, and cumulative dollar value.
  2. In second list, tabulate activity number, late finish date, dollar value, and cumulative dollar value.
  3. In subsequent issues of both lists, substitute actual finish dates for activities completed as of list date.
  4. Prepare list for ease of comparison with payment requests; coordinate timing with progress meetings.
    - a. In both value summary lists, tabulate "actual percent complete" and "cumulative value completed" with total at bottom.
    - b. Submit value summary printouts one week before each regularly scheduled progress meeting.

## 1.11 REPORTS

- A. Daily Construction Reports: Prepare a daily construction report recording the following information concerning events at Project site:
1. List of subcontractors at Project site.
  2. List of separate contractors at Project site.
  3. Approximate count of personnel at Project site.
  4. Equipment at Project site.
  5. Material deliveries.
  6. High and low temperatures and general weather conditions, including presence of rain or snow.
  7. Testing and inspection.
  8. Accidents.
  9. Meetings and significant decisions.
  10. Unusual events.
  11. Stoppages, delays, shortages, and losses.
  12. Meter readings and similar recordings.
  13. Emergency procedures.
  14. Orders and requests of authorities having jurisdiction.
  15. Change Orders received and implemented.

16. Work Change Directives received and implemented.
  17. Services connected and disconnected.
  18. Equipment or system tests and startups.
  19. Partial completions and occupancies.
  20. Substantial Completions authorized.
- B. Material Location Reports: At weekly intervals, prepare and submit a comprehensive list of materials delivered to and stored at Project site. List shall be cumulative, showing materials previously reported plus items recently delivered. Include with list a statement of progress on and delivery dates for materials or items of equipment fabricated or stored away from Project site. Indicate the following categories for stored materials:
1. Material stored prior to previous report and remaining in storage.
  2. Material stored prior to previous report and since removed from storage and installed.
  3. Material stored following previous report and remaining in storage.
- C. Site Condition Reports: Immediately on discovery of a difference between site conditions and the Contract Documents, prepare and submit a detailed report. Submit with a Request for Information. Include a detailed description of the differing conditions, together with recommendations for changing the Contract Documents.
- D. Unusual Event Reports: When an event of an unusual and significant nature occurs at Project site, whether or not related directly to the Work, prepare and submit a special report. List chain of events, persons participating, responses by Contractor's personnel, evaluation of results or effects, and similar pertinent information. Advise Owner in advance when these events are known or predictable.
1. Submit unusual event reports directly to Owner within one day(s) of an occurrence. Distribute copies of report to parties affected by the occurrence.

**PART 2 – PRODUCTS (Not Used)**

**PART 3 – EXECUTION (Not Used)**

**END OF SECTION 013200**

## SECTION 013233 - PHOTOGRAPHIC DOCUMENTATION

### PART 1 – GENERAL

#### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

#### 1.2 SUMMARY

- A. Section includes administrative and procedural requirements for the following:
  - 1. Preconstruction photographs.
  - 2. Concealed Work photographs.
  - 3. Periodic construction photographs.
  - 4. Final Completion construction photographs.
  - 5. Preconstruction video recordings.
  - 6. Periodic construction video recordings.
  - 7. Construction webcam.
- B. Related Requirements:
  - 1. Section 017700 "Closeout Procedures" for submitting photographic documentation as Project Record Documents at Project closeout.
  - 2. Section 017900 "Demonstration and Training" for submitting video recordings of demonstration of equipment and training of Owner's personnel.

#### 1.3 INFORMATIONAL SUBMITTALS

- A. Key Plan: Submit key plan of Project site and building with notation of vantage points marked for location and direction of each photograph. Indicate elevation or story of construction. Include same information as corresponding photographic documentation.
- B. Digital Photographs: Submit image files within three days of taking photographs.
  - 1. Submit photos by uploading to web-based Project management software site. Include copy of key plan indicating each photograph's location and direction.
  - 2. Identification: Provide the following information with each image description in web-based Project management software site:
    - a. Name of Project.
    - b. Name and contact information for photographer.
    - c. Name of Engineer.
    - d. Name of Contractor.
    - e. Date photograph was taken.
    - f. Description of location, vantage point, and direction.
    - g. Unique sequential identifier keyed to accompanying key plan.

- C. Video Recordings: Submit video recordings within seven days of recording.
  - 1. Submit video recordings by uploading to web-based Project management software site. Include copy of key plan indicating each video's location and direction.
  - 2. Identification: With each submittal, provide the following information on web-based Project management software site:
    - a. Name of Project.
    - b. Name and address of photographer.
    - c. Name of Engineer.
    - d. Name of Contractor.
    - e. Date video recording was recorded.
    - f. Description of vantage point, indicating location, direction (by compass point), and elevation or story of construction.

#### 1.4 QUALITY ASSURANCE

- A. Photographer Qualifications: An individual who has been regularly engaged as a professional photographer of construction projects for not less than three years.
- B. Construction Webcam Service Provider: A firm specializing in providing photographic equipment, web-based software, and related services for construction projects, with a record of providing satisfactory services similar to those required for Project.

#### 1.5 FORMATS AND MEDIA

- A. Digital Photographs: Provide color images in JPG format, produced by a digital camera with minimum sensor size of 12 megapixels, and at an image resolution of not less than 3200 by 2400 pixels, and with vibration-reduction technology. Use flash in low light levels or backlit conditions.
- B. Digital Video Recordings: Provide high-resolution, digital video in MPEG format, produced by a digital camera with minimum sensor resolution of 12 megapixels and capable of recording in full high-definition mode with vibration-reduction technology. Provide supplemental lighting in low light levels or backlit conditions.
- C. Digital Images: Submit digital media as originally recorded in the digital camera, without alteration, manipulation, editing, or modifications using image-editing software.
- D. Metadata: Record accurate date and time and GPS location data from camera.
- E. File Names: Name media files with date and Project area and sequential numbering suffix.

#### 1.6 CONSTRUCTION PHOTOGRAPHS

- A. Photographer: Engage a qualified photographer to take construction photographs.
- B. General: Take photographs with maximum depth of field and in focus.

1. Maintain key plan with each set of construction photographs that identifies each photographic location.
- C. Preconstruction Photographs: Before commencement of the Work, take photographs of Project site and surrounding properties, including existing items to remain during construction, from different vantage points, as directed by Owner.
1. Flag excavation areas and construction limits before taking construction photographs.
  2. Take 20 photographs to show existing conditions adjacent to property before starting the Work.
  3. Take 20 photographs of existing buildings either on or adjoining property, to accurately record physical conditions at start of construction.
  4. Take additional photographs as required to record settlement or cracking of adjacent structures, pavements, and improvements.
- D. Concealed Work Photographs: Before proceeding with installing work that will conceal other work, take photographs sufficient in number, with annotated descriptions, to record nature and location of concealed Work, including, but not limited to, the following:
1. Underground utilities.
  2. Underslab services.
  3. Piping.
  4. Electrical conduit.
  5. Waterproofing and weather-resistant barriers.
- E. Periodic Construction Photographs: Take 20 photographs weekly coinciding with the cutoff date associated with each Application for Payment. Select vantage points to show status of construction and progress since last photographs were taken.
- F. Final Completion Construction Photographs: Take **20** photographs after date of Substantial Completion for submission as Project Record Documents. Owner will inform photographer of desired vantage points.
- G. Additional Photographs: Engineer may request photographs in addition to periodic photographs specified. Additional photographs will be paid for by Change Order and are not included in the Contract Sum or in the allowance for construction photographs.
1. Three days' notice will be given, where feasible.
  2. In emergency situations, take additional photographs within 24 hours of request.
  3. Circumstances that could require additional photographs include, but are not limited to, the following:
    - a. Special events planned at Project site.
    - b. Immediate follow-up when on-site events result in construction damage or losses.
    - c. Photographs shall be taken at fabrication locations away from Project site. These photographs are not subject to unit prices or unit-cost allowances.
    - d. Substantial Completion of a major phase or component of the Work.
    - e. Extra record photographs at time of final acceptance.
    - f. Owner's request for special publicity photographs.

## 1.7 CONSTRUCTION VIDEO RECORDINGS

- A. Video Recording Photographer: Engage a qualified videographer to record construction video recordings.
- B. Preconstruction Video Recording: Before starting excavation or demolition record video recording of Project site and surrounding properties from different vantage points, as directed by the Owner.
  - 1. Show existing loading dock and street conditions before starting the Work.
  - 2. Show existing conditions adjacent to Project site before starting the Work.
  - 3. Show existing buildings either on or adjoining Project site to accurately record physical conditions at the start of excavation and demolition.
  - 4. Show protection efforts by Contractor.
- C. Periodic Construction Video Recordings: Record video recording monthly coinciding with the cutoff date associated with each Application for Payment. Select vantage points to show status of construction and progress since last video recordings were recorded. Minimum recording time shall be 30 minutes(s).

### **PART 2 – PRODUCTS (Not Used)**

### **PART 3 – EXECUTION (Not Used)**

**END OF SECTION 013233**

## SECTION 013300 - SUBMITTAL PROCEDURES

### PART 1 – GENERAL

#### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

#### 1.2 SUMMARY

- A. Section Includes:
  - 1. Submittal schedule requirements.
  - 2. Administrative and procedural requirements for submittals.
- B. Related Requirements:
  - 1. Section 012900 "Payment Procedures" for submitting Applications for Payment and the schedule of values.
  - 2. Section 013100 "Project Management and Coordination" for submitting coordination drawings and subcontract list and for requirements for web-based Project software.
  - 3. Section 013200 "Construction Progress Documentation" for submitting schedules and reports, including Contractor's construction schedule.
  - 4. Section 013233 "Photographic Documentation" for submitting preconstruction photographs, periodic construction photographs, and Final Completion construction photographs.
  - 5. Section 014000 "Quality Requirements" for submitting test and inspection reports, and schedule of tests and inspections.
  - 6. Section 017700 "Closeout Procedures" for submitting closeout submittals and maintenance material submittals.
  - 7. Section 017823 "Operation and Maintenance Data" for submitting operation and maintenance manuals.
  - 8. Section 017839 "Project Record Documents" for submitting record Drawings, record Specifications, and record Product Data.
  - 9. Section 017900 "Demonstration and Training" for submitting video recordings of demonstration of equipment and training of Owner's personnel.

#### 1.3 DEFINITIONS

- A. Action Submittals: Written and graphic information and physical samples that require Engineer's action. Action submittals are those submittals indicated in individual Specification Sections as "action submittals."
- B. Informational Submittals: Written and graphic information and physical samples that do not require Engineer's responsive action. Submittals may be rejected for not complying with

requirements. Informational submittals are those submittals indicated in individual Specification Sections as "informational submittals."

#### 1.4 SUBMITTAL SCHEDULE

- A. Submittal Schedule: Submit, as an action submittal, a list of submittals, arranged in chronological order by dates required by construction schedule. Include time required for review, ordering, manufacturing, fabrication, and delivery when establishing dates. Include additional time required for making corrections or revisions to submittals noted by Engineer and additional time for handling and reviewing submittals required by those corrections.
1. Coordinate submittal schedule with list of subcontracts, the schedule of values, and Contractor's construction schedule.
  2. Initial Submittal Schedule: Submit concurrently with startup construction schedule. Include submittals required during the first 60 days of construction. List those submittals required to maintain orderly progress of the Work and those required early because of long lead time for manufacture or fabrication.
  3. Final Submittal Schedule: Submit concurrently with the first complete submittal of Contractor's construction schedule.
    - a. Submit revised submittal schedule as required to reflect changes in current status and timing for submittals.
  4. Format: Arrange the following information in a tabular format:
    - a. Scheduled date for first submittal.
    - b. Specification Section number and title.
    - c. Submittal Category: Action; informational.
    - d. Name of subcontractor.
    - e. Description of the Work covered.
    - f. Scheduled date for Engineer's final release or approval.
    - g. Scheduled dates for purchasing.
    - h. Scheduled date of fabrication.
    - i. Scheduled dates for installation.
    - j. Activity or event number.

#### 1.5 SUBMITTAL FORMATS

- A. Submittal Information: Include the following information in each submittal:
1. Project name.
  2. Date.
  3. Name of Engineer.
  4. Name of Construction Manager.
  5. Name of Contractor.
  6. Name of firm or entity that prepared submittal.
  7. Names of subcontractor, manufacturer, and supplier.
  8. Unique submittal number, including revision identifier. Include Specification Section number with sequential alphanumeric identifier and alphanumeric suffix for resubmittals.
  9. Category and type of submittal.

10. Submittal purpose and description.
  11. Number and title of Specification Section, with paragraph number and generic name for each of multiple items.
  12. Drawing number and detail references, as appropriate.
  13. Indication of full or partial submittal.
  14. Location(s) where product is to be installed, as appropriate.
  15. Other necessary identification.
  16. Remarks.
  17. Signature of transmitter.
- B. Options: Identify options requiring selection by Engineer.
- C. Deviations and Additional Information: On each submittal, clearly indicate deviations from requirements in the Contract Documents, including minor variations and limitations; include relevant additional information and revisions, other than those requested by Engineer on previous submittals. Indicate by highlighting each submittal or noting on attached separate sheet.
- D. Electronic Submittals: Prepare submittals as PDF package, incorporating complete information into each PDF file. Name PDF file with submittal number.
- E. Submittals Utilizing Web-Based Project Software: Prepare submittals as PDF files or other format indicated by Project management software.

## 1.6 SUBMITTAL PROCEDURES

- A. Prepare and submit submittals required by individual Specification Sections. Types of submittals are indicated in individual Specification Sections.
1. Email: Prepare submittals as PDF package and transmit to Engineer by sending via email. Include PDF transmittal form. Include information in email subject line as requested by Engineer.
    - a. Engineer will return annotated file. Annotate and retain one copy of file as a digital Project Record Document file.
  2. Web-Based Project Management Software: Prepare submittals in PDF form, and upload to web-based Project management software website. Enter required data in web-based software site to fully identify submittal.
- B. Coordination: Coordinate preparation and processing of submittals with performance of construction activities.
1. Coordinate each submittal with fabrication, purchasing, testing, delivery, other submittals, and related activities that require sequential activity.
  2. Submit all submittal items required for each Specification Section concurrently unless partial submittals for portions of the Work are indicated on approved submittal schedule.
  3. Submit action submittals and informational submittals required by the same Specification Section as separate packages under separate transmittals.

4. Coordinate transmittal of submittals for related parts of the Work specified in different Sections, so processing will not be delayed because of need to review submittals concurrently for coordination.
    - a. Engineer reserves the right to withhold action on a submittal requiring coordination with other submittals until related submittals are received.
- C. Processing Time: Allow time for submittal review, including time for resubmittals, as follows. Time for review shall commence on Engineer's receipt of submittal. No extension of the Contract Time will be authorized because of failure to transmit submittals enough in advance of the Work to permit processing, including resubmittals.
1. Initial Review: Allow 15 days for initial review of each submittal. Allow additional time if coordination with subsequent submittals is required. Engineer will advise Contractor when a submittal being processed must be delayed for coordination.
  2. Intermediate Review: If intermediate submittal is necessary, process it in same manner as initial submittal.
  3. Resubmittal Review: Allow 15 days for review of each resubmittal.
  4. Sequential Review: Where sequential review of submittals by Engineer's consultants, Owner, or other parties is indicated, allow 21 days for initial review of each submittal.
  5. Concurrent Consultant Review: Where the Contract Documents indicate that submittals may be transmitted simultaneously to Engineer and to Engineer's consultants, allow 15 days for review of each submittal. Submittal will be returned to Engineer before being returned to Contractor.
    - a. Submit one copy of submittal to concurrent reviewer in addition to specified number of copies to Engineer.
- D. Resubmittals: Make resubmittals in same form and number of copies as initial submittal.
1. Note date and content of previous submittal.
  2. Note date and content of revision in label or title block, and clearly indicate extent of revision.
  3. Resubmit submittals until they are marked with approval notation from Engineer's action stamp.
- E. Distribution: Furnish copies of final submittals to manufacturers, subcontractors, suppliers, fabricators, installers, authorities having jurisdiction, and others as necessary for performance of construction activities. Show distribution on transmittal forms.
- F. Use for Construction: Retain complete copies of submittals on Project site. Use only final action submittals that are marked with approval notation from Engineer's action stamp.

## 1.7 SUBMITTAL REQUIREMENTS

- A. Product Data: Collect information into a single submittal for each element of construction and type of product or equipment.
1. If information must be specially prepared for submittal because standard published data are unsuitable for use, submit as Shop Drawings, not as Product Data.
  2. Mark each copy of each submittal to show which products and options are applicable.
  3. Include the following information, as applicable:

- a. Manufacturer's catalog cuts.
  - b. Manufacturer's product specifications.
  - c. Standard color charts.
  - d. Statement of compliance with specified referenced standards.
  - e. Testing by recognized testing agency.
  - f. Application of testing agency labels and seals.
  - g. Notation of coordination requirements.
  - h. Availability and delivery time information.
4. For equipment, include the following in addition to the above, as applicable:
    - a. Wiring diagrams that show factory-installed wiring.
    - b. Printed performance curves.
    - c. Operational range diagrams.
    - d. Clearances required to other construction, if not indicated on accompanying Shop Drawings.
  5. Submit Product Data before Shop Drawings, and before or concurrently with Samples.
- B. Shop Drawings: Prepare Project-specific information, drawn accurately to scale. Do not base Shop Drawings on reproductions of the Contract Documents or standard printed data.
1. Preparation: Fully illustrate requirements in the Contract Documents. Include the following information, as applicable:
    - a. Identification of products.
    - b. Schedules.
    - c. Compliance with specified standards.
    - d. Notation of coordination requirements.
    - e. Notation of dimensions established by field measurement.
    - f. Relationship and attachment to adjoining construction clearly indicated.
    - g. Seal and signature of professional engineer if specified.
  2. BIM Incorporation: Develop and incorporate Shop Drawing files into BIM established for Project.
- C. Product Schedule: As required in individual Specification Sections, prepare a written summary indicating types of products required for the Work and their intended location. Include the following information in tabular form:
1. Type of product. Include unique identifier for each product indicated in the Contract Documents or assigned by Contractor if none is indicated.
  2. Manufacturer and product name, and model number if applicable.
  3. Number and name of room or space.
  4. Location within room or space.
- D. Qualification Data: Prepare written information that demonstrates capabilities and experience of firm or person. Include lists of completed projects with project names and addresses, contact information of Engineers and owners, and other information specified.
- E. Design Data: Prepare and submit written and graphic information indicating compliance with indicated performance and design criteria in individual Specification Sections. Include list of assumptions and summary of loads. Include load diagrams if applicable. Provide name and version of software, if any, used for calculations. Number each page of submittal.

F. Certificates:

1. Certificates and Certifications Submittals: Submit a statement that includes signature of entity responsible for preparing certification. Certificates and certifications shall be signed by an officer or other individual authorized to sign documents on behalf of that entity. Provide a notarized signature where indicated.
2. Installer Certificates: Submit written statements on manufacturer's letterhead, certifying that Installer complies with requirements in the Contract Documents and, where required, is authorized by manufacturer for this specific Project.
3. Manufacturer Certificates: Submit written statements on manufacturer's letterhead, certifying that manufacturer complies with requirements in the Contract Documents. Include evidence of manufacturing experience where required.
4. Material Certificates: Submit written statements on manufacturer's letterhead, certifying that material complies with requirements in the Contract Documents.
5. Product Certificates: Submit written statements on manufacturer's letterhead, certifying that product complies with requirements in the Contract Documents.
6. Welding Certificates: Prepare written certification that welding procedures and personnel comply with requirements in the Contract Documents. Submit record of AWS B2.1/B2.1M on AWS forms. Include names of firms and personnel certified.

G. Test and Research Reports:

1. Compatibility Test Reports: Submit reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of compatibility tests performed before installation of product. Include written recommendations for substrate preparation and primers required.
2. Field Test Reports: Submit written reports indicating and interpreting results of field tests performed either during installation of product or after product is installed in its final location, for compliance with requirements in the Contract Documents.
3. Material Test Reports: Submit reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting test results of material for compliance with requirements in the Contract Documents.
4. Preconstruction Test Reports: Submit reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of tests performed before installation of product, for compliance with performance requirements in the Contract Documents.
5. Product Test Reports: Submit written reports indicating that current product produced by manufacturer complies with requirements in the Contract Documents. Base reports on evaluation of tests performed by manufacturer and witnessed by a qualified testing agency, or on comprehensive tests performed by a qualified testing agency.
6. Research Reports: Submit written evidence, from a model code organization acceptable to authorities having jurisdiction, that product complies with building code in effect for Project. Include the following information:
  - a. Name of evaluation organization.
  - b. Date of evaluation.
  - c. Time period when report is in effect.
  - d. Product and manufacturers' names.
  - e. Description of product.
  - f. Test procedures and results.
  - g. Limitations of use.

## 1.8 DELEGATED DESIGN SERVICES

- A. Performance and Design Criteria: Where professional design services or certifications by a design professional are specifically required of Contractor by the Contract Documents, provide products and systems complying with specific performance and design criteria indicated.
  - 1. If criteria indicated are insufficient to perform services or certification required, submit a written request for additional information to Engineer.
- B. Delegated-Design Services Certification: In addition to Shop Drawings, Product Data, and other required submittals, submit digitally signed PDF file signed and sealed by the responsible design professional, for each product and system specifically assigned to Contractor to be designed or certified by a design professional.
  - 1. Indicate that products and systems comply with performance and design criteria in the Contract Documents. Include list of codes, loads, and other factors used in performing these services.
- C. BIM Incorporation: Incorporate delegated-design drawing and data files into BIM established for Project.
  - 1. Prepare delegated-design drawings in the following format: Same digital data software program, version, and operating system as original Drawings

## 1.9 CONTRACTOR'S REVIEW

- A. Action Submittals and Informational Submittals: Review each submittal and check for coordination with other Work of the Contract and for compliance with the Contract Documents. Note corrections and field dimensions. Mark with approval stamp before submitting to Engineer.
- B. Contractor's Approval: Indicate Contractor's approval for each submittal with indication in web-based Project management software. Include name of reviewer, date of Contractor's approval, and statement certifying that submittal has been reviewed, checked, and approved for compliance with the Contract Documents.
  - 1. Engineer will not review submittals received from Contractor that do not have Contractor's review and approval.

## 1.10 ENGINEER'S REVIEW

- A. Action Submittals: Engineer will review each submittal, indicate corrections or revisions required, and return.
  - 1. PDF Submittals: Engineer will indicate, via markup on each submittal, the appropriate action.
  - 2. Submittals by Web-Based Project Management Software: Engineer will indicate, on Project management software website, the appropriate action.
- B. Informational Submittals: Engineer will review each submittal and will not return it or will return it if it does not comply with requirements. Engineer will forward each submittal to appropriate party.

- C. Partial submittals prepared for a portion of the Work will be reviewed when use of partial submittals has received prior approval from Engineer.
- D. Incomplete submittals are unacceptable, will be considered nonresponsive, and will be returned for resubmittal without review.
- E. Engineer will return without reviewing submittals received from sources other than Contractor.
- F. Submittals not required by the Contract Documents will be returned by Engineer without action.

**PART 2 – PRODUCTS (Not Used)**

**PART 3 – EXECUTION (Not Used)**

**END OF SECTION 013300**

## SECTION 013516 – ALTERATION PROJECT PROCEDURES

### PART 1 – GENERAL

#### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

#### 1.2 SUMMARY

- A. Section includes special procedures for alteration work.

#### 1.3 DEFINITIONS

- A. Alteration Work: This term includes remodeling, renovation, repair, and maintenance work performed within existing spaces or on existing surfaces as part of the Project.
- B. Consolidate: To strengthen loose or deteriorated materials in place.
- C. Design Reference Sample: A sample that represents the Engineer's prebid selection of work to be matched; it may be existing work or work specially produced for the Project.
- D. Dismantle: To remove by disassembling or detaching an item from a surface, using gentle methods and equipment to prevent damage to the item and surfaces; disposing of items unless indicated to be salvaged or reinstalled.
- E. Match: To blend with adjacent construction and manifest no apparent difference in material type, species, cut, form, detail, color, grain, texture, or finish; as approved by Engineer.
- F. Refinish: To remove existing finishes to base material and apply new finish to match original, or as otherwise indicated.
- G. Repair: To correct damage and defects, retaining existing materials, features, and finishes. This includes patching, piecing-in, splicing, consolidating, or otherwise reinforcing or upgrading materials.
- H. Replace: To remove, duplicate, and reinstall entire item with new material. The original item is the pattern for creating duplicates unless otherwise indicated.
- I. Replicate: To reproduce in exact detail, materials, and finish unless otherwise indicated.
- J. Reproduce: To fabricate a new item, accurate in detail to the original, and from either the same or a similar material as the original, unless otherwise indicated.

- K. Retain: To keep existing items that are not to be removed or dismantled.
- L. Strip: To remove existing finish down to base material unless otherwise indicated.

#### 1.4 COORDINATION

- A. Alteration Work Subschedule: A construction schedule coordinating the sequencing and scheduling of alteration work for entire Project, including each activity to be performed, and based on Contractor's Construction Schedule. Secure time commitments for performing critical construction activities from separate entities responsible for alteration work.
  - 1. Schedule construction operations in sequence required to obtain best Work results.
  - 2. Coordinate sequence of alteration work activities to accommodate the following:
    - a. Owner's continuing occupancy of portions of existing building.
    - b. Owner's partial occupancy of completed Work.
    - c. Other known work in progress.
    - d. Tests and inspections.
  - 3. Detail sequence of alteration work, with start and end dates.
  - 4. Utility Services: Indicate how long utility services will be interrupted. Coordinate shutoff, capping, and continuation of utility services.
  - 5. Use of elevator and stairs.
  - 6. Equipment Data: List gross loaded weight, axle-load distribution, and wheel-base dimension data for mobile and heavy equipment intended for use in existing structure. Do not use such equipment without certification from Contractor's professional engineer that the structure can support the imposed loadings without damage.
- B. Pedestrian and Vehicular Circulation: Coordinate alteration work with circulation patterns within Project building(s) and site. Some work is near circulation patterns and adjacent to restricted areas. Circulation patterns cannot be closed off entirely and in places can be only temporarily redirected around small areas of work. Access to restricted areas may not be obstructed. Plan and execute the Work accordingly.

#### 1.5 PROJECT MEETINGS FOR ALTERATION WORK

- A. Preliminary Conference for Alteration Work: Before starting alteration work, conduct conference at Project site.
  - 1. Attendees: In addition to representatives of Owner, Engineer, and Contractor, testing service representative, specialists, and chemical-cleaner manufacturer(s) shall be represented at the meeting.
  - 2. Agenda: Discuss items of significance that could affect progress of alteration work, including review of the following:
    - a. Alteration Work Subschedule: Discuss and finalize; verify availability of materials, specialists' personnel, equipment, and facilities needed to make progress and avoid delays.
    - b. Fire-prevention plan.
    - c. Governing regulations.
    - d. Areas where existing construction is to remain and the required protection.

- e. Hauling routes.
  - f. Sequence of alteration work operations.
  - g. Storage, protection, and accounting for salvaged and specially fabricated items.
  - h. Existing conditions, staging, and structural loading limitations of areas where materials are stored.
  - i. Qualifications of personnel assigned to alteration work and assigned duties.
  - j. Requirements for extent and quality of work, tolerances, and required clearances.
  - k. Embedded work such as flashings and lintels, special details, collection of waste, protection of occupants and the public, and condition of other construction that affects the Work or will affect the work.
3. Reporting: Record conference results and distribute copies to everyone in attendance and to others affected by decisions or actions resulting from conference.
- B. Coordination Meetings: Conduct coordination meetings specifically for alteration work at weekly intervals. Coordination meetings are in addition to specific meetings held for other purposes, such as progress meetings and preinstallation conferences.
1. Attendees: In addition to representatives of Owner, Engineer, and Contractor, each specialist, supplier, installer, and other entity concerned with progress or involved in planning, coordination, or performance of alteration work activities shall be represented at these meetings. All participants at conference shall be familiar with Project and authorized to conclude matters relating to alteration work.
  2. Agenda: Review and correct or approve minutes of previous coordination meeting. Review other items of significance that could affect progress of alteration work. Include topics for discussion as appropriate to status of Project.
    - a. Alteration Work Subschedule: Review progress since last coordination meeting. Determine whether each schedule item is on time, ahead of schedule, or behind schedule. Determine how construction behind schedule will be expedited with retention of quality; secure commitments from parties involved to do so. Discuss whether schedule revisions are required to ensure that current and subsequent activities are completed within the Contract Time.
    - b. Schedule Updating: Revise Contractor's Alteration Work Subschedule after each coordination meeting where revisions to schedule have been made or recognized. Issue revised schedule concurrently with report of each meeting.
    - c. Review present and future needs of each entity present, including review items listed in the "Preliminary Conference for Alteration Work" Paragraph in this article and the following:
      - I. Interface requirements of alteration work with other Project Work.
      - II. Status of submittals for alteration work.
      - III. Access to alteration work locations.
      - IV. Effectiveness of fire-prevention plan.
      - V. Quality and work standards of alteration work.
      - VI. Change Orders for alteration work.
  3. Reporting: Record meeting results and distribute copies to everyone in attendance and to others affected by decisions or actions resulting from each meeting.

## 1.6 MATERIALS OWNERSHIP

- A. Historic items, relics, and similar objects including, but not limited to, cornerstones and their contents, commemorative plaques and tablets, antiques, and other items of interest or value to Owner that may be encountered or uncovered during the Work, regardless of whether they were previously documented, remain Owner's property.
  - 1. Carefully dismantle and salvage each item or object in a manner to prevent damage and protect it from damage, then promptly deliver it to Owner where directed at Project site.

## 1.7 INFORMATIONAL SUBMITTALS

- A. Alteration Work Subschedule:
  - 1. Submit alteration work subschedule within seven days of date established for commencement of alteration work.
- B. Preconstruction Documentation: Show preexisting conditions of adjoining construction and site improvements that are to remain, including finish surfaces, that might be misconstrued as damage caused by Contractor's alteration work operations.
- C. Alteration Work Program: Submit 30 days before work begins.
- D. Fire-Prevention Plan: Submit 30 days before work begins.

## 1.8 QUALITY ASSURANCE

- A. Specialist Qualifications: An experienced firm regularly engaged in specialty work similar in nature, materials, design, and extent to alteration work as specified in each Section and that has completed a minimum of five recent projects with a record of successful in-service performance that demonstrates the firm's qualifications to perform this work.
  - 1. Field Supervisor Qualifications: Full-time supervisors experienced in specialty work similar in nature, material, design, and extent to that indicated for this Project. Supervisors shall be on-site when specialty work begins and during its progress. Supervisors shall not be changed during Project except for causes beyond the control of the specialist firm.
    - a. Construct new mockups of required work whenever a supervisor is replaced.
- B. Alteration Work Program: Prepare a written plan for alteration work for whole Project, including each phase or process and protection of surrounding materials during operations. Show compliance with indicated methods and procedures specified in this and other Sections. Coordinate this whole-Project alteration work program with specific requirements of programs required in other alteration work Sections.
  - 1. Dust and Noise Control: Include locations of temporary dust- and noise-control partitions and means of egress from occupied areas coordinated with continuing on-site operations and other known work in progress.
  - 2. Debris Hauling: Include plans clearly marked to show debris hauling routes, turning radii, and locations and details of temporary protective barriers.

- C. Fire-Prevention Plan: Prepare a written plan for preventing fires during the Work, including placement of fire extinguishers, fire blankets, rag buckets, and other fire-control devices during each phase or process. Coordinate plan with Owner's fire-protection equipment and requirements. Include fire-watch personnel's training, duties, and authority to enforce fire safety.
- D. Safety and Health Standard: Comply with ANSI/ASSE A10.6.

## 1.9 STORAGE AND HANDLING OF SALVAGED MATERIALS

- A. Salvaged Materials:
  - 1. Clean loose dirt and debris from salvaged items unless more extensive cleaning is indicated.
  - 2. Pack or crate items after cleaning; cushion against damage during handling. Label contents of containers.
  - 3. Store items in a secure area until delivery to Owner.
  - 4. Transport items to Owner's storage area on-site.
  - 5. Protect items from damage during transport and storage.
- B. Salvaged Materials for Reinstallation:
  - 1. Repair and clean items for reuse as indicated.
  - 2. Pack or crate items after cleaning and repairing; cushion against damage during handling. Label contents of containers.
  - 3. Protect items from damage during transport and storage.
  - 4. Reinstall items in locations indicated. Comply with installation requirements for new materials and equipment unless otherwise indicated. Provide connections, supports, and miscellaneous materials to make items functional for use indicated.
- C. Existing Materials to Remain: Protect construction indicated to remain against damage and soiling from construction work. Where permitted by Engineer, items may be dismantled and taken to a suitable, protected storage location during construction work and reinstalled in their original locations after alteration and other construction work in the vicinity is complete.
- D. Storage: Catalog and store items within a weathertight enclosure where they are protected from moisture, weather, condensation, and freezing temperatures.
  - 1. Identify each item for reinstallation with a nonpermanent mark to document its original location. Indicate original locations on plans, elevations, sections, or photographs by annotating the identifying marks.
  - 2. Secure stored materials to protect from theft.
  - 3. Control humidity so that it does not exceed 85 percent. Maintain temperatures 5 deg F or more above the dew point.
- E. Storage Space:
  - 1. Owner will arrange for limited on-site location(s) for free storage of salvaged material. This storage space includes security and climate control for stored material.
  - 2. Arrange for off-site locations for storage and protection of salvaged material that cannot be stored and protected on-site.

## 1.10 FIELD CONDITIONS

- A. Survey of Existing Conditions: Record existing conditions that affect the Work by use of measured drawings.
  - 1. Comply with requirements specified in Section 013233 "Photographic Documentation."
- B. Discrepancies: Notify Engineer of discrepancies between existing conditions and Drawings before proceeding with removal and dismantling work.
- C. Size Limitations in Existing Spaces: Materials, products, and equipment used for performing the Work and for transporting debris, materials, and products shall be of sizes that clear surfaces within existing spaces, areas, rooms, and openings, including temporary protection, by 12 inches or more.

## **PART 2 – PRODUCTS - (Not Used)**

## **PART 3 – EXECUTION**

### 3.1 PROTECTION

- A. Protect persons, motor vehicles, surrounding surfaces of building, building site, plants, and surrounding buildings from harm resulting from alteration work.
  - 1. Use only proven protection methods, appropriate to each area and surface being protected.
  - 2. Provide temporary barricades, barriers, and directional signage to exclude the public from areas where alteration work is being performed.
  - 3. Erect temporary barriers to form and maintain fire-egress routes.
  - 4. Erect temporary protective covers over walkways and at points of pedestrian and vehicular entrance and exit that must remain in service during alteration work.
  - 5. Contain dust and debris generated by alteration work, and prevent it from reaching the public or adjacent surfaces.
  - 6. Provide shoring, bracing, and supports as necessary. Do not overload structural elements.
  - 7. Protect floors and other surfaces along hauling routes from damage, wear, and staining.
  - 8. Provide supplemental sound-control treatment to isolate demolition work from other areas of the building if necessary.
- B. Temporary Protection of Materials to Remain:
  - 1. Protect existing materials with temporary protections and construction. Do not remove existing materials unless otherwise indicated.
  - 2. Do not attach temporary protection to existing surfaces except as indicated as part of the alteration work program.
- C. Comply with each product manufacturer's written instructions for protections and precautions. Protect against adverse effects of products and procedures on people and adjacent materials, components, and vegetation.

- D. Utility and Communications Services:
  - 1. Notify Owner, Engineer, authorities having jurisdiction, and entities owning or controlling wires, conduits, pipes, and other services affected by alteration work before commencing operations.
  - 2. Disconnect and cap pipes and services as required by authorities having jurisdiction, as required for alteration work.
  - 3. Maintain existing services unless otherwise indicated; keep in service, and protect against damage during operations. Provide temporary services during interruptions to existing utilities.
  
- E. Existing Drains: Prior to the start of work in an area, test drainage system to ensure that it is functioning properly. Notify Engineer immediately of inadequate drainage or blockage. Do not begin work in an area until the drainage system is functioning properly.
  - 1. Prevent solids such as adhesive or mortar residue or other debris from entering the drainage system. Clean out drains and drain lines that become sluggish or blocked by sand or other materials resulting from alteration work.
  - 2. Protect drains from pollutants. Block drains or filter out sediments, allowing only clean water to pass.

### 3.2 PROTECTION FROM FIRE

- A. General: Follow fire-prevention plan and the following:
  - 1. Comply with NFPA 241 requirements unless otherwise indicated. Perform duties titled "Owner's Responsibility for Fire Protection."
  - 2. Remove and keep area free of combustibles, including rubbish, paper, waste, and chemicals, unless necessary for the immediate work.
    - a. If combustible material cannot be removed, provide fire blankets to cover such materials.
  
- B. Heat-Generating Equipment and Combustible Materials: Comply with the following procedures while performing work with heat-generating equipment or combustible materials, including welding, torch-cutting, soldering, brazing, removing paint with heat, or other operations where open flames or implements using high heat or combustible solvents and chemicals are anticipated:
  - 1. Obtain Owner's approval for operations involving use of open-flame or welding or other high-heat equipment. Use of open-flame equipment is not permitted. Notify Owner at least 72 hours before each occurrence, indicating location of such work.
  - 2. As far as practicable, restrict heat-generating equipment to shop areas or outside the building.
  - 3. Do not perform work with heat-generating equipment in or near rooms or in areas where flammable liquids or explosive vapors are present or thought to be present. Use a combustible gas indicator test to ensure that the area is safe.
  - 4. Use fireproof baffles to prevent flames, sparks, hot gases, or other high-temperature material from reaching surrounding combustible material.
  - 5. Prevent the spread of sparks and particles of hot metal through open windows, doors, holes, and cracks in floors, walls, ceilings, roofs, and other openings.

6. Fire Watch: Before working with heat-generating equipment or combustible materials, station personnel to serve as a fire watch at each location where such work is performed. Fire-watch personnel shall have the authority to enforce fire safety. Station fire watch according to NFPA 51B, NFPA 241, and as follows:
  - a. Train each fire watch in the proper operation of fire-control equipment and alarms.
  - b. Prohibit fire-watch personnel from other work that would be a distraction from fire-watch duties.
  - c. Cease work with heat-generating equipment whenever fire-watch personnel are not present.
  - d. Have fire-watch personnel perform final fire-safety inspection each day beginning no sooner than 30 minutes after conclusion of work in each area to detect hidden or smoldering fires and to ensure that proper fire prevention is maintained.
  - e. Maintain fire-watch personnel at each area of Project site until 30 minutes after conclusion of daily work.
- C. Fire-Control Devices: Provide and maintain fire extinguishers, fire blankets, and rag buckets for disposal of rags with combustible liquids. Maintain each as suitable for the type of fire risk in each work area. Ensure that nearby personnel and the fire-watch personnel are trained in fire-extinguisher and blanket use.
- D. Sprinklers: Where sprinkler protection exists and is functional, maintain it without interruption while operations are being performed. If operations are performed close to sprinklers, shield them temporarily with guards.
  1. Remove temporary guards at the end of work shifts, whenever operations are paused, and when nearby work is complete.

### 3.3 PROTECTION DURING APPLICATION OF CHEMICALS

- A. Protect motor vehicles, surrounding surfaces of building, building site, plants, and surrounding buildings from harm or spillage resulting from applications of chemicals and adhesives.
- B. Cover adjacent surfaces with protective materials that are proven to resist chemicals selected for Project unless chemicals being used will not damage adjacent surfaces as indicated in alteration work program. Use covering materials and masking agents that are waterproof and UV resistant and that will not stain or leave residue on surfaces to which they are applied. Apply protective materials according to manufacturer's written instructions. Do not apply liquid masking agents or adhesives to painted or porous surfaces. When no longer needed, promptly remove protective materials.
- C. Do not apply chemicals during winds of sufficient force to spread them to unprotected surfaces.
- D. Neutralize alkaline and acid wastes and legally dispose of off Owner's property.
- E. Collect and dispose of runoff from chemical operations by legal means and in a manner that prevents soil contamination, soil erosion, undermining of paving and foundations, damage to landscaping, or water penetration into building interior.

### 3.4 GENERAL ALTERATION WORK

- A. Have specialty work performed only by qualified specialists.
- B. Ensure that supervisory personnel are present when work begins and during its progress.
- C. Record existing work before each procedure (preconstruction), and record progress during the work. Use digital preconstruction documentation photographs. Comply with requirements in Section 013233 "Photographic Documentation."
- D. Perform surveys of Project site as the Work progresses to detect hazards resulting from alterations.
- E. Notify Engineer of visible changes in the integrity of material or components whether from environmental causes including biological attack, UV degradation, freezing, or thawing or from structural defects including cracks, movement, or distortion.
  - 1. Do not proceed with the work in question until directed by Engineer.

**END OF SECTION 013516**

## SECTION 014000 – QUALITY REQUIREMENTS

### PART 1 – GENERAL

#### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

#### 1.2 SUMMARY

- A. Section includes administrative and procedural requirements for quality assurance and quality control.
- B. Testing and inspection services are required to verify compliance with requirements specified or indicated. These services do not relieve Contractor of responsibility for compliance with the Contract Document requirements.
  - 1. Specific quality-assurance and quality-control requirements for individual work results are specified in their respective Specification Sections. Requirements in individual Sections may also cover production of standard products.
  - 2. Specified tests, inspections, and related actions do not limit Contractor's other quality-assurance and quality-control procedures that facilitate compliance with the Contract Document requirements.
  - 3. Requirements for Contractor to provide quality-assurance and quality-control services required by Engineer, Owner, or authorities having jurisdiction are not limited by provisions of this Section.

#### 1.3 DEFINITIONS

- A. Experienced: When used with an entity or individual, "experienced," unless otherwise further described, means having successfully completed a minimum of five previous projects similar in nature, size, and extent to this Project; being familiar with special requirements indicated; and having complied with requirements of authorities having jurisdiction.
- B. Field Quality-Control Tests and Inspections: Tests and inspections that are performed on-site for installation of the Work and for completed Work.
- C. Installer/Applicator/Erector: Contractor or another entity engaged by Contractor as an employee, subcontractor, or sub-subcontractor, to perform a particular construction operation, including installation, erection, application, assembly, and similar operations.
  - 1. Use of trade-specific terminology in referring to a Work result does not require that certain construction activities specified apply exclusively to specific trade(s).

- D. Mockups: Full-size physical assemblies that are constructed either as freestanding temporary built elements or as part of permanent construction. Mockups are constructed to verify selections made under Sample submittals; to demonstrate aesthetic effects and qualities of materials and execution; to review coordination, testing, or operation; to show interface between dissimilar materials; and to demonstrate compliance with specified installation tolerances. Mockups are not Samples. Unless otherwise indicated, approved mockups establish the standard by which the Work will be judged.
  - 1. Laboratory Mockups: Full-size physical assemblies constructed and tested at testing facility to verify performance characteristics.
  - 2. Product Mockups: Mockups that may include multiple products, materials, or systems specified in a single Section.
  - 3. In-Place Mockups: Mockups constructed on-site in their actual final location as part of permanent construction.
- E. Preconstruction Testing: Tests and inspections performed specifically for Project before products and materials are incorporated into the Work, to verify performance or compliance with specified criteria. Unless otherwise indicated, copies of reports of tests or inspections performed for other than the Project do not meet this definition.
- F. Product Tests: Tests and inspections that are performed by a nationally recognized testing laboratory (NRTL) according to 29 CFR 1910.7, by a testing agency accredited according to NIST's National Voluntary Laboratory Accreditation Program (NVLAP), or by a testing agency qualified to conduct product testing and acceptable to authorities having jurisdiction, to establish product performance and compliance with specified requirements.
- G. Source Quality-Control Tests and Inspections: Tests and inspections that are performed at the source (e.g., plant, mill, factory, or shop).
- H. Testing Agency: An entity engaged to perform specific tests, inspections, or both. The term "testing laboratory" shall have the same meaning as the term "testing agency."
- I. Quality-Assurance Services: Activities, actions, and procedures performed before and during execution of the Work, to guard against defects and deficiencies and substantiate that construction will comply with requirements.
- J. Quality-Control Services: Tests, inspections, procedures, and related actions during and after execution of the Work, to evaluate that actual products incorporated into the Work and completed construction comply with requirements. Contractor's quality-control services do not include contract administration activities performed by Engineer.

#### 1.4 DELEGATED-DESIGN SERVICES

- A. Performance and Design Criteria: Where professional design services or certifications by a design professional are specifically required of Contractor by the Contract Documents, provide products and systems complying with specific performance and design criteria indicated.
  - 1. If criteria indicated are not sufficient to perform services or certification required, submit a written request for additional information to Engineer.

- B. Delegated-Design Services Statement: Submit a statement signed and sealed by the design professional responsible, for each product and system specifically assigned to Contractor to be designed or certified by a design professional, indicating that the products and systems are in compliance with performance and design criteria indicated. Include list of codes, loads, and other factors used in performing these services.

## 1.5 CONFLICTING REQUIREMENTS

- A. Conflicting Standards and Other Requirements: If compliance with two or more standards or requirements is specified and the standards or requirements establish different or conflicting requirements for minimum quantities or quality levels, inform the Engineer regarding the conflict and obtain clarification prior to proceeding with the Work. Refer conflicting requirements that are different, but apparently equal, to Engineer for clarification before proceeding.
- B. Minimum Quantity or Quality Levels: The quantity or quality level shown or specified shall be the minimum provided or performed. The actual installation may comply exactly with the minimum quantity or quality specified, or it may exceed the minimum within reasonable limits. To comply with these requirements, indicated numeric values are minimum or maximum, as appropriate, for the context of requirements. Refer uncertainties to Engineer for a decision before proceeding.

## 1.6 INFORMATIONAL SUBMITTALS

- A. Contractor's Quality-Control Plan: For quality-assurance and quality-control activities and responsibilities.
- B. Qualification Data: For Contractor's quality-control personnel.
- C. Contractor's Statement of Responsibility: When required by authorities having jurisdiction, submit copy of written statement of responsibility submitted to authorities having jurisdiction before starting work on the following systems:
  - 1. Seismic-force-resisting system, designated seismic system, or component listed in the Statement of Special Inspections.
  - 2. Primary wind-force-resisting system or a wind-resisting component listed in the Statement of Special Inspections.
- D. Testing Agency Qualifications: For testing agencies specified in "Quality Assurance" Article to demonstrate their capabilities and experience. Include proof of qualifications in the form of a recent report on the inspection of the testing agency by a recognized authority.
- E. Schedule of Tests and Inspections: Prepare in tabular form and include the following:
  - 1. Specification Section number and title.
  - 2. Entity responsible for performing tests and inspections.
  - 3. Description of test and inspection.
  - 4. Identification of applicable standards.
  - 5. Identification of test and inspection methods.

6. Number of tests and inspections required.
  7. Time schedule or time span for tests and inspections.
  8. Requirements for obtaining samples.
  9. Unique characteristics of each quality-control service.
- F. Reports: Prepare and submit certified written reports and documents as specified.
- G. Permits, Licenses, and Certificates: For Owner's record, submit copies of permits, licenses, certifications, inspection reports, releases, jurisdictional settlements, notices, receipts for fee payments, judgments, correspondence, records, and similar documents established for compliance with standards and regulations bearing on performance of the Work.

## 1.7 CONTRACTOR'S QUALITY-CONTROL PLAN

- A. Quality-Control Plan, General: Submit quality-control plan within 10 days of Notice to Proceed, and not less than five days prior to preconstruction conference. Submit in format acceptable to Engineer. Identify personnel, procedures, controls, instructions, tests, records, and forms to be used to carry out Contractor's quality-assurance and quality-control responsibilities and to coordinate Owner's quality-assurance and quality-control activities. Coordinate with Contractor's Construction Schedule.
- B. Quality-Control Personnel Qualifications: Engage qualified personnel trained and experienced in managing and executing quality-assurance and quality-control procedures similar in nature and extent to those required for Project.
1. Project quality-control manager may also serve as Project superintendent.
- C. Submittal Procedure: Describe procedures for ensuring compliance with requirements through review and management of submittal process. Indicate qualifications of personnel responsible for submittal review.
- D. Testing and Inspection: In quality-control plan, include a comprehensive schedule of Work requiring testing or inspection, including the following:
1. Contractor-performed tests and inspections, including subcontractor-performed tests and inspections. Include required tests and inspections and Contractor-elected tests and inspections. Distinguish source quality-control tests and inspections from field quality-control tests and inspections.
  2. Special inspections required by authorities having jurisdiction and indicated on the Statement of Special Inspections.
  3. Owner-performed tests and inspections indicated in the Contract Documents.
- E. Continuous Inspection of Workmanship: Describe process for continuous inspection during construction to identify and correct deficiencies in workmanship in addition to testing and inspection specified. Indicate types of corrective actions to be required to bring the Work into compliance with standards of workmanship established by Contract requirements and approved mockups.
- F. Monitoring and Documentation: Maintain testing and inspection reports, including log of approved and rejected results. Include Work Engineer has indicated as nonconforming or

defective. Indicate corrective actions taken to bring nonconforming Work into compliance with requirements. Comply with requirements of authorities having jurisdiction.

## 1.8 REPORTS AND DOCUMENTS

- A. Test and Inspection Reports: Prepare and submit certified written reports specified in other Sections. Include the following:
1. Date of issue.
  2. Project title and number.
  3. Name, address, telephone number, and email address of testing agency.
  4. Dates and locations of samples and tests or inspections.
  5. Names of individuals making tests and inspections.
  6. Description of the Work and test and inspection method.
  7. Identification of product and Specification Section.
  8. Complete test or inspection data.
  9. Test and inspection results and an interpretation of test results.
  10. Record of temperature and weather conditions at time of sample-taking and testing and inspection.
  11. Comments or professional opinion on whether tested or inspected Work complies with the Contract Document requirements.
  12. Name and signature of laboratory inspector.
  13. Recommendations on retesting and reinspecting.
- B. Manufacturer's Technical Representative's Field Reports: Prepare written information documenting manufacturer's technical representative's tests and inspections specified in other Sections. Include the following:
1. Name, address, telephone number, and email address of technical representative making report.
  2. Statement on condition of substrates and their acceptability for installation of product.
  3. Statement that products at Project site comply with requirements.
  4. Summary of installation procedures being followed, whether they comply with requirements and, if not, what corrective action was taken.
  5. Results of operational and other tests and a statement of whether observed performance complies with requirements.
  6. Statement of whether conditions, products, and installation will affect warranty.
  7. Other required items indicated in individual Specification Sections.
- C. Factory-Authorized Service Representative's Reports: Prepare written information documenting manufacturer's factory-authorized service representative's tests and inspections specified in other Sections. Include the following:
1. Name, address, telephone number, and email address of factory-authorized service representative making report.
  2. Statement that equipment complies with requirements.
  3. Results of operational and other tests and a statement of whether observed performance complies with requirements.
  4. Statement of whether conditions, products, and installation will affect warranty.
  5. Other required items indicated in individual Specification Sections.

## 1.9 QUALITY ASSURANCE

- A. Qualifications paragraphs in this article establish the minimum qualification levels required; individual Specification Sections specify additional requirements.
- B. **Manufacturer Qualifications:** A firm experienced in manufacturing products or systems like those indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units. As applicable, procure products from manufacturers able to meet qualification requirements, warranty requirements, and technical or factory-authorized service representative requirements.
- C. **Fabricator Qualifications:** A firm experienced in producing products like those indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units.
- D. **Installer Qualifications:** A firm or individual experienced in installing, erecting, applying, or assembling work similar in material, design, and extent to that indicated for this Project, whose work has resulted in construction with a record of successful in-service performance.
- E. **Professional Engineer Qualifications:** A professional engineer who is legally qualified to practice in jurisdiction where Project is located and who is experienced in providing engineering services of the kind indicated. Engineering services are defined as those performed for installations of the system, assembly, or product that is similar in material, design, and extent to those indicated for this Project.
- F. **Specialists:** Certain Specification Sections require that specific construction activities shall be performed by entities who are recognized experts in those operations. Specialists shall satisfy qualification requirements indicated and shall be engaged in the activities indicated.
  - 1. Requirements of authorities having jurisdiction shall supersede requirements for specialists.
- G. **Testing and Inspecting Agency Qualifications:** An NRTL, an NVLAP, or an independent agency with the experience and capability to conduct testing and inspection indicated, as documented in accordance with ASTM E329, and with additional qualifications specified in individual Sections; and, where required by authorities having jurisdiction, that is acceptable to authorities.
- H. **Manufacturer's Technical Representative Qualifications:** An authorized representative of manufacturer who is trained and approved by manufacturer to observe and inspect installation of manufacturer's products that are similar in material, design, and extent to those indicated for this Project.
- I. **Factory-Authorized Service Representative Qualifications:** An authorized representative of manufacturer who is trained and approved by manufacturer to inspect, demonstrate, repair, and perform service on installations of manufacturer's products that are similar in material, design, and extent to those indicated for this Project.

- J. Preconstruction Testing: Where testing agency is indicated to perform preconstruction testing for compliance with specified requirements for performance and test methods, comply with the following Contractor's responsibilities, including the following:
1. Provide test specimens representative of intended products and construction.
  2. Submit specimens in a timely manner with sufficient time for testing and analyzing results to prevent delaying the Work.
  3. Provide sizes and configurations of test assemblies, mockups, and laboratory mockups to adequately demonstrate capability of products to comply with performance requirements.
  4. Build site-assembled test assemblies and mockups, using installers who will perform same tasks for Project.
  5. Build laboratory mockups at testing facility, using personnel, products, and methods of construction indicated for the completed Work.
  6. When testing is complete, remove test specimens and test assemblies; do not reuse products on Project.
  7. Testing Agency Responsibilities: Submit a certified written report of each test, inspection, and similar quality-assurance service to Engineer, with copy to Contractor. Interpret tests and inspections, and state in each report whether tested and inspected Work complies with or deviates from the Contract Documents.
- K. Mockups: Before installing portions of the Work requiring mockups, build mockups for each form of construction and finish required to comply with the following requirements, using materials indicated for the completed Work:
1. Build mockups of size indicated.
  2. Build mockups in location indicated or, if not indicated, as directed by Engineer.
  3. Notify Engineer **seven** days in advance of dates and times when mockups will be constructed.
  4. Employ supervisory personnel who will oversee mockup construction. Employ workers who will be employed to perform same tasks during the construction at Project.
  5. Demonstrate the range of aesthetic effects and workmanship.
  6. Obtain Engineer's approval of mockups before starting corresponding Work, fabrication, or construction.
    - a. Allow **seven** days for initial review and each re-review of each mockup.
  7. Promptly correct unsatisfactory conditions noted by Engineer's preliminary review, to the satisfaction of the Engineer, before completion of final mockup.
  8. Approval of mockups by the Engineer does not constitute approval of deviations from the Contract Documents contained in mockups unless Engineer specifically approves such deviations in writing.
  9. Maintain mockups during construction in an undisturbed condition as a standard for judging the completed Work.
  10. Demolish and remove mockups when directed unless otherwise indicated.

## 1.10 QUALITY CONTROL

- A. Owner Responsibilities: Where quality-control services are indicated as Owner's responsibility, Owner will engage a qualified testing agency to perform these services.

1. Owner will furnish Contractor with names, addresses, and telephone numbers of testing agencies engaged and a description of types of testing and inspection they are engaged to perform.
  2. Payment for these services will be made from testing and inspection allowances specified in Section 012100 "Allowances," as authorized by Change Orders.
  3. Costs for retesting and reinspecting construction that replaces or is necessitated by Work that failed to comply with the Contract Documents will be charged to Contractor, and the Contract Sum will be adjusted by Change Order.
- B. Contractor Responsibilities: Tests and inspections not explicitly assigned to Owner are Contractor's responsibility. Perform additional quality-control activities, whether specified or not, to verify and document that the Work complies with requirements.
1. Unless otherwise indicated, provide quality-control services specified and those required by authorities having jurisdiction. Perform quality-control services required of Contractor by authorities having jurisdiction, whether specified or not.
  2. Engage a qualified testing agency to perform quality-control services.
    - a. Contractor shall not employ same entity engaged by Owner, unless agreed to in writing by Owner.
  3. Notify testing agencies at least 24 hours in advance of time when Work that requires testing or inspection will be performed.
  4. Where quality-control services are indicated as Contractor's responsibility, submit a certified written report, in duplicate, of each quality-control service.
  5. Testing and inspection requested by Contractor and not required by the Contract Documents are Contractor's responsibility.
  6. Submit additional copies of each written report directly to authorities having jurisdiction, when they so direct.
- C. Retesting/Reinspecting: Regardless of whether original tests or inspections were Contractor's responsibility, provide quality-control services, including retesting and reinspecting, for construction that replaced Work that failed to comply with the Contract Documents.
- D. Testing Agency Responsibilities: Cooperate with Engineer and Contractor in performance of duties. Provide qualified personnel to perform required tests and inspections.
1. Notify Engineer and Contractor promptly of irregularities or deficiencies observed in the Work during performance of its services.
  2. Determine the locations from which test samples will be taken and in which in-situ tests are conducted.
  3. Conduct and interpret tests and inspections, and state in each report whether tested and inspected Work complies with or deviates from requirements.
  4. Submit a certified written report, in duplicate, of each test, inspection, and similar quality-control service through Contractor.
  5. Do not release, revoke, alter, or increase the Contract Document requirements or approve or accept any portion of the Work.
  6. Do not perform duties of Contractor.
- E. Manufacturer's Field Services: Where indicated, engage a factory-authorized service representative to inspect field-assembled components and equipment installation, including

service connections. Report results in writing as specified in Section 013300 "Submittal Procedures."

- F. **Manufacturer's Technical Services:** Where indicated, engage a manufacturer's technical representative to observe and inspect the Work. Manufacturer's technical representative's services include participation in preinstallation conferences, examination of substrates and conditions, verification of materials, observation of Installer activities, inspection of completed portions of the Work, and submittal of written reports.
- G. **Contractor's Associated Requirements and Services:** Cooperate with agencies and representatives performing required tests, inspections, and similar quality-control services, and provide reasonable auxiliary services as requested. Notify agency sufficiently in advance of operations to permit assignment of personnel. Provide the following:
  - 1. Access to the Work.
  - 2. Incidental labor and facilities necessary to facilitate tests and inspections.
  - 3. Adequate quantities of representative samples of materials that require testing and inspection. Assist agency in obtaining samples.
  - 4. Facilities for storage and field curing of test samples.
  - 5. Delivery of samples to testing agencies.
  - 6. Preliminary design mix intended for use for material mixes that require control by testing agency.
  - 7. Security and protection for samples and for testing and inspection equipment at Project site.
- H. **Coordination:** Coordinate sequence of activities to accommodate required quality-assurance and quality-control services with a minimum of delay and to avoid necessity of removing and replacing construction to accommodate testing and inspection.
  - 1. Schedule times for tests, inspections, obtaining samples, and similar activities.
- I. **Schedule of Tests and Inspections:** Prepare a schedule of tests, inspections, and similar quality-control services required by the Contract Documents as a component of Contractor's quality-control plan. Coordinate and submit concurrently with Contractor's Construction Schedule. Update and submit with each Application for Payment.
  - 1. **Schedule Contents:** Include tests, inspections, and quality-control services, including Contractor- and Owner-retained services, commissioning activities, and other Project-required services paid for by other entities.
  - 2. **Distribution:** Distribute schedule to Owner, Engineer, testing agencies, and each party involved in performance of portions of the Work where tests and inspections are required.

#### 1.11 SPECIAL TESTS AND INSPECTIONS

- A. **Special Tests and Inspections:** Owner will engage a qualified testing agency to conduct special tests and inspections required by authorities having jurisdiction as the responsibility of Owner, as indicated in the Statement of Special Inspections attached to this Section, and as follows:
  - 1. Verifying that manufacturer maintains detailed fabrication and quality-control procedures, and reviewing the completeness and adequacy of those procedures.

2. Notifying Engineer and Contractor promptly of irregularities and deficiencies observed in the Work during performance of its services.
3. Submitting a certified written report of each test, inspection, and similar quality-control service to Engineer with copy to Contractor and to authorities having jurisdiction.
4. Submitting a final report of special tests and inspections at Substantial Completion, which includes a list of unresolved deficiencies.
5. Interpreting tests and inspections and stating in each report whether tested and inspected Work complies with or deviates from the Contract Documents.
6. Retesting and reinspecting corrected Work.

## **PART 2 – PRODUCTS (Not Used)**

## **PART 3 – EXECUTION**

### **3.1 TEST AND INSPECTION LOG**

- A. Test and Inspection Log: Prepare a record of tests and inspections. Include the following:
  1. Date test or inspection was conducted and Description of the Work tested or inspected.
  2. Date test or inspection results were transmitted to Engineer.
  3. Identification of testing agency or special inspector conducting test or inspection.
- B. Maintain log at Project site. Post changes and revisions occur. Provide access to test and inspection log for Engineer's and authorities' having jurisdiction reference during normal working hours. Submit log at Project closeout as part of Project Record Documents.

### **3.2 REPAIR AND PROTECTION**

- A. General: On completion of testing, inspection, sample-taking, and similar services, repair damaged construction and restore substrates and finishes.
  1. Provide materials and comply with installation requirements specified in other Specification Sections or matching existing substrates and finishes. Restore patched areas and extend restoration into adjoining areas with durable seams that are as invisible as possible. Comply with the Contract Document requirements for cutting and patching in Section 017300 "Execution."
- B. Protect construction exposed by or for quality-control service activities.
- C. Repair and protection are Contractor's responsibility, regardless of the assignment of responsibility for quality-control services.

## **END OF SECTION 014000**

## SECTION 014200 - REFERENCES

### PART 1 – GENERAL

#### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

#### 1.2 DEFINITIONS

- A. General: Basic Contract definitions are included in the Conditions of the Contract.
- B. "Approved": When used to convey Engineer's action on Contractor's submittals, applications, and requests, "approved" is limited to Engineer's duties and responsibilities as stated in the Conditions of the Contract.
- C. "Directed": A command or instruction by Engineer. Other terms including "requested," "authorized," "selected," "required," and "permitted" have the same meaning as "directed."
- D. "Indicated": Requirements expressed by graphic representations or in written form on Drawings, in Specifications, and in other Contract Documents. Other terms including "shown," "noted," "scheduled," and "specified" have the same meaning as "indicated."
- E. "Regulations": Laws, ordinances, statutes, and lawful orders issued by authorities having jurisdiction, and rules, conventions, and agreements within the construction industry that control performance of the Work.
- F. "Furnish": Supply and deliver to Project site, ready for unloading, unpacking, assembly, installation, and similar operations.
- G. "Install": Unload, temporarily store, unpack, assemble, erect, place, anchor, apply, work to dimension, finish, cure, protect, clean, and similar operations at Project site.
- H. "Provide": Furnish and install, complete and ready for the intended use.
- I. "Project Site": Space available for performing construction activities. The extent of Project site is shown on Drawings and may or may not be identical with the description of the land on which Project is to be built.

#### 1.3 INDUSTRY STANDARDS

- A. Applicability of Standards: Unless the Contract Documents include more stringent requirements, applicable construction industry standards have the same force and effect as if

bound or copied directly into the Contract Documents to the extent referenced. Such standards are made a part of the Contract Documents by reference.

- B. Publication Dates: Comply with standards in effect as of date of the Contract Documents unless otherwise indicated.
- C. Copies of Standards: Each entity engaged in construction on Project should be familiar with industry standards applicable to its construction activity. Copies of applicable standards are not bound with the Contract Documents.
  - 1. Where copies of standards are needed to perform a required construction activity, obtain copies directly from publication source.

#### 1.4 ABBREVIATIONS AND ACRONYMS

- A. Industry Organizations: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities indicated in Gale's "Encyclopedia of Associations: National Organizations of the U.S." or in Columbia Books' "National Trade & Professional Associations of the United States."
- B. Code Agencies: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities in the following list. This information is believed to be accurate as of the date of the Contract Documents.
  - 1. IAPMO - International Association of Plumbing and Mechanical Officials; [www.iapmo.org](http://www.iapmo.org).
  - 2. ICC - International Code Council; [www.iccsafe.org](http://www.iccsafe.org).
  - 3. ICC-ES - ICC Evaluation Service, LLC; [www.icc-es.org](http://www.icc-es.org).
- C. Federal Government Agencies: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities in the following list. Information is subject to change and is up to date as of the date of the Contract Documents.
  - 1. COE - Army Corps of Engineers; [www.usace.army.mil](http://www.usace.army.mil).
  - 2. CPSC - Consumer Product Safety Commission; [www.cpsc.gov](http://www.cpsc.gov).
  - 3. DOC - Department of Commerce; National Institute of Standards and Technology; [www.nist.gov](http://www.nist.gov).
  - 4. DOD - Department of Defense; [www.quicksearch.dla.mil](http://www.quicksearch.dla.mil).
  - 5. DOE - Department of Energy; [www.energy.gov](http://www.energy.gov).
  - 6. EPA - Environmental Protection Agency; [www.epa.gov](http://www.epa.gov).
  - 7. FAA - Federal Aviation Administration; [www.faa.gov](http://www.faa.gov).
  - 8. FG - Federal Government Publications; [www.gpo.gov/fdsys](http://www.gpo.gov/fdsys).
  - 9. GSA - General Services Administration; [www.gsa.gov](http://www.gsa.gov).
  - 10. HUD - Department of Housing and Urban Development; [www.hud.gov](http://www.hud.gov).
  - 11. LBL - Lawrence Berkeley National Laboratory; Environmental Energy Technologies Division; [www.eetd.lbl.gov](http://www.eetd.lbl.gov).
  - 12. OSHA - Occupational Safety & Health Administration; [www.osha.gov](http://www.osha.gov).
  - 13. SD - Department of State; [www.state.gov](http://www.state.gov).

14. TRB - Transportation Research Board; National Cooperative Highway Research Program; The National Academies; [www.trb.org](http://www.trb.org).
  15. USDA - Department of Agriculture; Agriculture Research Service; U.S. Salinity Laboratory; [www.ars.usda.gov](http://www.ars.usda.gov).
  16. USDA - Department of Agriculture; Rural Utilities Service; [www.usda.gov](http://www.usda.gov).
  17. USDOJ - Department of Justice; Office of Justice Programs; National Institute of Justice; [www.ojp.usdoj.gov](http://www.ojp.usdoj.gov).
  18. USP - U.S. Pharmacopeial Convention; [www.usp.org](http://www.usp.org).
  19. USPS - United States Postal Service; [www.usps.com](http://www.usps.com).
- D. Standards and Regulations: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the standards and regulations in the following list. This information is subject to change and is believed to be accurate as of the date of the Contract Documents.
1. CFR - Code of Federal Regulations; Available from Government Printing Office; [www.gpo.gov/fdsys](http://www.gpo.gov/fdsys).
  2. DOD - Department of Defense; Military Specifications and Standards; Available from DLA Document Services; [www.quicksearch.dla.mil](http://www.quicksearch.dla.mil).
  3. DSCC - Defense Supply Center Columbus; (See FS).
  4. FED-STD - Federal Standard; (See FS).
  5. FS - Federal Specification; Available from DLA Document Services; [www.quicksearch.dla.mil](http://www.quicksearch.dla.mil).
    - a. Available from Defense Standardization Program; [www.dsp.dla.mil](http://www.dsp.dla.mil).
    - b. Available from General Services Administration; [www.gsa.gov](http://www.gsa.gov).
    - c. Available from National Institute of Building Sciences/Whole Building Design Guide; [www.wbdg.org](http://www.wbdg.org).
  6. MILSPEC - Military Specification and Standards; (See DOD).
  7. USAB - United States Access Board; [www.access-board.gov](http://www.access-board.gov).
  8. USATBCB - U.S. Architectural & Transportation Barriers Compliance Board; (See USAB).
  9. CPUC; California Public Utilities Commission; [www.cpuc.ca.gov](http://www.cpuc.ca.gov).
  10. SCAQMD; South Coast Air Quality Management District; [www.aqmd.gov](http://www.aqmd.gov).
  11. TFS; Texas A&M Forest Service; Sustainable Forestry and Economic Development; [www.txforestservation.tamu.edu](http://www.txforestservation.tamu.edu).

## **PART 2 – PRODUCTS (Not Used)**

## **PART 3 – EXECUTION (Not Used)**

## **END OF SECTION 014200**

## SECTION 016000 – PRODUCT REQUIREMENTS

### PART 1 – GENERAL

#### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

#### 1.2 SUMMARY

- A. Section includes administrative and procedural requirements for selection of products for use in Project; product delivery, storage, and handling; manufacturers' standard warranties on products; special warranties; and comparable products.
- B. Related Requirements:
  - 1. Section 011000 "Summary" for Contractor requirements related to Owner-furnished products.
  - 2. Section 012300 "Alternates" for products selected under an alternate.
  - 3. Section 012500 "Substitution Procedures" for requests for substitutions.
  - 4. Section 014200 "References" for applicable industry standards for products specified.
  - 5. Section 017700 "Closeout Procedures" for submitting warranties.

#### 1.3 DEFINITIONS

- A. Products: Items obtained for incorporating into the Work, whether purchased for Project or taken from previously purchased stock. The term "product" includes the terms "material," "equipment," "system," and terms of similar intent.
  - 1. Named Products: Items identified by manufacturer's product name, including make or model number or other designation shown or listed in manufacturer's published product literature that is current as of date of the Contract Documents.
  - 2. New Products: Items that have not previously been incorporated into another project or facility. Salvaged items or items reused from other projects are not considered new products. Items that are manufactured or fabricated to include recycled content materials are considered new products, unless indicated otherwise.
  - 3. Comparable Product: Product by named manufacturer that is demonstrated and approved through the comparable product submittal process described in Part 2 "Comparable Products" Article, to have the indicated qualities related to type, function, dimension, in-service performance, physical properties, appearance, and other characteristics that equal or exceed those of specified product.
- B. Basis-of-Design Product Specification: A specification in which a single manufacturer's product is named and accompanied by the words "basis-of-design product," including make or

model number or other designation. Published attributes and characteristics of basis-of-design product establish salient characteristics of products.

1. Evaluation of Comparable Products: In addition to the basis-of-design product description, product attributes and characteristics may be listed to establish the significant qualities related to type, function, in-service performance and physical properties, weight, dimension, durability, visual characteristics, and other special features and requirements for purposes of evaluating comparable products of additional manufacturers named in the specification. Manufacturers' published attributes and characteristics of basis-of-design product also establish salient characteristics of products for purposes of evaluating comparable products.
- C. Subject to Compliance with Requirements: Where the phrase "Subject to compliance with requirements" introduces a product selection procedure in an individual Specification Section, provide products qualified under the specified product procedure. In the event that a named product or product by a named manufacturer does not meet the other requirements of the specifications, select another named product or product from another named manufacturer that does meet the requirements of the specifications; submit a comparable product request or substitution request, if applicable.
- D. Comparable Product Request Submittal: An action submittal requesting consideration of a comparable product, including the following information:
1. Identification of basis-of-design product or fabrication or installation method to be replaced, including Specification Section number and title and Drawing numbers and titles.
  2. Data indicating compliance with the requirements specified in Part 2 "Comparable Products" Article.
- E. Basis-of-Design Product Specification Submittal: An action submittal complying with requirements in Section 013300 "Submittal Procedures."
- F. Substitution: Refer to Section 012500 "Substitution Procedures" for definition and limitations on substitutions.

#### 1.4 QUALITY ASSURANCE

- A. Compatibility of Options: If Contractor is given option of selecting between two or more products for use on Project, select product compatible with products previously selected, even if previously selected products were also options.
1. Resolution of Compatibility Disputes between Multiple Contractors:
    - a. Contractors are responsible for providing products and construction methods compatible with products and construction methods of other contractors.
    - b. If a dispute arises between the multiple contractors over concurrently selectable but incompatible products, Engineer will determine which products shall be used.
- B. Identification of Products: Except for required labels and operating data, do not attach or imprint manufacturer or product names or trademarks on exposed surfaces of products or equipment that will be exposed to view in occupied spaces or on the exterior.

1. Labels: Locate required product labels and stamps on a concealed surface, or, where required for observation following installation, on a visually accessible surface that is not conspicuous.
2. Equipment Nameplates: Provide a permanent nameplate on each item of service or power-operated equipment. Locate on a visually accessible but inconspicuous surface. Include information essential for operation, including the following:
  - a. Name of product and manufacturer.
  - b. Model and serial number.
  - c. Capacity.
  - d. Speed.
  - e. Ratings.
3. See individual identification Sections in Divisions 21, 22, 23, and 26 for additional equipment identification requirements.

## 1.5 COORDINATION

- A. Modify or adjust affected work as necessary to integrate work of approved comparable products and approved substitutions.

## 1.6 PRODUCT DELIVERY, STORAGE, AND HANDLING

- A. Deliver, store, and handle products, using means and methods that will prevent damage, deterioration, and loss, including theft and vandalism. Comply with manufacturer's written instructions.
- B. Delivery and Handling:
  1. Schedule delivery to minimize long-term storage at Project site and to prevent overcrowding of construction spaces.
  2. Coordinate delivery with installation time to ensure minimum holding time for items that are flammable, hazardous, easily damaged, or sensitive to deterioration, theft, and other losses.
  3. Deliver products to Project site in an undamaged condition in manufacturer's original sealed container or other packaging system, complete with labels and instructions for handling, storing, unpacking, protecting, and installing.
  4. Inspect products on delivery to determine compliance with the Contract Documents and that products are undamaged and properly protected.
  5. The Contractor shall be responsible for coordinating all street closures, traffic control measures, and crane operations required to offload equipment. All permits, notifications, and safety compliance shall be secured by the contractor in accordance with local jurisdictional requirements.
  6. The Contractor shall provide all rigging, hoisting, and offloading services necessary to receive equipment from delivery vehicles. This includes but is not limited to crane rental, certified riggers, crane operator, and lift plans stamped by a qualified professional engineer.

7. The Contractor shall furnish and operate low-height transport platforms, dollies, or skates suitable for moving equipment through freight elevators, corridors, and basement access points. All equipment shall be protected from damage during transit and installation.
8. The Contractor shall verify all access routes, elevator dimensions, turning radii, and floor load capacities prior to delivery. Any modifications or temporary removals (e.g., doors, handrails) required for equipment passage shall be coordinated and executed by the contractor.
9. Contractor shall coordinate delivery timing with the owner and other trades to avoid disruption to ongoing operations. After-hours or weekend delivery is required and shall be included in the contractor's logistics plan and coordinated with the owner.
10. Contractor shall be responsible for any damage to building finishes, elevator interiors, or structural elements resulting from equipment transport or installation.

C. Storage:

1. Provide a secure location and enclosure at Project site for storage of materials and equipment.
2. Store products to allow for inspection and measurement of quantity or counting of units.
3. Store materials in a manner that will not endanger Project structure.
4. Store products that are subject to damage by the elements under cover in a weathertight enclosure above ground, with ventilation adequate to prevent condensation and with adequate protection from wind.
5. Protect foam plastic from exposure to sunlight, except to extent necessary for period of installation and concealment.
6. Comply with product manufacturer's written instructions for temperature, humidity, ventilation, and weather-protection requirements for storage.
7. Protect stored products from damage and liquids from freezing.
8. Provide a secure location and enclosure at Project site for storage of materials and equipment by Owner's construction forces. Coordinate location with Owner.

## 1.7 PRODUCT WARRANTIES

- A. Warranties specified in other Sections shall be in addition to, and run concurrent with, other warranties required by the Contract Documents. Manufacturers' disclaimers and limitations on product warranties do not relieve Contractor of obligations under requirements of the Contract Documents.
  1. Manufacturer's Warranty: Written standard warranty form furnished by individual manufacturer for a particular product and issued in the name of the Owner or endorsed by manufacturer to Owner.
  2. Special Warranty: Written warranty required by the Contract Documents to provide specific rights for Owner and issued in the name of the Owner or endorsed by manufacturer to Owner.
- B. Special Warranties: Prepare a written document that contains appropriate terms and identification, ready for execution.
  1. Manufacturer's Standard Form: Modified to include Project-specific information and properly executed.

2. Specified Form: When specified forms are included in the Project Manual, prepare a written document, using indicated form properly executed.
  3. See other Sections for specific content requirements and particular requirements for submitting special warranties.
- C. Submittal Time: Comply with requirements in Section 017700 "Closeout Procedures."

## **PART 2 – PRODUCTS**

### **2.1 PRODUCT SELECTION PROCEDURES**

- A. General Product Requirements: Provide products that comply with the Contract Documents, are undamaged and, unless otherwise indicated, are new at time of installation.
1. Provide products complete with accessories, trim, finish, fasteners, and other items needed for complete installation and indicated use and effect.
  2. Standard Products: If available, and unless custom products or nonstandard options are specified, provide standard products of types that have been produced and used successfully in similar situations on other projects.
  3. Owner reserves the right to limit selection to products with warranties meeting requirements of the Contract Documents.
  4. Where products are accompanied by the term "as selected," Engineer will make selection.
  5. Descriptive, performance, and reference standard requirements in the Specifications establish salient characteristics of products.
  6. Or Equal: For products specified by name and accompanied by the term "or equal," "or approved equal," or "or approved," comply with requirements in "Comparable Products" Article to obtain approval for use of an unnamed product.
    - a. Submit additional documentation required by Engineer in order to establish equivalency of intended products. Unless otherwise indicated, evaluation of "or equal" product status is by the Engineer, whose determination is final.
- B. Product Selection Procedures:
1. Sole Product: Where Specifications name a single manufacturer and product, provide the named product that complies with requirements. Comparable products or substitutions for Contractor's convenience will not be considered.
    - a. Sole product may be indicated by the phrase "Subject to compliance with requirements, provide the following."
  2. Sole Manufacturer/Source: Where Specifications name a single manufacturer or source, provide a product by the named manufacturer or source that complies with requirements. Comparable products or substitutions for Contractor's convenience will not be considered.
    - a. Sole manufacturer/source may be indicated by the phrase "Subject to compliance with requirements, provide products by the following."
  3. Limited List of Products: Where Specifications include a list of names of both manufacturers and products, provide one of the products listed that complies with requirements. Comparable products or substitutions for Contractor's convenience will be considered.

- a. Limited list of products may be indicated by the phrase "Subject to compliance with requirements, provide one of the following."
  - 4. Non-Limited List of Products: Where Specifications include a list of names of both available manufacturers and products, provide one of the products listed or an unnamed product that complies with requirements.
    - a. Non-limited list of products is indicated by the phrase "Subject to compliance with requirements, available products that may be incorporated in the Work include, but are not limited to, the following."
    - b. Provision of an unnamed product is not considered a substitution, if the product complies with requirements.
  - 5. Limited List of Manufacturers: Where Specifications include a list of manufacturers' names, provide a product by one of the manufacturers listed that complies with requirements. Comparable products or substitutions for Contractor's convenience will be considered.
    - a. Limited list of manufacturers is indicated by the phrase "Subject to compliance with requirements, provide products by one of the following."
  - 6. Non-Limited List of Manufacturers: Where Specifications include a list of available manufacturers, provide a product by one of the manufacturers listed or a product by an unnamed manufacturer that complies with requirements.
    - a. Non-limited list of manufacturers is indicated by the phrase "Subject to compliance with requirements, available manufacturers whose products may be incorporated in the Work include, but are not limited to, the following."
    - b. Provision of products of an unnamed manufacturer is not considered a substitution, if the product complies with requirements.
  - 7. Basis-of-Design Product: Where Specifications name a product, or refer to a product indicated on Drawings, and include a list of manufacturers, provide the specified or indicated product or a comparable product by one of the other named manufacturers. Drawings and Specifications may additionally indicate sizes, profiles, dimensions, and other characteristics that are based on the product named. Comply with requirements in "Comparable Products" Article for consideration of an unnamed product by one of the other named manufacturers.
    - a. For approval of products by unnamed manufacturers, comply with requirements in Section 012500 "Substitution Procedures" for substitutions for convenience.
- C. Visual Matching Specification: Where Specifications require the phrase "match Engineer's sample," provide a product that complies with requirements and matches Engineer's sample. Engineer's decision will be final on whether another product matches.
- 1. If no product available within specified category matches and complies with other specified requirements, comply with requirements in Section 012500 "Substitution Procedures" for request to use another product.
- D. Visual Selection Specification: Where Specifications include the phrase "as selected by Engineer from manufacturer's full range" or a similar phrase, select a product that complies with requirements. Engineer will select color, gloss, pattern, density, or texture from manufacturer's product line that includes both standard and premium items.
- E. Sustainable Product Selection: Where Specifications require product to meet sustainable product characteristics, select products complying with indicated requirements. Comply with

requirements in Division 01 Sustainability Requirements Section and individual Specification Sections.

1. Select products for which sustainable design documentation submittals are available from manufacturer.

## 2.2 COMPARABLE PRODUCTS

- A. Conditions for Consideration of Comparable Products: Engineer will consider Contractor's request for comparable product when the following conditions are satisfied. If the following conditions are not satisfied, Engineer may return requests without action, except to record noncompliance with the following requirements:
1. Evidence that requested product does not require revisions to the Contract Documents, is consistent with the Contract Documents, will produce the indicated results, and is compatible with other portions of the Work.
  2. Detailed comparison of significant qualities of requested product with those of the named basis-of-design product. Significant product qualities include attributes, such as type, function, in-service performance and physical properties, weight, dimension, durability, visual characteristics, and other specific features and requirements.
  3. Evidence that requested product provides specified warranty.
  4. List of similar installations for completed projects, with project names and addresses and names and addresses of Engineers and owners, if requested.
  5. Samples, if requested.
- B. Engineer's Action on Comparable Products Submittal: If necessary, Engineer will request additional information or documentation for evaluation, as specified in Section 013300 "Submittal Procedures."
1. Form of Approval of Submittal: As specified in Section 013300 "Submittal Procedures."
  2. Use product specified if Engineer does not issue a decision on use of a comparable product request within time allocated.
- C. Submittal Requirements, Two-Step Process: Approval by the Engineer of Contractor's request for use of comparable product is not intended to satisfy other submittal requirements. Comply with specified submittal requirements.
- D. Submittal Requirements, Single-Step Process: When acceptable to Engineer, incorporate specified submittal requirements of individual Specification Section in combined submittal for comparable products. Approval by the Engineer of Contractor's request for use of comparable product and of individual submittal requirements will also satisfy other submittal requirements.

## **PART 3 – EXECUTION (Not Used)**

### **END OF SECTION 016000**

## SECTION 017300 - EXECUTION

### PART 1 – GENERAL

#### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

#### 1.2 SUMMARY

- A. Section includes general administrative and procedural requirements governing execution of the Work, including, but not limited to, the following:
  - 1. Construction layout.
  - 2. Field engineering and surveying.
  - 3. Installation of the Work.
  - 4. Cutting and patching.
  - 5. Coordination of Owner's portion of the Work.
  - 6. Coordination of Owner-installed products.
  - 7. Progress cleaning.
  - 8. Starting and adjusting.
  - 9. Protection of installed construction.
- B. Related Requirements:
  - 1. Section 013300 "Submittal Procedures" for submitting surveys.
  - 2. Section 017700 "Closeout Procedures" for submitting final property survey with Project Record Documents, recording of Owner-accepted deviations from indicated lines and levels, replacing defective work, and final cleaning.

#### 1.3 DEFINITIONS

- A. Cutting: Removal of in-place construction necessary to permit installation or performance of subsequent work.
- B. Patching: Fitting and repair work required to restore construction to original conditions after installation of subsequent work.

#### 1.4 PREINSTALLATION MEETINGS

- A. Cutting and Patching Conference: Conduct conference at Project site.
  - 1. Prior to commencing work requiring cutting and patching, review extent of cutting and patching anticipated and examine procedures for ensuring satisfactory result from cutting and patching work. Inform Engineer of scheduled meeting. Require representatives of

each entity directly concerned with cutting and patching to attend, including the following:

- a. Contractor's superintendent.
  - b. Trade supervisor responsible for cutting operations.
  - c. Trade supervisor(s) responsible for patching of each type of substrate.
  - d. Mechanical, electrical, and utilities subcontractors' supervisors, to the extent each trade is affected by cutting and patching operations.
2. Review areas of potential interference and conflict. Coordinate procedures and resolve potential conflicts before proceeding.

## 1.5 INFORMATIONAL SUBMITTALS

- A. Cutting and Patching Plan: Submit plan describing procedures at least 10 days prior to the time cutting and patching will be performed. Include the following information:
  1. Extent: Describe reason for and extent of each occurrence of cutting and patching.
  2. Changes to In-Place Construction: Describe anticipated results. Include changes to structural elements and operating components as well as changes in building appearance and other significant visual elements.
  3. Products: List products to be used for patching and firms or entities that will perform patching work.
  4. Dates: Indicate when cutting and patching will be performed.
  5. Utilities and Mechanical and Electrical Systems: List services and systems that cutting and patching procedures will disturb or affect. List services and systems that will be relocated and those that will be temporarily out of service. Indicate length of time permanent services and systems will be disrupted.
    - a. Include description of provisions for temporary services and systems during interruption of permanent services and systems.

## 1.6 QUALITY ASSURANCE

- A. Professional Engineer Qualifications: Refer to Section 014000 "Quality Requirements."
- B. Cutting and Patching: Comply with requirements for and limitations on cutting and patching of construction elements.
  1. Structural Elements: When cutting and patching structural elements, or when encountering the need for cutting and patching of elements whose structural function is not known, notify Engineer of locations and details of cutting and await directions from Engineer before proceeding. Shore, brace, and support structural elements during cutting and patching. Do not cut and patch structural elements in a manner that could change their load-carrying capacity or increase deflection.
  2. Operational Elements: Do not cut and patch operating elements and related components in a manner that results in reducing their capacity to perform as intended or that results in increased maintenance or decreased operational life or safety. Operational elements include the following:
    - a. Primary operational systems and equipment.
    - b. Fire separation assemblies.

- c. Air or smoke barriers.
  - d. Fire-suppression systems.
  - e. Plumbing piping systems.
  - f. Mechanical systems piping and ducts.
  - g. Control systems.
  - h. Communication systems.
  - i. Fire-detection and -alarm systems.
  - j. Conveying systems.
  - k. Electrical wiring systems.
  - l. Operating systems of special construction.
3. Other Construction Elements: Do not cut and patch other construction elements or components in a manner that could change their load-carrying capacity, that results in reducing their capacity to perform as intended, or that results in increased maintenance or decreased operational life or safety. Other construction elements include but are not limited to the following:
- a. Water, moisture, or vapor barriers.
  - b. Membranes and flashings.
  - c. Exterior curtain-wall construction.
  - d. Sprayed fire-resistive material.
  - e. Equipment supports.
  - f. Piping, ductwork, vessels, and equipment.
  - g. Noise- and vibration-control elements and systems.
4. Visual Elements: Do not cut and patch construction in a manner that results in visual evidence of cutting and patching. Do not cut and patch exposed construction in a manner that would, in Engineer's opinion, reduce the building's aesthetic qualities. Remove and replace construction that has been cut and patched in a visually unsatisfactory manner.
- C. Manufacturer's Installation Instructions: Obtain and maintain on-site manufacturer's written recommendations and instructions for installation of specified products and equipment.

## **PART 2 – PRODUCTS**

### **2.1 MATERIALS**

- A. Comply with requirements specified in other Sections.
  - 1. For projects requiring compliance with sustainable design and construction practices and procedures, use products for patching that comply with sustainable design requirements.
- B. In-Place Materials: Use materials for patching identical to in-place materials. For exposed surfaces, use materials that visually match in-place adjacent surfaces to the fullest extent possible.
  - 1. If identical materials are unavailable or cannot be used, use materials that, when installed, will provide a match acceptable to Engineer for the visual and functional performance of in-place materials. Use materials that are not considered hazardous.

- C. Cleaning Agents: Use cleaning materials and agents recommended by manufacturer or fabricator of the surface to be cleaned. Do not use cleaning agents that are potentially hazardous to health or property or that might damage finished surfaces.
  - 1. Use cleaning products that comply with Green Seal's GS-37, or if GS-37 is not applicable, use products that comply with the California Code of Regulations maximum allowable VOC levels.

## **PART 3 – EXECUTION**

### **3.1 EXAMINATION**

- A. Existing Conditions: The existence and location of underground and other utilities and construction indicated as existing are not guaranteed. Before beginning sitework, investigate and verify the existence and location of underground utilities, mechanical and electrical systems, and other construction affecting the Work.
  - 1. Before construction, verify the location and invert elevation at points of connection of sanitary sewer, storm sewer, gas service piping, and water-service piping; underground electrical services; and other utilities.
  - 2. Furnish location data for work related to Project that must be performed by public utilities serving Project site.
- B. Examination and Acceptance of Conditions: Before proceeding with each component of the Work, examine substrates, areas, and conditions, with Installer or Applicator present where indicated, for compliance with requirements for installation tolerances and other conditions affecting performance. Record observations.
  - 1. Examine roughing-in for mechanical and electrical systems to verify actual locations of connections before equipment and fixture installation.
  - 2. Examine walls, floors, and roofs for suitable conditions where products and systems are to be installed.
  - 3. Verify compatibility with and suitability of substrates, including compatibility with existing finishes or primers.
- C. Written Report: Where a written report listing conditions detrimental to performance of the Work is required by other Sections, include the following:
  - 1. Description of the Work, including Specification Section number and paragraph, and Drawing sheet number and detail, where applicable.
  - 2. List of detrimental conditions, including substrates.
  - 3. List of unacceptable installation tolerances.
  - 4. Recommended corrections.
- D. Proceed with installation only after unsatisfactory conditions have been corrected. Proceeding with the Work indicates acceptance of surfaces and conditions.

### 3.2 PREPARATION

- A. Existing Utility Information: Furnish information to Owner that is necessary to adjust, move, or relocate existing utility structures, utility poles, lines, services, or other utility appurtenances located in or affected by construction. Coordinate with authorities having jurisdiction.
- B. Field Measurements: Take field measurements as required to fit the Work properly. Recheck measurements before installing each product. Where portions of the Work are indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication. Coordinate fabrication schedule with construction progress to avoid delaying the Work.
- C. Space Requirements: Verify space requirements and dimensions of items shown diagrammatically on Drawings.
- D. Review of Contract Documents and Field Conditions: Immediately on discovery of the need for clarification of the Contract Documents, submit a request for information to Engineer in accordance with requirements in Section 013100 "Project Management and Coordination."

### 3.3 CONSTRUCTION LAYOUT

- A. Verification: Before proceeding to lay out the Work, verify layout information shown on Drawings, in relation to the property survey and existing benchmarks and existing conditions. If discrepancies are discovered, notify Engineer promptly.
- B. Engage a professional engineer experienced in laying out the Work, using the following accepted surveying practices:
  - 1. Establish benchmarks and control points to set lines and levels at each story of construction and elsewhere as needed to locate each element of Project.
  - 2. Establish limits on use of Project site.
  - 3. Establish dimensions within tolerances indicated. Do not scale Drawings to obtain required dimensions.
  - 4. Inform installers of lines and levels to which they must comply.
  - 5. Check the location, level and plumb, of every major element as the Work progresses.
  - 6. Notify Engineer when deviations from required lines and levels exceed allowable tolerances.
  - 7. Close site surveys with an error of closure equal to or less than the standard established by authorities having jurisdiction.
- C. Site Improvements: Locate and lay out site improvements, including pavements, grading, fill and topsoil placement, utility slopes, and rim and invert elevations.
- D. Building Lines and Levels: Locate and lay out control lines and levels for structures, building foundations, column grids, and floor levels, including those required for mechanical and electrical work. Transfer survey markings and elevations for use with control lines and levels. Level foundations and piers from two or more locations.

- E. Record Log: Maintain a log of layout control work. Record deviations from required lines and levels. Include beginning and ending dates and times of surveys, weather conditions, name and duty of each survey party member, and types of instruments and tapes used. Make the log available for reference by Engineer.

### 3.4 FIELD ENGINEERING

- A. Identification: Owner will identify existing benchmarks, control points, and property corners.
- B. Reference Points: Locate existing permanent benchmarks, control points, and similar reference points before beginning the Work. Preserve and protect permanent benchmarks and control points during construction operations.
  - 1. Do not change or relocate existing benchmarks or control points without prior written approval of Engineer. Report lost or destroyed permanent benchmarks or control points promptly. Report the need to relocate permanent benchmarks or control points to Engineer before proceeding.
  - 2. Replace lost or destroyed permanent benchmarks and control points promptly. Base replacements on the original survey control points.
- C. Benchmarks: Establish and maintain a minimum of two permanent benchmarks on Project site, referenced to data established by survey control points. Comply with authorities having jurisdiction for type and size of benchmark.
  - 1. Record benchmark locations, with horizontal and vertical data, on Project Record Documents.
  - 2. Where the actual location or elevation of layout points cannot be marked, provide temporary reference points sufficient to locate the Work.
  - 3. Remove temporary reference points when no longer needed. Restore marked construction to its original condition.
- D. Certified Survey: On completion of foundation walls, major site improvements, and other work requiring field-engineering services, prepare a certified survey showing dimensions, locations, angles, and elevations of construction and sitework.

### 3.5 INSTALLATION

- A. Locate the Work and components of the Work accurately, in correct alignment and elevation, as indicated.
  - 1. Make vertical work plumb and make horizontal work level.
  - 2. Where space is limited, install components to maximize space available for maintenance and ease of removal for replacement.
  - 3. Conceal pipes, ducts, and wiring in finished areas unless otherwise indicated.
  - 4. Maintain minimum headroom clearance of 96 inches in occupied spaces and 90 inches in unoccupied spaces, unless otherwise indicated on Drawings.
- B. Comply with manufacturer's written instructions and recommendations for installing products in applications indicated.

- C. Install products at the time and under conditions that will ensure satisfactory results as judged by Engineer. Maintain conditions required for product performance until Substantial Completion.
- D. Conduct construction operations, so no part of the Work is subjected to damaging operations or loading more than that expected during normal conditions of occupancy of type expected for Project.
- E. Sequence the Work and allow adequate clearances to accommodate movement of construction items on-site and placement in permanent locations.
- F. Tools and Equipment: Select tools or equipment that minimize production of excessive noise levels.
- G. Templates: Obtain and distribute to the parties involved templates for Work specified to be factory prepared and field installed. Check Shop Drawings of other portions of the Work to confirm that adequate provisions are made for locating and installing products to comply with indicated requirements.
- H. Attachment: Provide blocking and attachment plates and anchors and fasteners of adequate size and number to securely anchor each component in place, accurately located and aligned with other portions of the Work. Where size and type of attachments are not indicated, verify size and type required for load conditions with manufacturer.
  - 1. Mounting Heights: Where mounting heights are not indicated, mount components at heights directed by Engineer.
  - 2. Allow for building movement, including thermal expansion and contraction.
  - 3. Coordinate installation of anchorages. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver such items to Project site in time for installation.
- I. Joints: Make joints of uniform width. Where joint locations in exposed Work are not indicated, arrange joints for the best visual effect, as judged by Engineer. Fit exposed connections together to form hairline joints.
- J. Repair or remove and replace damaged, defective, or nonconforming Work.
  - 1. Comply with Section 017700 "Closeout Procedures" for repairing or removing and replacing defective Work.

### 3.6 CUTTING AND PATCHING

- A. General: Employ skilled workers to perform cutting and patching. Proceed with cutting and patching at the earliest feasible time, and complete without delay.
  - 1. Cut in-place construction to provide for installation of other components or performance of other construction, and subsequently patch as required to restore surfaces to their original condition.

- B. Existing Warranties: Remove, replace, patch, and repair materials and surfaces cut or damaged during installation or cutting and patching operations, by methods and with materials so as not to void existing warranties.
- C. Temporary Support: Provide temporary support of Work to be cut.
- D. Protection: Protect in-place construction during cutting and patching to prevent damage. Provide protection from adverse weather conditions for portions of Project that might be exposed during cutting and patching operations.
- E. Adjacent Occupied Areas: Where interference with use of adjoining areas or interruption of free passage to adjoining areas is unavoidable, coordinate cutting and patching in accordance with requirements in Section 011000 "Summary."
- F. Existing Utility Services and Mechanical/Electrical Systems: Where existing services/systems are required to be removed, relocated, or abandoned, bypass such services/systems before cutting to prevent interruption to occupied areas.
- G. Cutting: Cut in-place construction by sawing, drilling, breaking, chipping, grinding, and similar operations, including excavation, using methods least likely to damage elements retained or adjoining construction. If possible, review intended procedures with original Installer; comply with original Installer's written recommendations.
  - 1. In general, use hand or small power tools designed for sawing and grinding, not hammering and chopping. Cut holes and slots neatly to minimum size required, and with minimum disturbance of adjacent surfaces. Temporarily cover openings when not in use.
  - 2. Finished Surfaces: Cut or drill from the exposed or finished side into concealed surfaces.
  - 3. Concrete and Masonry: Cut using a cutting machine, such as an abrasive saw or a diamond-core drill.
  - 4. Excavating and Backfilling: Comply with requirements in applicable Sections where required by cutting and patching operations.
  - 5. Mechanical and Electrical Services: Cut off pipe or conduit in walls or partitions to be removed. Cap, valve, or plug and seal remaining portion of pipe or conduit to prevent entrance of moisture or other foreign matter after cutting.
  - 6. Proceed with patching after construction operations requiring cutting are complete.
- H. Patching: Patch construction by filling, repairing, refinishing, closing up, and similar operations following performance of other Work. Patch with durable seams that are as invisible as practicable, as judged by Engineer. Provide materials and comply with installation requirements specified in other Sections, where applicable.
  - 1. Inspection: Where feasible, test and inspect patched areas after completion to demonstrate physical integrity of installation.
  - 2. Exposed Finishes: Restore exposed finishes of patched areas and extend finish restoration into retained adjoining construction in a manner that will eliminate evidence of patching and refinishing.
    - a. Clean piping, conduit, and similar features before applying paint or other finishing materials.
    - b. Restore damaged pipe covering to its original condition.

3. Floors and Walls: Where walls or partitions that are removed extend one finished area into another, patch and repair floor and wall surfaces in the new space. Provide an even surface of uniform finish, color, texture, and appearance. Remove in-place floor and wall coverings and replace with new materials, if necessary, to achieve uniform color and appearance.
    - a. Where patching occurs in a painted surface, prepare substrate and apply primer and intermediate paint coats appropriate for substrate over the patch, and apply final paint coat over entire unbroken surface containing the patch, corner to corner of wall and edge to edge of ceiling. Provide additional coats until patch blends with adjacent surfaces.
  4. Ceilings: Patch, repair, or rehang in-place ceilings as necessary to provide an even-plane surface of uniform appearance.
  5. Exterior Building Enclosure: Patch components in a manner that restores enclosure to a weathertight condition and ensures thermal and moisture integrity of building enclosure.
- I. Cleaning: Clean areas and spaces where cutting and patching are performed. Remove paint, mortar, oils, putty, and similar materials from adjacent finished surfaces.

### 3.7 COORDINATION OF OWNER'S PORTION OF THE WORK

- A. Site Access: Provide access to Project site for Owner's construction personnel and Owner's separate contractors.
  1. Provide temporary facilities required for Owner-furnished, Contractor-installed and Owner-furnished, Owner-installed products.
  2. Refer to Section 011000 "Summary" for other requirements for Owner-furnished, Contractor-installed and Owner-furnished, Owner-installed products.
- B. Coordination: Coordinate construction and operations of the Work with work performed by Owner's construction personnel and Owner's separate contractors.
  1. Construction Schedule: Inform Owner of Contractor's preferred construction schedule for Owner's portion of the Work. Adjust construction schedule based on a mutually agreeable timetable. Notify Owner if changes to schedule are required due to differences in actual construction progress.
  2. Preinstallation Conferences: Include Owner's construction personnel and Owner's separate contractors at preinstallation conferences covering portions of the Work that are to receive Owner's work. Attend preinstallation conferences conducted by Owner's construction personnel if portions of the Work depend on Owner's construction.

### 3.8 PROGRESS CLEANING

- A. Clean Project site and work areas daily, including common areas. Enforce requirements strictly. Dispose of materials lawfully.
  1. Comply with requirements in NFPA 241 for removal of combustible waste materials and debris.
  2. Do not hold waste materials more than seven days during normal weather or three days if the temperature is expected to rise above 80 deg F.

3. Containerize hazardous and unsanitary waste materials separately from other waste. Mark containers appropriately and dispose of legally, according to regulations.
    - a. Use containers intended for holding waste materials of type to be stored.
  4. Coordinate progress cleaning for joint-use areas where Contractor and other contractors are working concurrently.
- B. Site: Maintain Project site free of waste materials and debris.
- C. Work Areas: Clean areas where Work is in progress to the level of cleanliness necessary for proper execution of the Work.
  1. Remove liquid spills promptly.
  2. Where dust would impair proper execution of the Work, broom-clean or vacuum the entire work area, as appropriate.
- D. Installed Work: Keep installed work clean. Clean installed surfaces according to written instructions of manufacturer or fabricator of product installed, using only cleaning materials specifically recommended. If specific cleaning materials are not recommended, use cleaning materials that are not hazardous to health or property and that will not damage exposed surfaces.
- E. Concealed Spaces: Remove debris from concealed spaces before enclosing the space.
- F. Exposed Surfaces: Clean exposed surfaces and protect as necessary to ensure freedom from damage and deterioration at time of Substantial Completion.
- G. Waste Disposal: Do not bury or burn waste materials on-site. Do not wash waste materials down sewers or into waterways. Comply with waste disposal requirements in Section 017419 "Construction Waste Management and Disposal".
- H. During handling and installation, clean and protect construction in progress and adjoining materials already in place. Apply protective covering where required to ensure protection from damage or deterioration at Substantial Completion.
- I. Clean and provide maintenance on completed construction as frequently as necessary through the remainder of the construction period. Adjust and lubricate operable components to ensure operability without damaging effects.
- J. Limiting Exposures: Supervise construction operations to ensure that no part of the construction, completed or in progress, is subject to harmful, dangerous, damaging, or otherwise deleterious exposure during the construction period.

### 3.9 STARTING AND ADJUSTING

- A. Start equipment and operating components to confirm proper operation. Remove malfunctioning units, replace with new units, and retest.
- B. Adjust equipment for proper operation. Adjust operating components for proper operation without binding.

- C. Test each piece of equipment to verify proper operation. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.
- D. Manufacturer's Field Service: Comply with qualification requirements in Section 014000 "Quality Requirements."

### 3.10 PROTECTION AND REPAIR OF INSTALLED CONSTRUCTION

- A. Provide final protection and maintain conditions that ensure installed Work is without damage or deterioration at time of Substantial Completion.
- B. Repair Work previously completed and subsequently damaged during construction period. Repair to like-new condition.
- C. Protection of Existing Items: Provide protection and ensure that existing items to remain undisturbed by construction are maintained in condition that existed at commencement of the Work.
- D. Comply with manufacturer's written instructions for temperature and relative humidity.

**END OF SECTION 017300**

## **SECTION 017419 - CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL**

### **PART 1 – GENERAL**

#### **1.1 RELATED DOCUMENTS**

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

#### **1.2 SUMMARY**

- A. Section includes administrative and procedural requirements for the following:
  1. Salvaging non-hazardous demolition and construction waste.
  2. Recycling non-hazardous demolition and construction waste.
  3. Disposing of nonhazardous demolition and construction waste.

#### **1.3 DEFINITIONS**

- A. Construction Waste: Building, structure, and site improvement materials and other solid waste resulting from construction, remodeling, renovation, or repair operations. Construction waste includes packaging.
- B. Demolition Waste: Building, structure, and site improvement materials resulting from demolition operations.
- C. Disposal: Removal of demolition or construction waste and subsequent salvage, sale, recycling, or deposit in landfill, incinerator acceptable to authorities having jurisdiction, or designated spoil areas on Owner's property.
- D. Recycle: Recovery of demolition or construction waste for subsequent processing in preparation for reuse.
- E. Salvage: Recovery of demolition or construction waste and subsequent sale or reuse in another facility.
- F. Salvage and Reuse: Recovery of demolition or construction waste and subsequent incorporation into the Work.

#### **1.4 MATERIALS OWNERSHIP**

- A. Unless otherwise indicated, demolition and construction waste becomes property of Contractor.

- B. Historic items, relics, antiques, and similar objects including, but not limited to, cornerstones and their contents, commemorative plaques and tablets, and other items of interest or value to Owner that may be uncovered during demolition remain the property of Owner.
  - 1. Carefully salvage in a manner to prevent damage and promptly return to Owner.

#### 1.5 ACTION SUBMITTALS

- A. Waste Management Plan: Submit plan within 14 days of date established for the Notice to Proceed.

#### 1.6 INFORMATIONAL SUBMITTALS

- A. Waste Reduction Progress Reports: Concurrent with each Application for Payment, submit report. Use Form CWM-7 for construction waste and Form CWM-8 for demolition waste. Include the following information:
  - 1. Material category.
  - 2. Generation point of waste.
  - 3. Total quantity of waste in tons.
  - 4. Quantity of waste salvaged, both estimated and actual in tons.
  - 5. Quantity of waste recycled, both estimated and actual in tons.
  - 6. Total quantity of waste recovered (salvaged plus recycled) in tons.
  - 7. Total quantity of waste recovered (salvaged plus recycled) as a percentage of total waste.
- B. Waste Reduction Calculations: Before request for Substantial Completion, submit calculated end-of-Project rates for salvage, recycling, and disposal as a percentage of total waste generated by the Work.
- C. Records of Donations: Indicate receipt and acceptance of salvageable waste donated to individuals and organizations. Indicate whether organization is tax exempt.
- D. Records of Sales: Indicate receipt and acceptance of salvageable waste sold to individuals and organizations. Indicate whether organization is tax exempt.
- E. Recycling and Processing Facility Records: Indicate receipt and acceptance of recyclable waste by recycling and processing facilities licensed to accept them. Include manifests, weight tickets, receipts, and invoices.
- F. Landfill and Incinerator Disposal Records: Indicate receipt and acceptance of waste by landfills and incinerator facilities licensed to accept them. Include manifests, weight tickets, receipts, and invoices.
- G. Qualification Data: For waste management coordinator.

## 1.7 QUALITY ASSURANCE

- A. Waste Management Coordinator Qualifications: Experienced firm, or individual employed and assigned by General Contractor, with a record of successful waste management coordination of projects with similar requirements. Superintendent may serve as Waste Management Coordinator.
- B. Regulatory Requirements: Comply with transportation and disposal regulations of authorities having jurisdiction.
- C. Waste Management Conference(s): Conduct conference(s) at Project site to comply with requirements in Section 013100 "Project Management and Coordination." Review methods and procedures related to waste management including, but not limited to, the following:
  - 1. Review and discuss waste management plan including responsibilities of each contractor and waste management coordinator.
  - 2. Review requirements for documenting quantities of each type of waste and its disposition.
  - 3. Review and finalize procedures for materials separation and verify availability of containers and bins needed to avoid delays.
  - 4. Review procedures for periodic waste collection and transportation to recycling and disposal facilities.
  - 5. Review waste management requirements for each trade.

## 1.8 WASTE MANAGEMENT PLAN

- A. General: Develop a waste management plan according to requirements in this Section. Plan shall consist of waste identification, waste reduction work plan, and cost/revenue analysis. Distinguish between demolition and construction waste. Indicate quantities by weight or volume, but use same units of measure throughout waste management plan.
- B. Waste Identification: Indicate anticipated types and quantities of demolition and construction waste generated by the Work. Use Form CWM-1 for construction waste and Form CWM-2 for demolition waste. Include estimated quantities and assumptions for estimates.
- C. Waste Reduction Work Plan: List each type of waste and whether it will be salvaged, recycled, or disposed of in landfill or incinerator. Use Form CWM-3 for construction waste and Form CWM-4 for demolition waste. Include points of waste generation, total quantity of each type of waste, quantity for each means of recovery, and handling and transportation procedures.
  - 1. Salvaged Materials for Reuse: For materials that will be salvaged and reused in this Project, describe methods for preparing salvaged materials before incorporation into the Work.
  - 2. Salvaged Materials for Sale: For materials that will be sold to individuals and organizations, include list of their names, addresses, and telephone numbers.
  - 3. Salvaged Materials for Donation: For materials that will be donated to individuals and organizations, include list of their names, addresses, and telephone numbers.
  - 4. Recycled Materials: Include list of local receivers and processors and type of recycled materials each will accept. Include names, addresses, and telephone numbers.

5. Disposed Materials: Indicate how and where materials will be disposed of. Include name, address, and telephone number of each landfill and incinerator facility.
  6. Handling and Transportation Procedures: Include method that will be used for separating recyclable waste including sizes of containers, container labeling, and designated location where materials separation will be performed.
- D. Cost/Revenue Analysis: Indicate total cost of waste disposal as if there were no waste management plan and net additional cost or net savings resulting from implementing waste management plan. Use Form CWM-5 for construction waste and Form CWM-6 for demolition waste. Include the following:
1. Total quantity of waste.
  2. Estimated cost of disposal (cost per unit). Include transportation and tipping fees and cost of collection containers and handling for each type of waste.
  3. Total cost of disposal (with no waste management).
  4. Revenue from salvaged materials.
  5. Revenue from recycled materials.
  6. Savings in transportation and tipping fees by donating materials.
  7. Savings in transportation and tipping fees that are avoided.
  8. Handling and transportation costs. Include cost of collection containers for each type of waste.
  9. Net additional cost or net savings from waste management plan.

## **PART 2 – PRODUCTS**

### **2.1 PERFORMANCE REQUIREMENTS**

- A. General: Achieve end-of-Project rates for salvage/recycling of 50 percent by weight of total nonhazardous solid waste generated by the Work. Practice efficient waste management in the use of materials in the course of the Work. Use all reasonable means to divert construction and demolition waste from landfills and incinerators. Facilitate recycling and salvage of materials.
1. Demolition Waste:
    - a. Asphalt paving.
    - b. Concrete.
    - c. Concrete reinforcing steel.
    - d. Brick.
    - e. Concrete masonry units.
    - f. Wood studs.
    - g. Wood joists.
    - h. Plywood and oriented strand board.
    - i. Wood paneling.
    - j. Wood trim.
    - k. Structural and miscellaneous steel.
    - l. Rough hardware.
    - m. Roofing.
    - n. Insulation.
    - o. Doors and frames.

- p. Door hardware.
- q. Windows.
- r. Glazing.
- s. Metal studs.
- t. Gypsum board.
- u. Acoustical tile and panels.
- v. Carpet.
- w. Carpet pad.
- x. Demountable partitions.
- y. Equipment.
- z. Cabinets.
- aa. Plumbing fixtures.
- bb. Piping.
- cc. Supports and hangers.
- dd. Valves.
- ee. Sprinklers.
- ff. Mechanical equipment.
- gg. Refrigerants.
- hh. Electrical conduit.
- ii. Copper wiring.
- jj. Lighting fixtures.
- kk. Lamps.
- ll. Ballasts.
- mm. Electrical devices.
- nn. Switchgear and panelboards.
- oo. Transformers.
- 2. Construction Waste:
  - a. Masonry and CMU.
  - b. Lumber.
  - c. Wood sheet materials.
  - d. Wood trim.
  - e. Metals.
  - f. Roofing.
  - g. Insulation.
  - h. Carpet and pad.
  - i. Gypsum board.
  - j. Piping.
  - k. Electrical conduit.
  - l. Packaging: Regardless of salvage/recycle goal indicated in "General" Paragraph above, salvage or recycle 100 percent of the following uncontaminated packaging materials:
    - I. Paper.
    - II. Cardboard.
    - III. Boxes.
    - IV. Plastic sheet and film.
    - V. Polystyrene packaging.
    - VI. Wood crates.
    - VII. Wood pallets.

- VIII. Plastic pails.
- m. Construction Office Waste: Regardless of salvage/recycle goal indicated in "General" Paragraph above, salvage or recycle 100 percent of the following construction office waste materials:
- I. Paper.
  - II. Aluminum cans.
  - III. Glass containers.

## **PART 3 – EXECUTION**

### **3.1 PLAN IMPLEMENTATION**

- A. General: Implement approved waste management plan. Provide handling, containers, storage, signage, transportation, and other items as required to implement waste management plan during the entire duration of the Contract.
1. Comply with operation, termination, and removal requirements in Section 015000 "Temporary Facilities and Controls."
- B. Waste Management Coordinator: Engage a waste management coordinator to be responsible for implementing, monitoring, and reporting status of waste management work plan.
- C. Training: Train workers, subcontractors, and suppliers on proper waste management procedures, as appropriate for the Work.
1. Distribute waste management plan to everyone concerned within three days of submittal return.
  2. Distribute waste management plan to entities when they first begin work on-site. Review plan procedures and locations established for salvage, recycling, and disposal.
- D. Site Access and Temporary Controls: Conduct waste management operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities.
1. Designate and label specific areas on Project site necessary for separating materials that are to be salvaged and recycled.
- E. Waste Management in Historic Zones or Areas: Transportation equipment and other materials shall be of sizes that clear surfaces within historic spaces, areas, rooms, and openings, by 12 inches or more.

### **3.2 SALVAGING DEMOLITION WASTE**

- A. Salvaged Items for Reuse in the Work: Salvage items for reuse and handle as follows:
1. Clean salvaged items.
  2. Pack or crate items after cleaning. Identify contents of containers with label indicating elements, date of removal, quantity, and location where removed.
  3. Store items in a secure area until installation.
  4. Protect items from damage during transport and storage.

5. Install salvaged items to comply with installation requirements for new materials and equipment. Provide connections, supports, and miscellaneous materials necessary to make items functional for use indicated.
- B. Salvaged Items for Sale and Donation: Not permitted on Project site.
  - C. Salvaged Items for Owner's Use: Salvage items for Owner's use and handle as follows:
    1. Clean salvaged items.
    2. Pack or crate items after cleaning. Identify contents of containers with label indicating elements, date of removal, quantity, and location where removed.
    3. Store items in a secure area until delivery to Owner.
    4. Transport items to Owner's storage area designated by Owner.
    5. Protect items from damage during transport and storage.
  - D. Doors and Hardware: Brace open end of door frames. Except for removing door closers, leave door hardware attached to doors.
  - E. Equipment: Drain tanks, piping, and fixtures. Seal openings with caps or plugs. Protect equipment from exposure to weather.
  - F. Plumbing Fixtures: Separate by type and size.
  - G. Lighting Fixtures: Separate lamps by type and protect from breakage.
  - H. Electrical Devices: Separate switches, receptacles, switchgear, transformers, meters, panelboards, circuit breakers, and other devices by type.

### 3.3 RECYCLING DEMOLITION AND CONSTRUCTION WASTE, GENERAL

- A. General: Recycle paper and beverage containers used by on-site workers.
- B. Recycling Incentives: Revenues, savings, rebates, tax credits, and other incentives received for recycling waste materials shall be shared equally by Owner and Contractor.
- C. Preparation of Waste: Prepare and maintain recyclable waste materials according to recycling or reuse facility requirements. Maintain materials free of dirt, adhesives, solvents, petroleum contamination, and other substances deleterious to the recycling process.
- D. Procedures: Separate recyclable waste from other waste materials, trash, and debris. Separate recyclable waste by type at Project site to the maximum extent practical according to approved construction waste management plan.
  1. Provide appropriately marked containers or bins for controlling recyclable waste until removed from Project site. Include list of acceptable and unacceptable materials at each container and bin.
    - a. Inspect containers and bins for contamination and remove contaminated materials if found.
  2. Stockpile processed materials on-site without intermixing with other materials. Place, grade, and shape stockpiles to drain surface water. Cover to prevent windblown dust.

3. Stockpile materials away from construction area. Do not store within drip line of remaining trees.
4. Store components off the ground and protect from the weather.
5. Remove recyclable waste from Owner's property and transport to recycling receiver or processor as often as required to prevent overfilling bins.

### 3.4 RECYCLING DEMOLITION WASTE

- A. Asphalt Paving: Grind asphalt to maximum 4-inch size.
- B. Asphalt Paving: Break up and transport paving to asphalt-recycling facility.
- C. Concrete: Remove reinforcement and other metals from concrete and sort with other metals.
  1. Pulverize concrete to maximum 4-inch size.
- D. Masonry: Remove metal reinforcement, anchors, and ties from masonry and sort with other metals.
  1. Pulverize masonry to maximum 4-inch size.
  2. Clean and stack undamaged, whole masonry units on wood pallets.
- E. Wood Materials: Sort and stack members according to size, type, and length. Separate lumber, engineered wood products, panel products, and treated wood materials.
- F. Metals: Separate metals by type.
  1. Structural Steel: Stack members according to size, type of member, and length.
  2. Remove and dispose of bolts, nuts, washers, and other rough hardware.
- G. Asphalt Shingle Roofing: Separate organic and glass-fiber asphalt shingles and felts. Remove and dispose of nails, staples, and accessories.
- H. Gypsum Board: Stack large clean pieces on wood pallets or in container and store in a dry location. Remove edge trim and sort with other metals. Remove and dispose of fasteners.
- I. Acoustical Ceiling Panels and Tile: Stack large clean pieces on wood pallets and store in a dry location.
- J. Metal Suspension System: Separate metal members, including trim and other metals from acoustical panels and tile, and sort with other metals.
- K. Piping: Reduce piping to straight lengths and store by material and size. Separate supports, hangers, valves, sprinklers, and other components by material and size.
- L. Conduit: Reduce conduit to straight lengths and store by material and size.
- M. Lamps: Separate lamps by type and store according to requirements in 40 CFR 273.

### 3.5 RECYCLING CONSTRUCTION WASTE

- A. Packaging:
  - 1. Cardboard and Boxes: Break down packaging into flat sheets. Bundle and store in a dry location.
  - 2. Polystyrene Packaging: Separate and bag materials.
  - 3. Pallets: As much as possible, require deliveries using pallets to remove pallets from Project site. For pallets that remain on-site, break down pallets into component wood pieces and comply with requirements for recycling wood.
  - 4. Crates: Break down crates into component wood pieces and comply with requirements for recycling wood.
- B. Wood Materials:
  - 1. Clean Cut-Offs of Lumber: Grind or chip into small pieces.
  - 2. Clean Sawdust: Bag sawdust that does not contain painted or treated wood.
- C. Gypsum Board: Stack large clean pieces on wood pallets or in container and store in a dry location.
  - 1. Clean Gypsum Board: Grind scraps of clean gypsum board using small mobile chipper or hammer mill. Screen out paper after grinding.
- D. Paint: Seal containers and store by type.

### 3.6 DISPOSAL OF WASTE

- A. General: Except for items or materials to be salvaged or recycled, remove waste materials from Project site and legally dispose of them in a landfill or incinerator acceptable to authorities having jurisdiction.
  - 1. Except as otherwise specified, do not allow waste materials that are to be disposed of accumulate on-site.
  - 2. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.
- B. General: Except for items or materials to be salvaged or recycled, remove waste materials and legally dispose of at designated spoil areas on Owner's property.
- C. Burning: Do not burn waste materials.

### 3.7 ATTACHMENTS

- A. Form CWM-1 for construction waste identification.
- B. Form CWM-2 for demolition waste identification.
- C. Form CWM-3 for construction waste reduction work plan.
- D. Form CWM-4 for demolition waste reduction work plan.

- E. Form CWM-5 for cost/revenue analysis of construction waste reduction work plan.
- F. Form CWM-6 for cost/revenue analysis of demolition waste reduction work plan.
- G. Form CWM-7 for construction waste reduction progress report.
- H. Form CWM-8 for demolition waste reduction progress report.

**END OF SECTION 017419**

## SECTION 017700 – CLOSEOUT PROCEDURES

### PART 1 – GENERAL

#### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

#### 1.2 SUMMARY

- A. Section includes administrative and procedural requirements for Contract closeout, including, but not limited to, the following:
  - 1. Substantial Completion procedures.
  - 2. Final completion procedures.
  - 3. Warranties.
  - 4. Final cleaning.
- B. Related Requirements:
  - 1. Section 012900 "Payment Procedures" for requirements for Applications for Payment for Substantial Completion and Final Completion.
  - 2. Section 013233 "Photographic Documentation" for submitting Final Completion construction photographic documentation.
  - 3. Section 017823 "Operation and Maintenance Data" for additional operation and maintenance manual requirements.
  - 4. Section 017839 "Project Record Documents" for submitting Record Drawings, Record Specifications, and Record Product Data.
  - 5. Section 017900 "Demonstration and Training" for requirements to train the Owner's maintenance personnel to adjust, operate, and maintain products, equipment, and systems.

#### 1.3 DEFINITIONS

- A. List of Incomplete Items: Contractor-prepared list of items to be completed or corrected, prepared for the Engineer's use prior to Engineer's inspection, to determine if the Work is substantially complete.

#### 1.4 ACTION SUBMITTALS

- A. Product Data: For each type of cleaning agent.
- B. Contractor's List of Incomplete Items: Initial submittal at Substantial Completion.

- C. Certified List of Incomplete Items: Final submittal at Final Completion.

#### 1.5 CLOSEOUT SUBMITTALS

- A. Certificates of Release: From authorities having jurisdiction.
- B. Certificate of Insurance: For continuing coverage.
- C. Field Report: For pest-control inspection.

#### 1.6 MAINTENANCE MATERIAL SUBMITTALS

- A. Schedule of Maintenance Material Items: For maintenance material submittal items required by other Sections.

#### 1.7 SUBSTANTIAL COMPLETION PROCEDURES

- A. Contractor's List of Incomplete Items: Prepare and submit a list of items to be completed and corrected (Contractor's "punch list"), indicating the value of each item on the list and reasons why the Work is incomplete.
- B. Submittals Prior to Substantial Completion: Complete the following a minimum of 10 days prior to requesting inspection for determining date of Substantial Completion. List items below that are incomplete at time of request.
  - 1. Certificates of Release: Obtain and submit releases from authorities having jurisdiction, permitting Owner unrestricted use of the Work and access to services and utilities. Include occupancy permits, operating certificates, and similar releases.
  - 2. Submit closeout submittals specified in other Division 01 Sections, including Project Record Documents, operation and maintenance manuals, damage or settlement surveys, property surveys, and similar final record information.
  - 3. Submit closeout submittals specified in individual Sections, including specific warranties, workmanship bonds, maintenance service agreements, final certifications, and similar documents.
  - 4. Submit maintenance material submittals specified in individual Sections, including tools, spare parts, extra materials, and similar items, and deliver to location designated by Engineer. Label with manufacturer's name and model number.
    - a. Schedule of Maintenance Material Items: Prepare and submit schedule of maintenance material submittal items, including name and quantity of each item and name and number of related Specification Section. Obtain Owner's signature for receipt of submittals.
  - 5. Submit testing, adjusting, and balancing records.
  - 6. Submit changeover information related to Owner's occupancy, use, operation, and maintenance.

- C. Procedures Prior to Substantial Completion: Complete the following a minimum of 10 days prior to requesting inspection for determining date of Substantial Completion. List items below that are incomplete at time of request.
1. Advise Owner of pending insurance changeover requirements.
  2. Make final changeover of permanent locks and deliver keys to Owner. Advise Owner's personnel of changeover in security provisions.
  3. Complete startup and testing of systems and equipment.
  4. Perform preventive maintenance on equipment used prior to Substantial Completion.
  5. Instruct Owner's personnel in operation, adjustment, and maintenance of products, equipment, and systems. Submit demonstration and training video recordings specified in Section 017900 "Demonstration and Training."
  6. Advise Owner of changeover in utility services.
  7. Participate with Owner in conducting inspection and walkthrough with local emergency responders.
  8. Terminate and remove temporary facilities from Project site, along with mockups, construction tools, and similar elements.
  9. Complete final cleaning requirements.
  10. Touch up paint and otherwise repair and restore marred exposed finishes to eliminate visual defects.
- D. Inspection: Submit a written request for inspection to determine Substantial Completion a minimum of 10 days prior to date the Work will be completed and ready for final inspection and tests. On receipt of request, Engineer will either proceed with inspection or notify Contractor of unfulfilled requirements. Engineer will prepare the Certificate of Substantial Completion after inspection or will notify Contractor of items, either on Contractor's list or additional items identified by Engineer, that must be completed or corrected before certificate will be issued.
1. Request reinspection when the Work identified in previous inspections as incomplete is completed or corrected.
  2. Results of completed inspection will form the basis of requirements for Final Completion.

## 1.8 FINAL COMPLETION PROCEDURES

- A. Submittals Prior to Final Completion: Before requesting final inspection for determining Final Completion, complete the following:
1. Submit a final Application for Payment in accordance with Section 012900 "Payment Procedures."
  2. Certified List of Incomplete Items: Submit certified copy of Engineer's Substantial Completion inspection list of items to be completed or corrected (punch list), endorsed and dated by Engineer. Certified copy of the list shall state that each item has been completed or otherwise resolved for acceptance.
  3. Certificate of Insurance: Submit evidence of final, continuing insurance coverage complying with insurance requirements.
  4. Submit pest-control final inspection report.
  5. Submit Final Completion photographic documentation.

- B. Inspection: Submit a written request for final inspection to determine acceptance a minimum of 10 days prior to date the Work will be completed and ready for final inspection and tests. On receipt of request, Engineer will either proceed with inspection or notify Contractor of unfulfilled requirements. Engineer will prepare a final Certificate for Payment after inspection or will notify Contractor of construction that must be completed or corrected before certificate will be issued.
  - 1. Request reinspection when the Work identified in previous inspections as incomplete is completed or corrected.

#### 1.9 LIST OF INCOMPLETE ITEMS

- A. Organization of List: Include name and identification of each space and area affected by construction operations for incomplete items and items needing correction including, if necessary, areas disturbed by Contractor that are outside the limits of construction.
  - 1. Organize list of spaces in sequential order, starting with exterior areas first and proceeding from lowest floor to highest floor, listed by room or space number.
  - 2. Organize items applying to each space by major element, including categories for ceilings, individual walls, floors, equipment, and building systems.
  - 3. Include the following information at the top of each page:
    - a. Project name.
    - b. Date.
    - c. Name of Engineer.
    - d. Name of Contractor.
    - e. Page number.
  - 4. Submit list of incomplete items in the following format:
    - a. PDF Electronic File: Engineer will return annotated file.

#### 1.10 SUBMITTAL OF PROJECT WARRANTIES

- A. Time of Submittal: Submit written warranties on request of Engineer for designated portions of the Work where warranties are indicated to commence on dates other than date of Substantial Completion, or when delay in submittal of warranties might limit Owner's rights under warranty.
- B. Partial Occupancy: Submit properly executed warranties within 15 days of completion of designated portions of the Work that are completed and occupied or used by Owner during construction period by separate agreement with Contractor.
- C. Organize warranty documents into an orderly sequence based on the table of contents of Project Manual.
- D. Warranty Electronic File: Provide warranties and bonds in PDF format. Assemble complete warranty and bond submittal package into a single electronic PDF file with bookmarks enabling navigation to each item. Provide bookmarked table of contents at beginning of document.
  - 1. Submit by uploading to web-based project software site.
- E. Warranties in Paper Form:

1. Bind warranties and bonds in heavy-duty, three-ring, vinyl-covered, loose-leaf binders, thickness as necessary to accommodate contents, and sized to receive 8-1/2-by-11-inch paper.
  2. Provide heavy paper dividers with plastic-covered tabs for each separate warranty. Mark tab to identify the product or installation. Provide a typed description of the product or installation, including the name of the product and the name, address, and telephone number of Installer.
  3. Identify each binder on the front and spine with the typed or printed title "WARRANTIES," Project name, and name of Contractor.
- F. Provide additional copies of each warranty to include in operation and maintenance manuals.

## **PART 2 – PRODUCTS**

### **2.1 MATERIALS**

- A. **Cleaning Agents:** Use cleaning materials and agents recommended by manufacturer or fabricator of the surface to be cleaned. Do not use cleaning agents that are potentially hazardous to health or property or that might damage finished surfaces.

## **PART 3 – EXECUTION**

### **3.1 FINAL CLEANING**

- A. **General:** Perform final cleaning. Conduct cleaning and waste-removal operations to comply with local laws and ordinances and Federal and local environmental and antipollution regulations.
- B. **Cleaning:** Employ experienced workers or professional cleaners for final cleaning. Clean each surface or unit to condition expected in an average commercial building cleaning and maintenance program. Comply with manufacturer's written instructions.
1. Complete the following cleaning operations before requesting inspection for certification of Substantial Completion for entire Project or for a designated portion of Project:
    - a. Clean Project site of rubbish, waste material, litter, and other foreign substances.
    - b. Sweep paved areas broom clean. Remove petrochemical spills, stains, and other foreign deposits.
    - c. Remove tools, construction equipment, machinery, and surplus material from Project site.
    - d. Clean exposed exterior and interior hard-surfaced finishes to a dirt-free condition, free of stains, films, and similar foreign substances. Avoid disturbing natural weathering of exterior surfaces. Restore reflective surfaces to their original condition.
    - e. Remove debris and surface dust from limited-access spaces, including roofs, plenums, shafts, trenches, equipment vaults, manholes, attics, and similar spaces.

- f. Clean flooring, removing debris, dirt, and staining; clean according to manufacturer's recommendations.
  - g. Vacuum and mop concrete.
  - h. Vacuum carpet and similar soft surfaces, removing debris and excess nap; clean according to manufacturer's recommendations if visible soil or stains remain.
  - i. Clean transparent materials, including mirrors and glass in doors and windows. Remove glazing compounds and other noticeable, vision-obscuring materials. Polish mirrors and glass, taking care not to scratch surfaces.
  - j. Remove labels that are not permanent.
  - k. Wipe surfaces of mechanical and electrical equipment and similar equipment. Remove excess lubrication, paint and mortar droppings, and other foreign substances.
  - l. Replace disposable air filters and clean permanent air filters. Clean exposed surfaces of diffusers, registers, and grills.
  - m. Clean ducts, blowers, and coils if units were operated without filters during construction or that display contamination with particulate matter on inspection.
    - I. Clean HVAC system in compliance with NADCA ACR. Provide written report on completion of cleaning.
  - n. Clean luminaires, lamps, globes, and reflectors to function with full efficiency.
  - o. Clean strainers.
  - p. Leave Project clean and ready for occupancy.
- C. Construction Waste Disposal: Comply with waste-disposal requirements in Section 017419"Construction Waste Management and Disposal."

### 3.2 REPAIR OF THE WORK

- A. Complete repair and restoration operations required by Section 017300 "Execution" before requesting inspection for determination of Substantial Completion.

**END OF SECTION 017700**

## SECTION 017900 – DEMONSTRATION AND TRAINING

### PART 1 – GENERAL

#### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

#### 1.2 SUMMARY

- A. Section includes administrative and procedural requirements for instructing Owner's personnel, including the following:
  - 1. Instruction in operation and maintenance of systems, subsystems, and equipment.
  - 2. Demonstration and training video recordings.

#### 1.3 INFORMATIONAL SUBMITTALS

- A. Instruction Program: Submit outline of instructional program for demonstration and training, including a list of training modules and a schedule of requested dates, times, length of instruction time, and instructors' names for each training module. Include learning objective and outline for each training module.
  - 1. Indicate training modules using manufacturer-produced demonstration and training video recordings for systems, equipment, and products in lieu of video recording of live instructional module.
- B. Qualification Data: For facilitator.
- C. Attendance Record: For each training module, submit list of participants and length of instruction time.
- D. Evaluations: For each participant and for each training module, submit results and documentation of performance-based test.

#### 1.4 CLOSEOUT SUBMITTALS

- A. Demonstration and Training Video Recordings: Submit two copies within seven days of end of each training module.
  - 1. Identification: On each copy, provide an applied label with the following information:
    - a. Name of Project.
    - b. Name and address of videographer.
    - c. Name of Engineer.
    - d. Name of Construction Manager.

- e. Name of Contractor.
- f. Date of video recording.
- 2. Transcript: Prepared in PDF electronic format. Include a cover sheet with same label information as the corresponding video recording and a table of contents with links to corresponding training components. Include name of Project and date of video recording on each page.
- 3. At completion of training, submit complete training manual(s) for Owner's use prepared in same PDF file format required for operation and maintenance manuals specified in Section 017823 "Operation and Maintenance Data."

## 1.5 QUALITY ASSURANCE

- A. Facilitator Qualifications: A firm or individual experienced in training or educating maintenance personnel in a training program similar in content and extent to that indicated for this Project, and whose work has resulted in training or education with a record of successful learning performance.
- B. Instructor Qualifications: A factory-authorized service representative, complying with requirements in Section 014000 "Quality Requirements," experienced in operation and maintenance procedures and training.
- C. Videographer Qualifications: A professional videographer who is experienced photographing demonstration and training events similar to those required.
- D. Preinstruction Conference: Conduct conference at Project site to comply with requirements in Section 013100 "Project Management and Coordination." Review methods and procedures related to demonstration and training including, but not limited to, the following:
  - 1. Inspect and discuss locations and other facilities required for instruction.
  - 2. Review and finalize instruction schedule and verify availability of educational materials, instructors' personnel, audiovisual equipment, and facilities needed to avoid delays.
  - 3. Review required content of instruction.

## 1.6 COORDINATION

- A. Coordinate instruction schedule with Owner's operations. Adjust schedule as required to minimize disrupting Owner's operations and to ensure availability of Owner's personnel.
- B. Coordinate instructors, including providing notification of dates, times, length of instruction time, and course content.
- C. Coordinate content of training modules with content of approved emergency, operation, and maintenance manuals. Do not submit instruction program until operation and maintenance data have been reviewed and approved by Engineer.

## 1.7 INSTRUCTION PROGRAM

- A. Program Structure: Develop an instruction program that includes individual training modules for each system and for equipment not part of a system, as required by individual Specification Sections.
- B. Training Modules: Develop a learning objective and teaching outline for each module. Include a description of specific skills and knowledge that participant is expected to master. For each module, include instruction for the following as applicable to the system, equipment, or component:
  - 1. Basis of System Design, Operational Requirements, and Criteria: Include the following:
    - a. System, subsystem, and equipment descriptions.
    - b. Performance and design criteria if Contractor is delegated design responsibility.
    - c. Operating standards.
    - d. Regulatory requirements.
    - e. Equipment function.
    - f. Operating characteristics.
    - g. Limiting conditions.
    - h. Performance curves.
  - 2. Documentation: Review the following items in detail:
    - a. Emergency manuals.
    - b. Systems and equipment operation manuals.
    - c. Systems and equipment maintenance manuals.
    - d. Product maintenance manuals.
    - e. Project Record Documents.
    - f. Identification systems.
    - g. Warranties and bonds.
    - h. Maintenance service agreements and similar continuing commitments.
  - 3. Emergencies: Include the following, as applicable:
    - a. Instructions on meaning of warnings, trouble indications, and error messages.
    - b. Instructions on stopping.
    - c. Shutdown instructions for each type of emergency.
    - d. Operating instructions for conditions outside of normal operating limits.
    - e. Sequences for electric or electronic systems.
    - f. Special operating instructions and procedures.
  - 4. Operations: Include the following, as applicable:
    - a. Startup procedures.
    - b. Equipment or system break-in procedures.
    - c. Routine and normal operating instructions.
    - d. Regulation and control procedures.
    - e. Control sequences.
    - f. Safety procedures.
    - g. Instructions on stopping.
    - h. Normal shutdown instructions.
    - i. Operating procedures for emergencies.
    - j. Operating procedures for system, subsystem, or equipment failure.
    - k. Seasonal and weekend operating instructions.
    - l. Required sequences for electric or electronic systems.

- m. Special operating instructions and procedures.
- 5. Adjustments: Include the following:
  - a. Alignments.
  - b. Checking adjustments.
  - c. Noise and vibration adjustments.
  - d. Economy and efficiency adjustments.
- 6. Troubleshooting: Include the following:
  - a. Diagnostic instructions.
  - b. Test and inspection procedures.
- 7. Maintenance: Include the following:
  - a. Inspection procedures.
  - b. Types of cleaning agents to be used and methods of cleaning.
  - c. List of cleaning agents and methods of cleaning detrimental to product.
  - d. Procedures for routine cleaning.
  - e. Procedures for preventive maintenance.
  - f. Procedures for routine maintenance.
  - g. Instruction on use of special tools.
- 8. Repairs: Include the following:
  - a. Diagnosis instructions.
  - b. Repair instructions.
  - c. Disassembly; component removal, repair, and replacement; and reassembly instructions.
  - d. Instructions for identifying parts and components.
  - e. Review of spare parts needed for operation and maintenance.

## 1.8 PREPARATION

- A. Assemble educational materials necessary for instruction, including documentation and training module. Assemble training modules into a training manual organized in coordination with requirements in Section 017823 "Operation and Maintenance Data."
- B. Set up instructional equipment at instruction location.

## 1.9 INSTRUCTION

- A. Facilitator: Engage a qualified facilitator to prepare instruction program and training modules, to coordinate instructors, and to coordinate between Contractor and Owner for number of participants, instruction times, and location.
- B. Engage qualified instructors to instruct Owner's personnel to adjust, operate, and maintain systems, subsystems, and equipment not part of a system.
  - 1. Engineer will furnish an instructor to describe basis of system design, operational requirements, criteria, and regulatory requirements.
  - 2. Owner will furnish an instructor to describe Owner's operational philosophy.
  - 3. Owner will furnish Contractor with names and positions of participants.

- C. Scheduling: Provide instruction at mutually agreed-on times. For equipment that requires seasonal operation, provide similar instruction at start of each season.
  - 1. Schedule training with Owner with at least seven days' advance notice.
- D. Training Location and Reference Material: Conduct training on-site in the completed and fully operational facility using the actual equipment in-place. Conduct training using final operation and maintenance data submittals.
- E. Evaluation: At conclusion of each training module, assess and document each participant's mastery of module by use of oral performance-based test.
- F. Cleanup: Collect used and leftover educational materials and give to Owner. Remove instructional equipment. Restore systems and equipment to condition existing before initial training use.

#### 1.10 DEMONSTRATION AND TRAINING VIDEO RECORDINGS

- A. General: Engage a qualified commercial videographer to record demonstration and training video recordings. Record each training module separately. Include classroom instructions and demonstrations, board diagrams, and other visual aids, but not student practice.
  - 1. At beginning of each training module, record each chart containing learning objective and lesson outline.
- B. Digital Video Recordings: Provide high-resolution, digital video in MPEG format, produced by a digital camera with minimum sensor resolution of 12 megapixels and capable of recording in full HD mode with vibration reduction technology.
  - 1. Submit video recordings by uploading to web-based Project software site.
  - 2. File Hierarchy: Organize folder structure and file locations according to Project Manual table of contents. Provide complete screen-based menu.
  - 3. File Names: Utilize file names based on name of equipment generally described in video segment, as identified in Project specifications.
  - 4. Contractor and Installer Contact File: Using appropriate software, create a file for inclusion on the equipment demonstration and training recording that describes the following for each Contractor involved on the Project, arranged according to Project Manual table of contents:
    - a. Name of Contractor/Installer.
    - b. Business address.
    - c. Business phone number.
    - d. Point of contact.
    - e. Email address.
- C. Recording: Mount camera on tripod before starting recording, unless otherwise necessary to adequately cover area of demonstration and training. Display continuous running time.
  - 1. Film training session(s) in segments not to exceed 15 minutes.
    - a. Produce segments to present a single significant piece of equipment per segment.
    - b. Organize segments with multiple pieces of equipment to follow order of Project Manual table of contents.

- c. Where a training session on a particular piece of equipment exceeds 15 minutes, stop filming and pause training session. Begin training session again upon commencement of new filming segment.
- D. Light Levels: Verify light levels are adequate to properly light equipment. Verify equipment markings are clearly visible prior to recording.
  - 1. Furnish additional portable lighting as required.
- E. Narration: Describe scenes on video recording by audio narration by microphone while video recording is recorded. Include description of items being viewed.
- F. Transcript: Provide a transcript of the narration. Display images and running time captured from videotape opposite the corresponding narration segment.
- G. Preproduced Video Recordings: Provide video recordings used as a component of training modules in same format as recordings of live training.

**PART 2 – PRODUCTS**

**PART 3 – EXECUTION**

**END OF SECTION 017900**

## **SECTION 017823 – OPERATION AND MAINTENANCE DATA**

### **PART 1 – GENERAL**

#### **1.1 RELATED DOCUMENTS**

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

#### **1.2 SUMMARY**

- A. Section includes administrative and procedural requirements for preparing operation and maintenance manuals, including the following:
  - 1. Operation and maintenance documentation directory manuals.
  - 2. Emergency manuals.
  - 3. Systems and equipment operation manuals.
  - 4. Systems and equipment maintenance manuals.
  - 5. Product maintenance manuals.
- B. Related Requirements:
  - 1. Section 013300 "Submittal Procedures" for submitting copies of submittals for operation and maintenance manuals.

#### **1.3 DEFINITIONS**

- A. System: An organized collection of parts, equipment, or subsystems united by regular interaction.
- B. Subsystem: A portion of a system with characteristics similar to a system.

#### **1.4 CLOSEOUT SUBMITTALS**

- A. Submit operation and maintenance manuals indicated. Provide content for each manual as specified in individual Specification Sections, and as reviewed and approved at the time of Section submittals. Submit reviewed manual content formatted and organized as required by this Section.
  - 1. Engineer will comment on whether content of operation and maintenance submittals is acceptable.
  - 2. Where applicable, clarify and update reviewed manual content to correspond to revisions and field conditions.
- B. Format: Submit operation and maintenance manuals in the following format:

1. Submit by uploading to web-based project software site. Enable reviewer comments on draft submittals.
- C. Initial Manual Submittal: Submit draft copy of each manual at least 30 days before commencing demonstration and training. Engineer will comment on whether general scope and content of manual are acceptable.
- D. Final Manual Submittal: Submit each manual in final form prior to requesting inspection for Substantial Completion and at least 15 days before commencing demonstration and training. Engineer will return copy with comments.
1. Correct or revise each manual to comply with Engineer's comments. Submit copies of each corrected manual within 15 days of receipt of Engineer's comments and prior to commencing demonstration and training.
- E. Comply with Section 017700 "Closeout Procedures" for schedule for submitting operation and maintenance documentation.

#### 1.5 FORMAT OF OPERATION AND MAINTENANCE MANUALS

- A. Manuals, Electronic Files: Submit manuals in the form of a multiple file composite electronic PDF file for each manual type required.
1. Electronic Files: Use electronic files prepared by manufacturer where available. Where scanning of paper documents is required, configure scanned file for minimum readable file size.
  2. File Names and Bookmarks: Bookmark individual documents based on file names. Name document files to correspond to system, subsystem, and equipment names used in manual directory and table of contents. Group documents for each system and subsystem into individual composite bookmarked files, then create composite manual, so that resulting bookmarks reflect the system, subsystem, and equipment names in a readily navigated file tree. Configure electronic manual to display bookmark panel on opening file.

#### 1.6 REQUIREMENTS FOR EMERGENCY, OPERATION, AND MAINTENANCE MANUALS

- A. Organization of Manuals: Unless otherwise indicated, organize each manual into a separate section for each system and subsystem, and a separate section for each piece of equipment not part of a system. Each manual shall contain the following materials, in the order listed:
1. Title page.
  2. Table of contents.
  3. Manual contents.
- B. Title Page: Include the following information:
1. Subject matter included in manual.
  2. Name and address of Project.
  3. Name and address of Owner.
  4. Date of submittal.
  5. Name and contact information for Contractor.
  6. Name and contact information for Construction Manager.

7. Name and contact information for Engineer.
  8. Name and contact information for Commissioning Authority.
  9. Names and contact information for major consultants to the Engineer that designed the systems contained in the manuals.
  10. Cross-reference to related systems in other operation and maintenance manuals.
- C. Table of Contents: List each product included in manual, identified by product name, indexed to the content of the volume, and cross-referenced to Specification Section number in Project Manual.
1. If operation or maintenance documentation requires more than one volume to accommodate data, include comprehensive table of contents for all volumes in each volume of the set.
- D. Manual Contents: Organize into sets of manageable size. Arrange contents alphabetically by system, subsystem, and equipment. If possible, assemble instructions for subsystems, equipment, and components of one system into a single binder.
- E. Identification: In the documentation directory and in each operation and maintenance manual, identify each system, subsystem, and piece of equipment with same designation used in the Contract Documents. If no designation exists, assign a designation according to ASHRAE Guideline 4, "Preparation of Operating and Maintenance Documentation for Building Systems."

## 1.7 EMERGENCY MANUALS

- A. Emergency Manual: Assemble a complete set of emergency information indicating procedures for use by emergency personnel and by Owner's operating personnel for types of emergencies indicated.
- B. Content: Organize manual into a separate section for each of the following:
1. Type of emergency.
  2. Emergency instructions.
  3. Emergency procedures.
- C. Type of Emergency: Where applicable for each type of emergency indicated below, include instructions and procedures for each system, subsystem, piece of equipment, and component:
1. Fire.
  2. Flood.
  3. Gas leak.
  4. Water leak.
  5. Power failure.
  6. Water outage.
  7. System, subsystem, or equipment failure.
  8. Chemical release or spill.

- D. Emergency Instructions: Describe and explain warnings, trouble indications, error messages, and similar codes and signals. Include responsibilities of Owner's operating personnel for notification of Installer, supplier, and manufacturer to maintain warranties.
- E. Emergency Procedures: Include the following, as applicable:
  - 1. Instructions on stopping.
  - 2. Shutdown instructions for each type of emergency.
  - 3. Operating instructions for conditions outside normal operating limits.
  - 4. Required sequences for electric or electronic systems.
  - 5. Special operating instructions and procedures.

## 1.8 SYSTEMS AND EQUIPMENT OPERATION MANUALS

- A. Systems and Equipment Operation Manual: Assemble a complete set of data indicating operation of each system, subsystem, and piece of equipment not part of a system. Include information required for daily operation and management, operating standards, and routine and special operating procedures.
  - 1. Engage a factory-authorized service representative to assemble and prepare information for each system, subsystem, and piece of equipment not part of a system.
  - 2. Prepare a separate manual for each system and subsystem, in the form of an instructional manual for use by Owner's operating personnel.
- B. Content: In addition to requirements in this Section, include operation data required in individual Specification Sections and the following information:
  - 1. System, subsystem, and equipment descriptions. Use designations for systems and equipment indicated on Contract Documents.
  - 2. Performance and design criteria if Contractor has delegated design responsibility.
  - 3. Operating standards.
  - 4. Operating procedures.
  - 5. Operating logs.
  - 6. Wiring diagrams.
  - 7. Control diagrams.
  - 8. Piped system diagrams.
  - 9. Precautions against improper use.
  - 10. License requirements including inspection and renewal dates.
- C. Descriptions: Include the following:
  - 1. Product name and model number. Use designations for products indicated on Contract Documents.
  - 2. Manufacturer's name.
  - 3. Equipment identification with serial number of each component.
  - 4. Equipment function.
  - 5. Operating characteristics.
  - 6. Limiting conditions.
  - 7. Performance curves.
  - 8. Engineering data and tests.
  - 9. Complete nomenclature and number of replacement parts.

- D. Operating Procedures: Include the following, as applicable:
  1. Startup procedures.
  2. Equipment or system break-in procedures.
  3. Routine and normal operating instructions.
  4. Regulation and control procedures.
  5. Instructions on stopping.
  6. Normal shutdown instructions.
  7. Seasonal and weekend operating instructions.
  8. Required sequences for electric or electronic systems.
  9. Special operating instructions and procedures.
- E. Systems and Equipment Controls: Describe the sequence of operation, and diagram controls as installed.
- F. Piped Systems: Diagram piping as installed, and identify color coding where required for identification.

## 1.9 SYSTEMS AND EQUIPMENT MAINTENANCE MANUALS

- A. Systems and Equipment Maintenance Manuals: Assemble a complete set of data indicating maintenance of each system, subsystem, and piece of equipment not part of a system. Include manufacturers' maintenance documentation, preventive maintenance procedures and frequency, repair procedures, wiring and systems diagrams, lists of spare parts, and warranty information.
  1. Engage a factory-authorized service representative to assemble and prepare information for each system, subsystem, and piece of equipment not part of a system.
  2. Prepare a separate manual for each system and subsystem, in the form of an instructional manual for use by Owner's operating personnel.
- B. Content: For each system, subsystem, and piece of equipment not part of a system, include source information, manufacturers' maintenance documentation, maintenance procedures, maintenance and service schedules, spare parts list and source information, maintenance service contracts, and warranties and bonds as described below.
- C. Source Information: List each system, subsystem, and piece of equipment included in manual, identified by product name and arranged to match manual's table of contents. For each product, list name, address, and telephone number of Installer or supplier and maintenance service agent, and cross-reference Specification Section number and title in Project Manual and drawing or schedule designation or identifier where applicable.
- D. Manufacturers' Maintenance Documentation: Include the following information for each component part or piece of equipment:
  1. Standard maintenance instructions and bulletins; include only sheets pertinent to product or component installed. Mark each sheet to identify each product or component incorporated into the Work. If data include more than one item in a tabular format, identify each item using appropriate references from the Contract Documents. Identify data applicable to the Work and delete references to information not applicable.

- a. Prepare supplementary text if manufacturers' standard printed data are not available and where the information is necessary for proper operation and maintenance of equipment or systems.
  - 2. Drawings, diagrams, and instructions required for maintenance, including disassembly and component removal, replacement, and assembly.
  - 3. Identification and nomenclature of parts and components.
  - 4. List of items recommended to be stocked as spare parts.
- E. Maintenance Procedures: Include the following information and items that detail essential maintenance procedures:
- 1. Test and inspection instructions.
  - 2. Troubleshooting guide.
  - 3. Precautions against improper maintenance.
  - 4. Disassembly; component removal, repair, and replacement; and reassembly instructions.
  - 5. Aligning, adjusting, and checking instructions.
  - 6. Demonstration and training video recording, if available.
- F. Maintenance and Service Schedules: Include service and lubrication requirements, list of required lubricants for equipment, and separate schedules for preventive and routine maintenance and service with standard time allotment.
- 1. Scheduled Maintenance and Service: Tabulate actions for daily, weekly, monthly, quarterly, semiannual, and annual frequencies.
  - 2. Maintenance and Service Record: Include manufacturers' forms for recording maintenance.
- G. Spare Parts List and Source Information: Include lists of replacement and repair parts, with parts identified and cross-referenced to manufacturers' maintenance documentation and local sources of maintenance materials and related services.
- H. Maintenance Service Contracts: Include copies of maintenance agreements with name and telephone number of service agent.
- I. Warranties and Bonds: Include copies of warranties and bonds and lists of circumstances and conditions that would affect validity of warranties or bonds.
- 1. Include procedures to follow and required notifications for warranty claims.
- J. Drawings: Prepare drawings supplementing manufacturers' printed data to illustrate the relationship of component parts of equipment and systems and to illustrate control sequence and flow diagrams. Coordinate these drawings with information contained in record Drawings to ensure correct illustration of completed installation.
- 1. Do not use original project record documents as part of maintenance manuals.

#### 1.10 PRODUCT MAINTENANCE MANUALS

- A. Product Maintenance Manual: Assemble a complete set of maintenance data indicating care and maintenance of each product, material, and finish incorporated into the Work.

- B. Content: Organize manual into a separate section for each product, material, and finish. Include source information, product information, maintenance procedures, repair materials and sources, and warranties and bonds, as described below.
- C. Source Information: List each product included in manual, identified by product name and arranged to match manual's table of contents. For each product, list name, address, and telephone number of Installer or supplier and maintenance service agent, and cross-reference Specification Section number and title in Project Manual and drawing or schedule designation or identifier where applicable.
- D. Product Information: Include the following, as applicable:
  - 1. Product name and model number.
  - 2. Manufacturer's name.
  - 3. Color, pattern, and texture.
  - 4. Material and chemical composition.
  - 5. Reordering information for specially manufactured products.
- E. Maintenance Procedures: Include manufacturer's written recommendations and the following:
  - 1. Inspection procedures.
  - 2. Types of cleaning agents to be used and methods of cleaning.
  - 3. List of cleaning agents and methods of cleaning detrimental to product.
  - 4. Schedule for routine cleaning and maintenance.
  - 5. Repair instructions.
- F. Repair Materials and Sources: Include lists of materials and local sources of materials and related services.
- G. Warranties and Bonds: Include copies of warranties and bonds and lists of circumstances and conditions that would affect validity of warranties or bonds.
  - 1. Include procedures to follow and required notifications for warranty claims.

**PART 2 – PRODUCTS (Not Used)**

**PART 3 – EXECUTION (Not Used)**

**END OF SECTION 017823**

## SECTION 017839 – PROJECT RECORD DOCUMENTS

### PART 1 – GENERAL

#### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

#### 1.2 SUMMARY

- A. Section includes administrative and procedural requirements for Project Record Documents, including the following:
  - 1. Record Drawings.
  - 2. Record specifications.
  - 3. Record Product Data.
  - 4. Miscellaneous record submittals.
- B. Related Requirements:
  - 1. Section 017300 "Execution" for final property survey.
  - 2. Section 017700 "Closeout Procedures" for general closeout procedures.
  - 3. Section 017823 "Operation and Maintenance Data" for operation and maintenance manual requirements.

#### 1.3 CLOSEOUT SUBMITTALS

- A. Record Drawings: Comply with the following:
  - 1. Number of Copies: Submit one set(s) of marked-up record prints.
  - 2. Number of Copies: Submit copies of Record Drawings as follows:
    - a. Initial Submittal:
      - I. Submit PDF electronic files of scanned record prints and one set(s) of file prints.
      - II. Engineer will indicate whether general scope of changes, additional information recorded, and quality of drafting are acceptable.
    - b. Final Submittal:
      - I. Submit PDF electronic files of scanned Record Prints and three set(s) of file prints.
    - c. Final Submittal:
      - I. Submit Record Digital Data Files and three set(s) of Record Digital Data File plots.
      - II. Plot each drawing file, whether or not changes and additional information were recorded.

- B. Record Specifications: Submit annotated PDF electronic files of Project's Specifications, including addenda and Contract modifications.
- C. Record Product Data: Submit annotated PDF electronic files and directories of each submittal.
  - 1. Where record Product Data are required as part of operation and maintenance manuals, submit duplicate marked-up Product Data as a component of manual.
- D. Miscellaneous Record Submittals: See other Specification Sections for miscellaneous record-keeping requirements and submittals in connection with various construction activities. Submit annotated PDF electronic files and directories of each submittal.
- E. Reports: Submit written report weekly indicating items incorporated into Project Record Documents concurrent with progress of the Work, including revisions, concealed conditions, field changes, product selections, and other notations incorporated.

#### 1.4 RECORD DRAWINGS

- A. Record Prints: Maintain one set of marked-up paper copies of the Contract Drawings and Shop Drawings, incorporating new and revised drawings as modifications are issued.
  - 1. Preparation: Mark record prints to show the actual installation, where installation varies from that shown originally. Require individual or entity who obtained record data, whether individual or entity is Installer, subcontractor, or similar entity, to provide information for preparation of corresponding marked-up record prints.
    - a. Give particular attention to information on concealed elements that would be difficult to identify or measure and record later.
    - b. Accurately record information in an acceptable drawing technique.
    - c. Record data as soon as possible after obtaining it.
    - d. Record and check the markup before enclosing concealed installations.
    - e. Cross-reference record prints to corresponding photographic documentation.
  - 2. Content: Types of items requiring marking include, but are not limited to, the following:
    - a. Dimensional changes to Drawings.
    - b. Revisions to details shown on Drawings.
    - c. Depths of foundations.
    - d. Locations and depths of underground utilities.
    - e. Revisions to routing of piping and conduits.
    - f. Revisions to electrical circuitry.
    - g. Actual equipment locations.
    - h. Duct size and routing.
    - i. Locations of concealed internal utilities.
    - j. Changes made by Change Order or Work Change Directive.
    - k. Changes made following Engineer's written orders.
    - l. Details not on the original Contract Drawings.
    - m. Field records for variable and concealed conditions.
    - n. Record information on the Work that is shown only schematically.
  - 3. Mark the Contract Drawings and Shop Drawings completely and accurately. Use personnel proficient at recording graphic information in production of marked-up record prints.

4. Mark record prints with erasable, red-colored pencil. Use other colors to distinguish between changes for different categories of the Work at same location.
  5. Mark important additional information that was either shown schematically or omitted from original Drawings.
  6. Note Construction Change Directive numbers, alternate numbers, Change Order numbers, and similar identification, where applicable.
- B. Record Digital Data Files: Immediately before inspection for Certificate of Substantial Completion, review marked-up record prints with Engineer. When authorized, prepare a full set of corrected digital data files of the Contract Drawings, as follows:
1. Format: Annotated PDF electronic file with comment function enabled.
  2. Incorporate changes and additional information previously marked on record prints. Delete, redraw, and add details and notations where applicable.
  3. Refer instances of uncertainty to Engineer for resolution.
  4. Engineer will furnish Contractor with one set of digital data files of the Contract Drawings for use in recording information.
    - a. See Section 013100 "Project Management and Coordination" for requirements related to use of Engineer's digital data files.
    - b. Engineer will provide data file layer information. Record markups in separate layers.
- C. Format: Identify and date each Record Drawing; include the designation "PROJECT RECORD DRAWING" in a prominent location.
1. Record Prints: Organize record prints into manageable sets. Bind each set with durable paper cover sheets. Include identification on cover sheets.
  2. Format: Annotated PDF electronic file with comment function enabled.
  3. Record Digital Data Files: Organize digital data information into separate electronic files that correspond to each sheet of the Contract Drawings. Name each file with the sheet identification. Include identification in each digital data file.
  4. Identification: As follows:
    - a. Project name.
    - b. Date.
    - c. Designation "PROJECT RECORD DRAWINGS."
    - d. Name of Engineer.
    - e. Name of Contractor.

## 1.5 RECORD SPECIFICATIONS

- A. Preparation: Mark Specifications to indicate the actual product installation, where installation varies from that indicated in Specifications, addenda, and Contract modifications.
1. Give particular attention to information on concealed products and installations that cannot be readily identified and recorded later.
  2. Mark copy with the proprietary name and model number of products, materials, and equipment furnished, including substitutions and product options selected.
  3. Record the name of manufacturer, supplier, installer, and other information necessary to provide a record of selections made.

4. For each principal product, indicate whether Record Product Data has been submitted in operation and maintenance manuals instead of submitted as Record Product Data.
  5. Note related Change Orders, Record Product Data, and Record Drawings where applicable.
- B. Format: Submit record specifications as annotated PDF electronic file.

## 1.6 RECORD PRODUCT DATA

- A. Recording: Maintain one copy of each submittal during the construction period for Project Record Document purposes. Post changes and revisions to Project Record Documents as they occur; do not wait until end of Project.
- B. Preparation: Mark Product Data to indicate the actual product installation where installation varies substantially from that indicated in Product Data submittal.
1. Give particular attention to information on concealed products and installations that cannot be readily identified and recorded later.
  2. Include significant changes in the product delivered to Project site and changes in manufacturer's written instructions for installation.
  3. Note related Change Orders, Record Specifications, and Record Drawings where applicable.
- C. Format: Submit Record Product Data as annotated PDF electronic file.
1. Include Record Product Data directory organized by Specification Section number and title, electronically linked to each item of Record Product Data.

## 1.7 MISCELLANEOUS RECORD SUBMITTALS

- A. Assemble miscellaneous records required by other Specification Sections for miscellaneous record keeping and submittal in connection with actual performance of the Work. Bind or file miscellaneous records and identify each, ready for continued use and reference.
- B. Format: Submit miscellaneous record submittals as **PDF electronic file**.
1. Include miscellaneous record submittals directory organized by Specification Section number and title, electronically linked to each item of miscellaneous record submittals.

## 1.8 MAINTENANCE OF RECORD DOCUMENTS

- A. Maintenance of Record Documents: Store Record Documents in the field office apart from the Contract Documents used for construction. Do not use Project Record Documents for construction purposes. Maintain Record Documents in good order and in a clean, dry, legible condition, protected from deterioration and loss. Provide access to Project Record Documents for Engineer's reference during normal working hours.

**PART 2 – PRODUCTS (Not Used)**

**PART 3 – EXECUTION (Not Used)**

**END OF SECTION 017839**

## **SECTION 032000 CONCRETE REINFORCEMENT**

### **PART 1 – GENERAL**

#### **1.1 SECTION INCLUDES**

- A. Reinforcing steel bars, wire fabric and accessories for cast-in-place concrete.

#### **1.2 RELATED SECTIONS**

- A. Section 03300 – Cast-in-Place Concrete.

#### **1.3 REFERENCES**

- A. ACI 301 – Structural Concrete for Buildings.
- B. ACI 318 – Building Code Requirements for Reinforced Concrete.
- C. ACI SP-66 – American Concrete Institute – Detailing Manual.
- D. ANSI/ASTM A82 – Cold Drawn Steel Wire for Concrete Reinforcement.
- E. ANSI/ASTM A185 – Welded Steel Wire Fabric for Concrete Reinforcement.
- F. ANSI/ASTM A496 – Deformed Steel Wire Fabric for Concrete Reinforcement.
- G. ANSI/ASTM A497 – Welded Deformed Steel Wire Fabric for Concrete Reinforcement.
- H. ANSI/AWS D1.4 – Structural Welding Code for Reinforcing Steel.
- I. ASTM A615 – Deformed and Plain Billet Steel Bars for Concrete Reinforcement.
- J. ASTM A706 – Low-Alloy Steel Deformed Bars for Concrete Reinforcement.
- K. AWS D12.1 – Welding Reinforcement Steel, Metal Inserts and Connections in Reinforced Concrete Construction.
- L. CRSI – Concrete Reinforcing Steel Institute – Manual of Practice.
- M. CRSI – Placing Reinforcing Bars.

#### **1.4 SUBMITTALS**

- A. Shop Drawings: Indicate bar sizes, spacings, locations, and quantities of reinforcing steel, bending and cutting schedules.

#### **1.5 QUALITY ASSURANCE**

- A. Perform Work in accordance with CRSI 63, 65 and Manual of Practice, ACI 301, and ACI 318.

## **PART 2 – PRODUCTS**

### **2.1 REINFORCEMENT**

- A. Reinforcing Steel: ASTM A615, 60 ksi yield grade; deformed billet steel bars, unfinished.

### **2.2 ACCESSORY MATERIALS**

- A. Tie Wire: Minimum 16 gage annealed type.
- B. Bolsters, Bar Supports, Horizontal Spacers: Sized and shaped for strength and support of reinforcement during concrete placement conditions including load bearing pad on bottom to prevent vapor barrier puncture.
- C. Special Chairs, Bolsters, Bar Supports, Horizontal Spacers Adjacent to Weather Exposed Concrete Surfaces: Plastic coated steel type; size and shape as required.

### **2.3 FABRICATION**

- A. Fabricate concrete reinforcing in accordance with CRSI Manual of Practice, ACI 318.
- B. Weld reinforcement in accordance with ANSI/AWS D1.4.
- C. Locate reinforcing splices not indicated on drawings, at point of minimum stress. Review location of splices with Architect/Engineer.

## **PART 3 – EXECUTION**

### **3.1 PLACEMENT**

- A. Place, support and secure reinforcement against displacement. Do not deviate from required position.
- B. Conform to applicable code for concrete cover over reinforcement.

**END OF SECTION**

## **SECTION 033000 CAST-IN-PLACE CONCRETE**

### **PART 1 – GENERAL**

#### **1.1 SECTION INCLUDES**

- A. Cast-in-place concrete foundation.

#### **1.2 RELATED SECTIONS**

- A. Section 03300 – Cast-in-Place Concrete.

#### **1.3 REFERENCES**

- A. ACI 301 – Structural Concrete for Buildings.
- B. ACI 302 – Guide for Concrete Floor and Slab Construction.
- C. ACI 304 – Recommended Practice for Measuring, Mixing, Transporting and Placing Concrete.
- D. ACI 305R – Hot Weather Concreting.
- E. ACI 306R – Cold Weather Concreting.
- F. ACI 308 – Standard Practice for Curing Concrete.
- G. ACI 318 – Building Code Requirements for Reinforced Concrete.
- H. ASTM C33 – Concrete Aggregates.
- I. ASTM C94 – Ready-Mixed Concrete.
- J. ASTM C150 – Portland Cement.
- K. ASTM C494 – Chemicals Admixtures for Concrete.
- L. ASTM C618 – Fly Ash and Raw or Calcinated Natural Pozzolan for Use as a Mineral Admixture in Portland Cement Concrete.

#### **1.4 SUBMITTALS**

- A. Product Data: Provide data on joint devices, attachment accessories and admixtures.
- B. Manufacturer’s Installation Instructions: Indicate installation procedures and interface required with adjacent Work.

#### **1.5 QUALITY ASSURANCE**

- A. Perform Work in accordance with ACI 301.
- B. Acquire cement and aggregate from same source for all work.

- C. Conform to ACI 305R when concreting during hot weather.
- D. Conform to ACI 306R when concreting during cold weather.

## **PART 2 – PRODUCTS**

### **2.1 CONCRETE MATERIALS**

- A. Cement: ASTM C150, Type I – Normal.
- B. Fine and Coarse Aggregates: ASTM C33.
- C. Water: Clean and not detrimental to concrete.

### **2.2 ADMIXTURES**

- A. Chemical: ASTM C494 Type A – Water Reducing, Type B – Retarding, Type C – Accelerating, Type D – Water Reducing and Retarding, Type E – Water Reducing and Accelerating, Type F – Water Reducing, High Range, Type G - Water Reducing, High Range and Retarding.
- B. Fly Ash Calcinated Pozzolan: ASTM C618 Class C or F.

### **2.3 CONCRETE MIX**

- A. Select proportions for normal weight concrete in accordance with ACI 301 Method 1.
- B. Use accelerating admixtures in cold weather only when approved by Engineer. Use of admixtures will not relax cold weather placement requirements.
- C. Use calcium chloride only when approved by Engineer.
- D. Use set retarding admixtures during hot weather only when approved by Engineer

## **PART 3 – EXECUTION**

### **3.1 EXAMINATION**

- A. Verify requirements for concrete cover over reinforcement.
- B. Verify that anchors, seats, plates, reinforcement and other items to be cast into concrete are accurately placed, positioned securely, and will not cause hardship in placing concrete.

### **3.2 PLACING CONCRETE**

- A. Place concrete in accordance with ACI 304, ACI 301 and ACI 318.

- B. Ensure reinforcement, inserts, embedded parts, formed expansion and contraction joints are not disturbed during concrete placement.
- C. Maintain records of concrete placement. Record date, location, quantity, air temperature, and test samples taken.

### **3.3 CURING AND PROTECTION**

- A. Immediately after placement, protect concrete from premature drying, excessively hot or cold temperatures, and mechanical injury.
- B. Maintain concrete with minimal moisture loss at relatively constant temperature for period necessary for hydration of cement and hardening of concrete.

### **3.4 FIELD QUALITY CONTROL**

- A. Provide free access to Work and cooperate with Testing Laboratory.
- B. Submit proposed mix design to Engineer for review prior to commencement of Work.
- C. Tests of cement and aggregates may be performed to ensure conformance with specified requirements.
- D. Four concrete test cylinders will be taken for every 50 cu yds of concrete placed.
- E. One additional test cylinder will be taken during cold weather concreting, cured on job site under same conditions as concrete it represents.
- F. One slump test will be taken for each set of test cylinders taken.

### **3.5 DEFECTIVE CONCRETE**

- A. Defective Concrete: Concrete not conforming to required lines, details, dimensions, tolerances or specified requirements.
- B. Repair or replacement of defective concrete will be determined by the Architect/Engineer.
- C. Do not patch, fill, touch-up, repair, or replace exposed concrete except upon express direction of Architect/Engineer for each individual area

**END OF SECTION**

## **SECTION 260500 - COMMON WORK RESULTS FOR ELECTRICAL**

### **PART 1 - GENERAL**

#### **1.1 RELATED DOCUMENTS**

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

#### **1.2 SUMMARY**

- A. Section Includes:
  1. Electrical equipment coordination and installation.
  2. Sleeves for raceways and cables.
  3. Sleeve seals.
  4. Grout.
  5. Common electrical installation requirements.

#### **1.3 DEFINITIONS**

- A. EPDM: Ethylene-propylene-diene terpolymer rubber.

#### **1.4 SUBMITTALS**

- A. Product Data: For sleeve seals.

#### **1.5 COORDINATION**

- A. Coordinate arrangement, mounting, and support of electrical equipment:
  1. To allow maximum possible headroom unless specific mounting heights that reduce headroom are indicated.
  2. To provide for ease of disconnecting the equipment with minimum interference to other installations.
  3. To allow right of way for piping and conduit installed at required slope.
  4. So connecting raceways, cables, wireways, cable trays, and busways will be clear of obstructions and of the working and access space of other equipment.
- B. Coordinate installation of required supporting devices and set sleeves in cast-in-place concrete, masonry walls, and other structural components as they are constructed.
- C. Coordinate location of access panels and doors for electrical items that are behind finished surfaces or otherwise concealed.

- D. Coordinate sleeve selection and application with selection and application of firestopping.

## **PART 2 - PRODUCTS**

### 2.1 SLEEVES FOR RACEWAYS AND CABLES

- A. Steel Pipe Sleeves: ASTM A 53/A 53M, Type E, Grade B, Schedule 40, galvanized steel, plain ends.
- B. Cast-Iron Pipe Sleeves: Cast or fabricated "wall pipe," equivalent to ductile-iron pressure pipe, with plain ends and integral waterstop, unless otherwise indicated.
- C. Sleeves for Rectangular Openings: Galvanized sheet steel.
  - 1. Minimum Metal Thickness:
    - a. For sleeve cross-section rectangle perimeter less than 50 inches (1270 mm) and no side more than 16 inches (400 mm), thickness shall be 0.052 inch (1.3 mm).
    - b. For sleeve cross-section rectangle perimeter equal to, or more than, 50 inches (1270 mm) and 1 or more sides equal to, or more than, 16 inches (400 mm), thickness shall be 0.138 inch (3.5 mm).

### 2.2 SLEEVE SEALS

- A. Description: Modular sealing device, designed for field assembly, to fill annular space between sleeve and raceway or cable.
  - 1. Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
    - a. Advance Products & Systems, Inc.
    - b. Calpico, Inc.
    - c. Metraflex Co.
  - 2. Sealing Elements: EPDM interlocking links shaped to fit surface of cable or conduit. Include type and number required for material and size of raceway or cable.
  - 3. Pressure Plates: Stainless steel. Include two for each sealing element.
  - 4. Connecting Bolts and Nuts: Stainless steel of length required to secure pressure plates to sealing elements. Include one for each sealing element.

### 2.3 GROUT

- A. Nonmetallic, Shrinkage-Resistant Grout: ASTM C 1107, factory-packaged, nonmetallic aggregate grout, noncorrosive, nonstaining, mixed with water to consistency suitable for application and a 30-minute working time.

## PART 3 - EXECUTION

### 3.1 COMMON REQUIREMENTS FOR ELECTRICAL INSTALLATION

- A. Comply with NECA 1.
- B. Measure indicated mounting heights to bottom of unit for suspended items and to center of unit for wall-mounting items.
- C. Headroom Maintenance: If mounting heights or other location criteria are not indicated, arrange and install components and equipment to provide maximum possible headroom consistent with these requirements.
- D. Equipment: Install to facilitate service, maintenance, and repair or replacement of components of both electrical equipment and other nearby installations. Connect in such a way as to facilitate future disconnecting with minimum interference with other items in the vicinity.
- E. Right of Way: Give to piping systems installed at a required slope.

### 3.2 SLEEVE INSTALLATION FOR ELECTRICAL PENETRATIONS

- A. Electrical penetrations occur when raceways, cables, wireways, cable trays, or busways penetrate concrete slabs, concrete or masonry walls, or fire-rated floor and wall assemblies.
- B. Concrete Slabs and Walls: Install sleeves for penetrations unless core-drilled holes or formed openings are used. Install sleeves during erection of slabs and walls.
- C. Use pipe sleeves unless penetration arrangement requires rectangular sleeved opening.
- D. Fire-Rated Assemblies: Install sleeves for penetrations of fire-rated floor and wall assemblies unless openings compatible with firestop system used are fabricated during construction of floor or wall.
- E. Cut sleeves to length for mounting flush with both surfaces of walls.
- F. Extend sleeves installed in floors 2 inches (50 mm) above finished floor level.
- G. Size pipe sleeves to provide 1/4-inch (6.4-mm) annular clear space between sleeve and raceway or cable, unless indicated otherwise.
- H. Seal space outside of sleeves with grout for penetrations of concrete and masonry
  - 1. Promptly pack grout solidly between sleeve and wall so no voids remain. Tool exposed surfaces smooth; protect grout while curing.
- I. Interior Penetrations of Non-Fire-Rated Walls and Floors: Seal annular space between sleeve and raceway or cable, using joint sealant appropriate for size, depth, and location of joint.

- J. Fire-Rated-Assembly Penetrations: Maintain indicated fire rating of walls, partitions, ceilings, and floors at raceway and cable penetrations. Install sleeves and seal raceway and cable penetration sleeves with firestop materials.
- K. Aboveground, Exterior-Wall Penetrations: Seal penetrations using steel pipe sleeves and mechanical sleeve seals. Select sleeve size to allow for 1-inch (25-mm) annular clear space between pipe and sleeve for installing mechanical sleeve seals.
- L. Underground, Exterior-Wall Penetrations: Install cast-iron pipe sleeves. Size sleeves to allow for 1-inch (25-mm) annular clear space between raceway or cable and sleeve for installing mechanical sleeve seals.

### 3.3 SLEEVE-SEAL INSTALLATION

- A. Install to seal exterior wall penetrations.
- B. Use type and number of sealing elements recommended by manufacturer for raceway or cable material and size. Position raceway or cable in center of sleeve. Assemble mechanical sleeve seals and install in annular space between raceway or cable and sleeve. Tighten bolts against pressure plates that cause sealing elements to expand and make watertight seal.

### 3.4 FIRESTOPPING

- A. Apply firestopping to penetrations of fire-rated floor and wall assemblies for electrical installations to restore original fire-resistance rating of assembly.

### 3.5 SITE ENVIRONMENTAL PROCEDURES:

- A. Indoor Air Quality: Temporary ventilation: Provide temporary ventilation during work and immediately after installation.
- B. Energy Efficiency: Verify equipment is properly installed, connected, and adjusted. Verify that equipment is operating as specified.
  - 1. Occupancy/Daylight Sensors: Test sensors for proper operation. Observe for light control over entire area being covered.

### 3.6 FINAL PERFORMANCE TEST

- A. **The new generator system and equipment are to be tested according to the manufacturer's requirements for startup and verification.**
- B. **The new generator system and equipment are to be tested in accordance with National Fire Protection Association (NFPA) 110 to verify compliance with all minimum acceptance testing and performance requirements.**

- C. **The Contractor shall give the Owner and Engineer seven (7) days' notice prior to performing startup and testing to allow for attendance.**

**END OF SECTION 26 05 00**

## **SECTION 260519 - LOW-VOLTAGE POWER CONDUCTORS AND CABLES**

### **PART 1 - GENERAL**

#### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

#### 1.2 SUMMARY

- A. Section Includes:
  1. Copper building wire rated 600V or less.
  2. Metal-clad cable, Type MC, rated 600V or less.
  3. Fire-alarm wire and cable.
  4. Connectors, splices, and terminations rated 600V and less.

#### 1.3 DEFINITIONS

- A. RoHS: Restriction of Hazardous Substances.

#### 1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Product Schedule: Indicate type, use, location, and termination locations.

#### 1.5 INFORMATIONAL SUBMITTALS

- A. Field quality-control reports.

### **PART 2 - PRODUCTS**

#### 2.1 COPPER BUILDING WIRE

- A. Description: Flexible, insulated and uninsulated, drawn copper current-carrying conductor with overall insulation layer or jacket, or both, rated 600 V or less.

- B. Standards:
  - 1. Listed and labeled as defined in NFPA 70, by qualified testing agency, and marked for intended location and use.
  - 2. RoHS compliant.
  - 3. Conductor and Cable Marking: Comply with wire and cable marking per UL's "Wire and Cable Marking and Application Guide."
- C. Conductors: Copper, complying with ASTM B3 for bare annealed copper and with ASTM B8 for stranded conductors.
- D. Conductor Insulation: Type THHN and Type THWN-2: Comply with UL 83.

## 2.2 METAL-CLAD CABLE, TYPE MC

- A. Description: Factory assembly of one or more current-carrying insulated conductors in overall metallic sheath.
- B. Standards:
  - 1. Listed and labeled as defined in NFPA 70, by qualified testing agency, and marked for intended location and use.
  - 2. Comply with UL 1569.
  - 3. RoHS compliant.
  - 4. Conductor and Cable Marking: Comply with wire and cable marking per UL's "Wire and Cable Marking and Application Guide."
- C. Circuits: Single circuit.
- D. Conductors: Copper, complying with ASTM B3 for bare annealed copper and with ASTM B8 for stranded conductors.
- E. Ground Conductor: Bare.
- F. Conductor Insulation: Type TFN/THHN/THWN-2: Comply with UL 83.
- G. Armor: Steel, interlocked.
- H. Jacket: PVC applied over armor.

## 2.3 FIRE-ALARM WIRE AND CABLE

- A. General Wire and Cable Requirements: NRTL listed and labeled as complying with NFPA 70, Article 760.
- B. Signaling Line Circuits: Twisted, shielded pair, not less than 16 AWG.
- C. Non-Power-Limited Circuits: Solid-copper conductors with 600-V rated, 75 deg C, color-coded insulation, and complying with requirements in UL 2196 for 2-hour rating.

1. Low-Voltage Circuits: 16 AWG, minimum, in pathway.
2. Line-Voltage Circuits: 12 AWG, minimum, in pathway.

## 2.4 CONNECTORS AND SPLICES

- A. Description: Factory-fabricated connectors, splices, and lugs of size, ampacity rating, material, type, and class for application and service indicated; listed and labeled as defined in NFPA 70, by qualified testing agency, and marked for intended location and use.
- B. Connectors and splices shall be manufactured by Hubbell, Service Wire Company, Burndy, or approved equal.
- C. Jacketed Cable Connectors: For steel jacketed cables, zinc die-cast with set screws, designed to connect conductors specified in this Section.
- D. Lugs: One piece, seamless, designed to terminate conductors specified in this Section.
  1. Material: Copper.
  2. Type: Two-hole with standard barrels.
  3. Termination: Compression.

## PART 3 - EXECUTION

### 3.1 CONDUCTOR MATERIAL APPLICATIONS

- A. Feeders: Copper; solid for 10 AWG and smaller; stranded for 8 AWG and larger.
- B. Branch Circuits: Copper. Solid for 10 AWG and smaller; stranded for 8 AWG and larger.
- C. Power-Limited Fire Alarm and Control: Solid for 12 AWG and smaller.

### 3.2 CONDUCTOR INSULATION AND MULTICONDUCTOR CABLE APPLICATIONS AND WIRING METHODS

- A. Service Entrance: Type THHN/THWN-2, single conductors in raceway.
- B. Exposed Feeders: Type THHN/THWN-2, single conductors in raceway.
- C. Feeders Concealed in Ceilings, Walls, Partitions, and Crawlspace: Type THHN/THWN-2, single conductors in raceway.
- D. Feeders Concealed in Concrete, below Slabs-on-Grade, and Underground: Type THHN/THWN-2, single conductors in raceway.

- E. Exposed Branch Circuits, Including in Crawlspace: Type THHN/THWN-2, single conductors in raceway.
- F. Branch Circuits Concealed in Ceilings, Walls, and Partitions: Type THHN/THWN-2, single conductors in raceway or Metal-clad cable, Type MC.
- G. Branch Circuits Concealed in Concrete, below Slabs-on-Grade, and Underground: Type THHN/THWN-2, single conductors in raceway.

### 3.3 INSTALLATION OF CONDUCTORS AND CABLES

- A. Conceal cables in finished walls, ceilings, and floors unless otherwise indicated.
- B. Complete raceway installation between conductor and cable termination points per Section 260533 "Raceways and Boxes" before pulling conductors and cables.
- C. Use manufacturer-approved pulling compound or lubricant where necessary; compound used must not deteriorate conductor or insulation. Do not exceed manufacturer's recommended maximum pulling tensions and sidewall pressure values.
- D. Use pulling means, including fish tape, cable, rope, and basket-weave wire/cable grips, that will not damage cables or raceway.
- E. Install exposed cables parallel and perpendicular to surfaces of exposed structural members and follow surface contours where possible.
- F. Support cables per Section 260529 "Hangers and Supports."

### 3.4 INSTALLATION OF FIRE-ALARM WIRING

- A. Comply with NECA 1 and NFPA 72.
- B. Wiring Method:
  - 1. Cables and pathways used for fire-alarm circuits, and equipment control wiring associated with fire-alarm system, may not contain any other wire or cable.
  - 2. Signaling Line Circuits: Power-limited fire-alarm cables shall not be installed in same cable or pathway as signaling line circuits.
- C. Wiring within Enclosures: Separate power-limited and non-power-limited conductors as recommended by manufacturer. Install conductors parallel with or at right angles to sides and back of enclosure. Bundle, lace, and train conductors to terminal points with no excess. Connect conductors that are terminated, spliced, or interrupted in any enclosure associated with fire-alarm system to terminal blocks. Mark each terminal per system's wiring diagrams. Make connections with approved crimp-on terminal spade lugs, pressure-type terminal blocks, or plug connectors.

- D. Cable Taps: Use numbered terminal strips in junction, pull, and outlet boxes; cabinets; or equipment enclosures where circuit connections are made.
- E. Color-Coding: Color-code fire-alarm conductors differently from normal building power wiring. Use one color-code for alarm circuit wiring and another for supervisory circuits. Color-code audible alarm-indicating circuits differently from alarm-initiating circuits. Use different colors for visible alarm-indicating devices. Paint fire-alarm system junction boxes and covers red.

### 3.5 CONNECTIONS

- A. Tighten electrical connectors and terminals per manufacturer's published torque-tightening values. If manufacturer's torque values are not indicated, use those specified in UL 486A-486B.
- B. Make splices, terminations, and taps that are compatible with conductor material and that possess equivalent or better mechanical strength and insulation ratings than un-spliced conductors.
- C. Wiring at Outlets: Install conductor at each outlet, with at least 6 inches of slack.

### 3.6 IDENTIFICATION

- A. Identify and color-code conductors and cables per Section 260553 "Identification."
- B. Identify each spare conductor at each end with identity number and location of other end of conductor and identify as spare conductor.

### 3.7 SLEEVE AND SLEEVE-SEAL INSTALLATION FOR ELECTRICAL PENETRATIONS

- A. Install sleeves and sleeve seals at penetrations of exterior floor and wall assemblies. Comply with requirements in Section 260544 "Sleeves and Sleeve Seals for Raceways and Cabling."

### 3.8 FIRESTOPPING

- A. Apply firestopping to electrical penetrations of fire-rated floor and wall assemblies to restore original fire-resistance rating of assembly per Section 078413 "Penetration Firestopping."

### 3.9 FIELD QUALITY CONTROL

- A. Perform tests and inspections.
  - 1. After installing conductors and cables and before electrical circuitry has been energized, test service entrance and feeder conductors for compliance with requirements.
  - 2. Perform each of following visual and electrical tests:

- a. Inspect exposed sections of conductor and cable for physical damage and correct connection per single-line diagram.
  - b. Test bolted connections for high resistance using one of following:
    - 1) Low-resistance ohmmeter.
    - 2) Calibrated torque wrench.
    - 3) Thermographic survey.
  - c. Inspect compression-applied connectors for correct cable match and indentation.
  - d. Inspect for correct identification.
  - e. Inspect cable jacket and condition.
  - f. Insulation-resistance test on each conductor for ground and adjacent conductors. Apply potential of 500V dc for 300V rated cable and 1000V dc for 600V rated cable for one-minute duration.
  - g. Continuity test on each conductor and cable.
  - h. Uniform resistance of parallel conductors.
3. Initial Infrared Scanning: After Substantial Completion, but before Final Acceptance, perform infrared scan of each splice in conductors 3 AWG and larger. Remove box and equipment covers so splices are accessible to portable scanner. Correct deficiencies determined during scan.
    - a. Instrument: Use infrared scanning device designed to measure temperature or to detect significant deviations from normal values. Provide calibration record for device.
    - b. Record of Infrared Scanning: Prepare certified report that identifies switches checked and that describes scanning results. Include notation of deficiencies detected, remedial action taken, and observations after remedial action.
  4. Follow-up Infrared Scanning: Perform additional follow-up infrared scan of each switch 11 months after date of Substantial Completion.
- B. Cables will be considered defective if they do not pass tests and inspections.
- C. Prepare test and inspection reports to record following:
1. Procedures used.
  2. Results that comply with requirements.
  3. Results that do not comply with requirements, and corrective action taken to achieve compliance with requirements.

**END OF SECTION 260519**

## SECTION 260526 - GROUNDING AND BONDING

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

#### 1.2 SUMMARY

- A. Section includes grounding and bonding systems and equipment, plus underground distribution grounding.

#### 1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated.

#### 1.4 INFORMATIONAL SUBMITTALS

- A. Coordination Drawings: Plans showing dimensioned locations of grounding features specified in "Field Quality Control" Article, including following:
  - 1. Ground rods.
  - 2. Grounding arrangements and connections for separately derived systems.
- B. Field quality-control reports.

#### 1.5 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data: For grounding to include in emergency, operation, and maintenance manuals.
  - 1. In addition to items specified in Section 017823 "Operation and Maintenance Data," include following:
    - a. Plans showing as-built, dimensioned locations of system described in "Field Quality Control" Article, including following:
      - 1) Ground rods.
      - 2) Grounding arrangements and connections for separately derived systems.

## PART 2 - PRODUCTS

### 2.1 SYSTEM DESCRIPTION

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by qualified testing agency, and marked for intended location and application.
- B. Comply with UL 467 for grounding and bonding materials and equipment.

### 2.2 CONDUCTORS

- A. Insulated Conductors: Copper wire or cable insulated for 600V unless otherwise required by applicable Code or authorities having jurisdiction.
- B. Bare Copper Conductors:
  - 1. Solid Conductors: ASTM B3.
  - 2. Stranded Conductors: ASTM B8.
  - 3. Tinned Conductors: ASTM B33.
  - 4. Bonding Cable: 28 kcmil, 14 strands of 17 AWG conductor, 1/4 inch in diameter.
  - 5. Bonding Conductor: 4 AWG or 6 AWG, stranded conductor.
  - 6. Bonding Jumper: Copper tape, braided conductors terminated with copper ferrules; 1-5/8 inches wide and 1/16 inch thick.
  - 7. Tinned Bonding Jumper: Tinned-copper tape, braided conductors terminated with copper ferrules; 1-5/8 inches wide and 1/16 inch thick.

### 2.3 CONNECTORS

- A. Listed and labeled by NRTL acceptable to authorities having jurisdiction for applications in which used and for specific types, sizes, and combinations of conductors and other items connected.
- B. Welded Connectors: Exothermic-welding kits of types recommended by kit manufacturer for materials being joined and installation conditions.
- C. Bus-Bar Connectors: Mechanical type, cast silicon bronze, solderless compression-type wire terminals, and long-barrel, 2-bolt connection to ground bus bar.
- D. Beam Clamps: Mechanical type, terminal, ground wire access from 4 directions, with dual, tin-plated or silicon bronze bolts.
- E. Cable-to-Cable Connectors: Compression type, copper or copper alloy.
- F. Conduit Hubs: Mechanical type, terminal with threaded hub.
- G. Ground Rod Clamps: Mechanical type, copper or copper alloy, terminal with hex head bolt.

- H. Ground Rod Clamps: Mechanical type, copper or copper alloy, terminal with hex head bolt.
- I. Lay-in Lug Connector: Mechanical type, copper rated for direct burial terminal with set screw.
- J. Service Post Connectors: Mechanical type, bronze alloy terminal, in short- and long-stud lengths, capable of single and double conductor connections.
- K. Signal Reference Grid Clamp: Mechanical type, stamped-steel terminal with hex head screw.
- L. Straps: Solid copper, cast-bronze clamp. Rated for 600A.
- M. U-Bolt Clamps: Mechanical type, copper or copper alloy, terminal listed for direct burial.
- N. Water Pipe Clamps:
  - 1. Mechanical type, 2 pieces with zinc-plated bolts.
    - a. Material: Die-cast zinc alloy.
    - b. Listed for direct burial.
  - 2. U-bolt type with malleable-iron clamp and copper ground connector rated for direct burial.

## 2.4 GROUNDING ELECTRODES

- A. Ground Rods: Copper-clad steel; 3/4 inch by 10 feet.

## PART 3 - EXECUTION

### 3.1 APPLICATIONS

- A. Conductors: Install solid conductor for 8 AWG and smaller, and stranded conductors for 6 AWG and larger unless otherwise indicated.
- B. Grounding Conductors: Green-colored insulation.
- C. Conductor Terminations and Connections:
  - 1. Pipe and Equipment Grounding Conductor Terminations: Bolted connectors.
  - 2. Underground Connections: Welded connectors except as otherwise indicated.
  - 3. Connections to Ground Rods at Test Wells: Bolted connectors.
  - 4. Connections to Structural Steel: Welded connectors.

### 3.2 GROUNDING AT SERVICE

- A. Equipment grounding conductors and grounding electrode conductors shall be connected to ground bus. Install main bonding jumper between neutral and ground buses.

### 3.3 GROUNDING SEPARATELY DERIVED SYSTEMS

- A. Generator: Install grounding electrode(s) at generator location. Electrode shall be connected to equipment grounding conductor and to frame of generator.

### 3.4 GROUNDING UNDERGROUND DISTRIBUTION SYSTEM COMPONENTS

- A. Comply with IEEE C2 grounding requirements.
- B. Grounding Handholes: Install driven ground rod through handhole floor, close to wall, and set rod depth so 4 inches will extend above finished floor. Protect ground rods passing through concrete floor with double wrapping of pressure-sensitive insulating tape or heat-shrunk insulating sleeve from 2 inches above to 6 inches below concrete. Seal floor opening with waterproof, non-shrink grout.

### 3.5 EQUIPMENT GROUNDING

- A. Install insulated equipment grounding conductors with feeders and branch circuits.

### 3.6 INSTALLATION

- A. Grounding Conductors: Route along shortest and straightest paths possible unless otherwise indicated or required by Code. Avoid obstructing access or placing conductors where they may be subjected to strain, impact, or damage.
- B. Ground Bonding Common with Lightning Protection System: Comply with NFPA 780 and UL 96 when interconnecting with lightning protection system. Bond electrical power system ground directly to lightning protection system grounding conductor at closest point to electrical service grounding electrode. Use bonding conductor sized same as system grounding electrode conductor and install in conduit.
- C. Ground Rods: Drive rods until tops are 2 inches below finished floor or final grade unless otherwise indicated.
  - 1. Interconnect ground rods with grounding electrode conductor below grade and as otherwise indicated. Make connections without exposing steel or damaging coating if any.
  - 2. Use exothermic welds for below-grade connections.
  - 3. For grounding electrode system, install at least 3 rods spaced at least 1-1/2-rod lengths from each other and located at least same distance from other grounding electrodes, and connect to service grounding electrode conductor.
- D. Bonding Straps and Jumpers: Install in locations accessible for inspection and maintenance except where routed through short lengths of conduit.
  - 1. Bonding to Structure: Bond straps directly to basic structure, taking care not to penetrate adjacent parts.

2. Bonding to Equipment Mounted on Vibration Isolation Hangers and Supports: Install bonding so vibration is not transmitted to rigidly mounted equipment.
  3. Use exothermic-welded connectors for outdoor locations; if disconnect-type connection is required, use bolted clamp.
- E. Grounding and Bonding for Piping:
1. Metal Water Service Pipe: Install insulated copper grounding conductors, in conduit, from building's main service equipment, or grounding bus, to main metal water service entrances to building. Connect grounding conductors to main metal water service pipes; use bolted clamp connector or bolt lug-type connector to pipe flange by using one of lug bolts of flange. Where dielectric main water fitting is installed, connect grounding conductor on street side of fitting. Bond metal grounding conductor conduit or sleeve to conductor at each end.
  2. Water Meter Piping: Use braided-type bonding jumpers to electrically bypass water meters. Connect to pipe with bolted connector.
  3. Bond each aboveground portion of gas piping system downstream from equipment shutoff valve.
- F. Grounding for Steel Building Structure: Install driven ground rod at base of each corner column and at intermediate exterior columns at distances not more than 60 feet apart.
- G. Concrete-Encased Grounding Electrode (Ufer Ground): Fabricate per NFPA 70; using electrically conductive coated steel reinforcing bars or rods, at least 20 feet long. If reinforcing is in multiple pieces, connect by usual steel tie wires or exothermic welding to create required length.
- H. Connections: Make connections so possibility of galvanic action or electrolysis is minimized. Select connectors, connection hardware, conductors, and connection methods so metals in direct contact are galvanically compatible.
1. Use electroplated or hot-tin-coated materials to ensure high conductivity and to make contact points closer in order of galvanic series.
  2. Make connections with clean, bare metal at points of contact.
  3. Make aluminum-to-steel connections with stainless-steel separators and mechanical clamps.
  4. Make aluminum-to-galvanized-steel connections with tin-plated copper jumpers and mechanical clamps.
  5. Coat and seal connections having dissimilar metals with inert material to prevent future penetration of moisture to contact surfaces.

### 3.7 FIELD QUALITY CONTROL

- A. Perform tests and inspections.
- B. Tests and Inspections:
1. After installing grounding system but before permanent electrical circuits have been energized, test for compliance with requirements.

2. Inspect physical and mechanical condition. Verify tightness of accessible, bolted, electrical connections with calibrated torque wrench per manufacturer's written instructions.
  3. Test completed grounding system at each location where maximum ground-resistance level is specified, at service disconnect enclosure grounding terminal. Make tests at ground rods before conductors are connected.
    - a. Measure ground resistance no fewer than 2 full days after last trace of precipitation and without soil being moistened by means other than natural drainage or seepage and without chemical treatment or other artificial means of reducing natural ground resistance.
    - b. Perform tests by fall-of-potential method per IEEE 81.
  4. Prepare dimensioned Drawings locating each ground rod and other grounding electrodes. Identify each by letter in alphabetical order, and key to record of tests and observations. Include number of rods driven and their depth at each location and include observations of weather and other phenomena that may affect test results. Describe measures taken to improve test results.
- C. Grounding system will be considered defective if it does not pass tests and inspections.
- D. Prepare test and inspection reports.
- E. Report measured ground resistances that exceed 10 ohms.
- F. Excessive Ground Resistance: If resistance to ground exceeds specified values, notify Architect promptly and include recommendations to reduce ground resistance.

**END OF SECTION 260526**

## SECTION 260529 - HANGERS AND SUPPORTS

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

#### 1.2 SUMMARY

- A. Section Includes:
  1. Steel slotted support systems.
  2. Conduit and cable support devices.
  3. Structural steel for fabricated supports and restraints.
  4. Mounting, anchoring, and attachment components, including mechanical expansion anchors, concrete inserts, clamps, through bolts, toggle bolts, and hanger rods.
  5. Fabricated metal equipment support assemblies.

#### 1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
  1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for following:
    - a. Slotted support systems, hardware, and accessories.
    - b. Clamps.
    - c. Hangers.
    - d. Sockets.
    - e. Eye nuts.
    - f. Fasteners.
    - g. Anchors.
    - h. Saddles.
    - i. Brackets.
  2. Include rated capacities and furnished specialties and accessories.

#### 1.4 INFORMATIONAL SUBMITTALS

- A. Welding certificates.

#### 1.5 QUALITY ASSURANCE

- A. Welding Qualifications: Qualify procedures and personnel per AWS D1.1/D1.1M.

## **PART 2 - PRODUCTS**

### **2.1 SUPPORT, ANCHORAGE, AND ATTACHMENT COMPONENTS**

- A. Steel Slotted Support Systems: Preformed steel channels and angles with minimum 13/32-inch-diameter holes at maximum of 8 inches on center in at least one surface.
  - 1. Standard: Comply with MFMA-4 factory-fabricated components for field assembly.
  - 2. Material for Channel, Fittings, and Accessories: Galvanized steel.
  - 3. Channel Width: Selected for applicable load criteria.
  - 4. Metallic Coatings: Hot-dip galvanized after fabrication and applied per MFMA-4.
- B. Conduit and Cable Support Devices: Steel hangers, clamps, and associated fittings, designed for types and sizes of raceway or cable to be supported.
- C. Structural Steel for Fabricated Supports and Restraints: ASTM A36/A36M steel plates, shapes, and bars; black and galvanized.
- D. Mounting, Anchoring, and Attachment Components: Items for fastening electrical items or their supports to building surfaces include following:
  - 1. Mechanical-Expansion Anchors: Insert-wedge-type, zinc-coated steel, for use in hardened portland cement concrete, with tension, shear, and pullout capacities appropriate for supported loads and building materials where used.
  - 2. Concrete Inserts: Steel or malleable-iron, slotted support system units are similar to MSS Type 18 units and comply with MFMA-4 or MSS SP-58.
  - 3. Clamps for Attachment to Steel Structural Elements: MSS SP-58 units are suitable for attached structural element.
  - 4. Through Bolts: Structural type, hex head, and high strength. Comply with ASTM F3125/F3125M, Grade A325.
  - 5. Toggle Bolts: All-steel springhead type.
  - 6. Hanger Rods: Threaded steel.

### **2.2 FABRICATED METAL EQUIPMENT SUPPORT ASSEMBLIES**

- A. Description: Welded or bolted structural-steel shapes, shop or field fabricated to fit dimensions of supported equipment.

## **PART 3 - EXECUTION**

### **3.1 APPLICATION**

- A. Comply with following standards for application and installation requirements of hangers and supports, except where requirements on Drawings or in this Section are stricter:
  - 1. NECA 1.
  - 2. NECA 101

- B. Comply with requirements in Section 078413 "Penetration Firestopping" for firestopping materials and installation for penetrations through fire-rated walls, ceilings, and assemblies.
- C. Comply with requirements for raceways and boxes specified in Section 260533 "Raceways and Boxes."
- D. Maximum Support Spacing and Minimum Hanger Rod Size for Raceways: Space supports for EMT and RMC as required by NFPA 70. Minimum rod size shall be 1/4 inch in diameter.
- E. Multiple Raceways or Cables: Install trapeze-type supports fabricated with steel slotted support system, sized so capacity can be increased by at least 25 percent in future without exceeding specified design load limits.
  - 1. Secure raceways and cables to these supports with 2-bolt conduit clamps.

### 3.2 SUPPORT INSTALLATION

- A. Comply with NECA 1 and NECA 101 for installation requirements except as specified in this article.
- B. Raceway Support Methods: In addition to methods described in NECA 1, EMT and RMC may be supported by openings through structure members, per NFPA 70.
- C. Strength of Support Assemblies: Where not indicated, select sizes of components so strength will be adequate to carry present and future static loads within specified loading limits. Minimum static design load used for strength determination shall be weight of supported components plus 200 pounds.
- D. Mounting and Anchorage of Surface-Mounted Equipment and Components: Anchor and fasten electrical items and their supports to building structural elements by following methods unless otherwise indicated by code:
  - 1. To Wood: Fasten with lag screws or through bolts.
  - 2. To New Concrete: Bolt to concrete inserts.
  - 3. To Masonry: Approved toggle-type bolts on hollow masonry units and expansion anchor fasteners on solid masonry units.
  - 4. To Existing Concrete: Expansion anchor fasteners.
  - 5. To Steel: Welded threaded studs complying with AWS D1.1/D1.1M, with lock washers and nuts.
  - 6. To Light Steel: Sheet metal screws.
  - 7. Items Mounted on Hollow Walls and Nonstructural Building Surfaces: Mount cabinets, panelboards, disconnect switches, control enclosures, pull and junction boxes, transformers, and other devices on slotted-channel racks attached to substrate.
- E. Drill holes for expansion anchors in concrete at locations and to depths that avoid need for reinforcing bars.

### 3.3 INSTALLATION OF FABRICATED METAL SUPPORTS

- A. Cut, fit, and place miscellaneous metal supports accurately in location, alignment, and elevation to support and anchor electrical materials and equipment.
- B. Field Welding: Comply with AWS D1.1/D1.1M.

### 3.4 PAINTING

- A. Touchup: Clean field welds and abraded areas of shop paint. Paint exposed areas immediately after erecting hangers and supports. Use same materials as used for shop painting. Comply with SSPC-PA 1 requirements for touching up field-painted surfaces.
  - 1. Apply paint by brush or spray to provide minimum dry film thickness of 2.0 mils.
- B. Galvanized Surfaces: Clean welds, bolted connections, and abraded areas and apply galvanizing-repair paint to comply with ASTM A780.

**END OF SECTION 260529**

## **SECTION 260533 - RACEWAYS AND BOXES FOR ELECTRICAL SYSTEMS**

### **PART 1 - GENERAL**

#### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

#### 1.2 SUMMARY

- A. Section Includes:
  - 1. Metal conduits and fittings.
  - 2. Metal wireways and auxiliary gutters.
  - 3. Surface raceways.
  - 4. Boxes, enclosures, and cabinets.
- B. Related Requirements: Section 260543 "Underground Ducts and Raceways" for exterior duct banks and underground utility construction.

#### 1.3 DEFINITIONS

- A. GRC: Galvanized rigid steel conduit.

#### 1.4 ACTION SUBMITTALS

- A. Product Data: For surface raceways, wireways and fittings, hinged-cover enclosures, and cabinets.

#### 1.5 INFORMATIONAL SUBMITTALS

- A. Source quality-control reports.

### **PART 2 - PRODUCTS**

#### 2.1 METAL CONDUITS AND FITTINGS

- A. Metal Conduit:
  - 1. Listing and Labeling: Listed and labeled as defined in NFPA 70, by qualified testing agency, and marked for intended location and application.

2. GRC: Comply with ANSI C80.1 and UL 6.
  3. EMT: Comply with ANSI C80.3 and UL 797.
  4. FMC: Comply with UL 1; zinc-coated steel.
  5. LFMC: Flexible steel conduit with PVC jacket and complying with UL 360.
- B. Metal Fittings:
1. Comply with NEMA FB 1 and UL 514B.
  2. Listing and Labeling: Listed and labeled as defined in NFPA 70, by qualified testing agency, and marked for intended location and application.
  3. Fittings, General: Listed and labeled for type of conduit, location, and use.
  4. Fittings for EMT:
    - a. Material: Steel.
    - b. Type: Set-screw.
  5. Expansion Fittings: Steel to match conduit type, complying with UL 651, rated for environmental conditions where installed, and including flexible external bonding jumper.
- C. Joint Compound for GRC: Approved, as defined in NFPA 70, by authorities having jurisdiction for use in conduit assemblies, and compounded for use to lubricate and protect threaded conduit joints from corrosion and to enhance their conductivity.

## 2.2 METAL WIREWAYS AND AUXILIARY GUTTERS

- A. Description: Sheet metal, complying with UL 870 and NEMA 250, Type 1 or Type 3R unless otherwise indicated, and sized per NFPA 70.
1. Metal wireways installed outdoors shall be listed and labeled as defined in NFPA 70, by qualified testing agency, and marked for intended location and application.
- B. Fittings and Accessories: Include covers, couplings, offsets, elbows, expansion joints, adapters, hold-down straps, end caps, and other fittings to match and mate with wireways as required for complete system.
- C. Wireway Covers: Hinged type unless otherwise indicated.
- D. Finish: Manufacturer's standard enamel finish.

## 2.3 SURFACE RACEWAYS

- A. Listing and Labeling: Surface raceways shall be listed and labeled as defined in NFPA 70, by qualified testing agency, and marked for intended location and application.
- B. Surface Metal Raceways: Galvanized steel with snap-on covers complying with UL 5. Manufacturer's standard enamel finish in color selected by Owner.

## 2.4 BOXES, ENCLOSURES, AND CABINETS

- A. General Requirements for Boxes, Enclosures, and Cabinets: Boxes, enclosures, and cabinets installed in wet locations shall be listed for use in wet locations.
- B. Sheet Metal Outlet and Device Boxes: Comply with NEMA OS 1 and UL 514A.
- C. Cast-Metal Outlet and Device Boxes: Comply with NEMA FB 1, ferrous alloy, Type FD, with gasketed cover.
- D. Small Sheet Metal Pull and Junction Boxes: NEMA OS 1.
- E. Cast-Metal Access, Pull, and Junction Boxes: Comply with NEMA FB 1 and UL 1773, galvanized, cast iron with gasketed cover.
- F. Box extensions used to accommodate new building finishes shall be of same material as recessed box.
- G. Device Box Dimensions: 4 inches square by 2-1/8 inches deep.
- H. Gangable boxes are allowed.
- I. Hinged-Cover Enclosures: Comply with UL 50 and NEMA 250, Type 1 or Type 3R with continuous-hinge cover with flush latch unless otherwise indicated.
  - 1. Metal Enclosures: Steel, finished inside and out with manufacturer's standard enamel.
  - 2. Interior Panels: Steel; sides finished with manufacturer's standard enamel.
- J. Cabinets:
  - 1. NEMA 250, Type 1 or Type 3R galvanized-steel box with removable interior panel and removable front, finished inside and out with manufacturer's standard enamel.
  - 2. Hinged door in front cover with flush latch and concealed hinge.
  - 3. Key latch to match panelboards.
  - 4. Metal barriers to separate wiring of different systems and voltage.
  - 5. Accessory feet where required for freestanding equipment.

## PART 3 - EXECUTION

### 3.1 RACEWAY APPLICATION

- A. Outdoors: Apply raceway products as specified below unless otherwise indicated:
  - 1. Exposed Conduit: GRC.
  - 2. Concealed Conduit, Aboveground: GRC.
  - 3. Connection to Vibrating Equipment (Including Transformers and Hydraulic, Pneumatic, Electric Solenoid, or Motor-Driven Equipment): LFMC.
  - 4. Boxes and Enclosures, Aboveground: NEMA 250, Type 3R.
- B. Indoors: Apply raceway products as specified below unless otherwise indicated:

1. Exposed: GRC.
  2. Concealed in Ceilings and Interior Walls and Partitions: EMT.
  3. Connection to Vibrating Equipment (Including Transformers and Hydraulic, Pneumatic, Electric Solenoid, or Motor-Driven Equipment): FMC, except use LFMC in damp or wet locations.
  4. Damp or Wet Locations: GRC.
  5. Boxes and Enclosures: NEMA 250, Type 1, except use NEMA 250, Type 4 in institutional and commercial kitchens and damp or wet locations.
- C. Minimum Raceway Size: 3/4-inch trade size.
- D. Raceway Fittings: Compatible with raceways and suitable for use and location.
1. Rigid and Intermediate Steel Conduit: Use threaded rigid steel conduit fittings unless otherwise indicated. Comply with NEMA FB 2.10.
  2. EMT: Use set-screw, steel fittings. Comply with NEMA FB 2.10.
  3. Flexible Conduit: Use only fittings listed for use with flexible conduit. Comply with NEMA FB 2.20.
- E. Install surface raceways only where indicated on Drawings.

### 3.2 INSTALLATION

- A. Comply with requirements in Section 260529 "Hangers and Supports" for hangers and supports.
- B. Comply with NECA 1 and NECA 101 for installation requirements except where requirements on Drawings or in this article are stricter. Comply with NFPA 70 limitations for types of raceways allowed in specific occupancies.
- C. Do not install raceways or electrical items on "explosion-relief" walls or rotating equipment.
- D. Do not fasten conduits onto bottom side of metal deck roof.
- E. Keep raceways at least 6 inches away from parallel runs of flues and steam or hot-water pipes. Install horizontal raceway runs above water and steam piping.
- F. Complete raceway installation before starting conductor installation.
- G. Arrange stub-ups so curved portions of bends are not visible above finished slab.
- H. Make bends in raceway using large-radius preformed ells. Field bending shall be per NFPA 70 minimum radii requirements. Use only equipment specifically designed for material and size involved.
- I. Conceal conduit within finished walls, ceilings, and floors unless otherwise indicated. Install conduits parallel or perpendicular to building lines.
- J. Support conduit within 12 inches of enclosures to which attached.

- K. Raceways Embedded in Slabs:
1. Run conduit larger than one-inch trade size, parallel or at right angles to main reinforcement. Where at right angles to reinforcement, place conduit close to slab support. Secure raceways to reinforcement at maximum 10-foot intervals.
  2. Arrange raceways to cross building expansion joints at right angles with expansion fittings.
  3. Arrange raceways to keep minimum of one inch of concrete cover in all directions.
  4. Do not embed threadless fittings in concrete unless specifically approved by Architect for each specific location.
- L. Stub-Ups to Above Recessed Ceilings:
1. Use EMT or RMC for raceways.
  2. Use conduit bushing or insulated fitting to terminate stub-ups not terminated in hubs or in enclosure.
- M. Threaded Conduit Joints, Exposed to Wet, Damp, or Outdoor Conditions: Apply listed compound to threads of raceway and fittings before making up joints. Follow compound manufacturer's written instructions.
- N. Raceway Terminations at Locations Subject to Moisture or Vibration: Use insulating bushings to protect conductors including conductors smaller than 4 AWG.
- O. Terminate threaded conduits into threaded hubs or with locknuts on inside and outside of boxes or cabinets. Install bushings on conduits up to 1-1/4-inch trade size and insulated throat metal bushings on 1-1/2-inch trade size and larger conduits terminated with locknuts. Install insulated throat metal grounding bushings on service conduits.
- P. Install raceways square to enclosure and terminate at enclosures with locknuts. Install locknuts hand tight plus 1/4 turn more.
- Q. Do not rely on locknuts to penetrate nonconductive coatings on enclosures. Remove coatings in locknut area before assembling conduit to enclosure to assure continuous ground path.
- R. Cut conduit perpendicular to length. For conduits 2-inch trade size and larger, use roll cutter or guide to make cut straight and perpendicular to length.
- S. Install pull wires in empty raceways. Use polypropylene or monofilament plastic line with not less than 200-pound tensile strength. Leave at least 12 inches of slack at each end of pull wire.
- T. Surface Raceways:
1. Install surface raceway with minimum 2-inch radius control at bend points.
  2. Secure surface raceway with screws or other anchor-type devices at intervals not exceeding 48 inches and with no less than 2 supports per straight raceway section. Support surface raceway per manufacturer's written instructions. Tape and glue are not acceptable support methods.
- U. Install raceway sealing fittings at accessible locations per NFPA 70 and fill them with listed sealing compound. For concealed raceways, install each fitting in flush steel box with blank

cover plate having finish like that of adjacent plates or surfaces. Install raceway sealing fittings per NFPA 70.

- V. Install devices to seal raceway interiors at accessible locations. Locate seals so no fittings or boxes are between seal and following changes of environments. Seal interior of raceways at following points.
  - 1. Where conduits pass from warm to cold locations, such as boundaries of refrigerated spaces.
  - 2. Conduit extending from interior to exterior of building.
  - 3. Conduit extending into pressurized duct and equipment.
  - 4. Conduit extending into pressurized zones that are automatically controlled to maintain different pressure set points.
  - 5. Where otherwise required by NFPA 70.
  
- W. Comply with manufacturer's written instructions for solvent welding RNC and fittings.
  
- X. Expansion-Joint Fittings:
  - 1. Install in each run of aboveground RNC that is located where environmental temperature change may exceed 30 degrees F and that has straight-run length that exceeds 25 feet. Install in each run of aboveground RMC conduit that is located where environmental temperature change may exceed 100 degrees F and that has straight-run length that exceeds 100 feet.
  - 2. Install type and quantity of fittings that accommodate temperature change listed for each of following locations:
    - a. Outdoor Locations Not Exposed to Direct Sunlight: 125 degrees F temperature change.
    - b. Outdoor Locations Exposed to Direct Sunlight: 155 degrees F temperature change.
    - c. Indoor Spaces Connected with Outdoors without Physical Separation: 125 degrees F temperature change.
    - d. Attics: 135 degrees F temperature change.
  - 3. Install fitting(s) that provide expansion and contraction for at least 0.000078 inch per foot of length of straight run per degree F of temperature change for metal conduits.
  - 4. Install expansion fittings at locations where conduits cross building or structure expansion joints.
  - 5. Install each expansion-joint fitting with position, mounting, and piston setting selected per manufacturer's written instructions for conditions at specific location at time of installation. Install conduit supports to allow for expansion movement.
  
- Y. Flexible Conduit Connections: Comply with NEMA RV 3. Use maximum of 36 inches of flexible conduit for equipment subject to vibration, noise transmission, or movement; and for transformers and motors.
  - 1. Use LFMC in damp or wet locations subject to severe physical damage.
  - 2. Use LFMC or LFNC in damp or wet locations not subject to severe physical damage.
  
- Z. Mount boxes at heights indicated on Drawings. If mounting heights of boxes are not individually indicated, give priority to ADA requirements. Install boxes with height measured to center of box unless otherwise indicated.

- AA. Recessed Boxes in Masonry Walls: Saw-cut opening for box in center of cell of masonry block and install box flush with surface of wall. Prepare block surfaces to provide flat surface for raintight connection between box and cover plate or supported equipment and box.
- BB. Horizontally separate boxes mounted on opposite sides of walls so they are not in same vertical channel.
- CC. Locate boxes so that cover or plate will not span different building finishes.
- DD. Support boxes of 3 gangs or more from more than one side by spanning 2 framing members or mounting on brackets specifically designed for purpose.
- EE. Fasten junction and pull boxes to or support from building structure. Do not support boxes by conduits.

### 3.3 SLEEVE AND SLEEVE-SEAL INSTALLATION FOR ELECTRICAL PENETRATIONS

- A. Install sleeves and sleeve seals at penetrations of exterior floor and wall assemblies. Comply with requirements in Section 260544 "Sleeves and Sleeve Seals for Raceways and Cabling."

### 3.4 FIRESTOPPING

- A. Install firestopping at penetrations of fire-rated floor and wall assemblies. Comply with requirements in Section 078413 "Penetration Firestopping."

### 3.5 PROTECTION

- A. Protect coatings, finishes, and cabinets from damage and deterioration.
  - 1. Repair damage to galvanized finishes with zinc-rich paint recommended by manufacturer.
  - 2. Repair damage to paint finishes with matching touchup coating recommended by manufacturer.

**END OF SECTION 260533**

## SECTION 260543 - UNDERGROUND DUCTS AND RACEWAYS

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

#### 1.2 SUMMARY

- A. Section Includes:
  - 1. Metal conduits and fittings, including GRC.
  - 2. Rigid nonmetallic duct.
  - 3. Duct accessories.
  - 4. Fiberglass handholes and boxes with polymer concrete cover.
  - 5. Utility structure accessories.

#### 1.3 DEFINITIONS

- A. Direct Buried: Duct or duct bank that is buried in ground, without any additional casing materials such as concrete.
- B. Duct: Single duct or multiple ducts. Duct may be either installed singly or as component of duct bank.
- C. Duct Bank:
  - 1. Two or more ducts installed in parallel, with or without additional casing materials.
  - 2. Multiple duct banks.
- D. GRC: Galvanized rigid (steel) conduit.
- E. Trafficways: Locations where vehicular or pedestrian traffic is normal course of events.

#### 1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product.
  - 1. Include duct-bank materials, including spacers and miscellaneous components.
  - 2. Include duct, conduits, and their accessories, including elbows, end bells, bends, fittings, and solvent cement.
  - 3. Include accessories for handholes and boxes.
  - 4. Include underground-line warning tape.

- B. Shop Drawings:
  - 1. Factory-Fabricated Handholes and Boxes:
    - a. Include dimensioned plans, sections, and elevations, and fabrication and installation details.
    - b. Include duct entry provisions, including locations and duct sizes.
    - c. Include cover design.
    - d. Include grounding details.
    - e. Include dimensioned locations of cable rack inserts, and pulling-in and lifting irons.

#### 1.5 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For professional engineer and testing agency responsible for testing nonconcrete handholes and boxes.
- B. Source quality-control reports.
- C. Field quality-control reports.

#### 1.6 MAINTENANCE MATERIALS SUBMITTALS

- A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
- B. Furnish cable-support stanchions, arms, insulators, and associated fasteners in quantities equal to 5 percent of quantity of each item installed.

#### 1.7 FIELD CONDITIONS

- A. Interruption of Existing Electrical Service: Do not interrupt electrical service to facilities occupied by Owner or others unless permitted under following conditions, and then only after arranging to provide temporary electrical service per requirements indicated:
  - 1. Notify Owner no fewer than 14 days in advance of proposed interruption of electrical service.
  - 2. Do not proceed with interruption of electrical service without Owner's written permission.
- B. Ground Water: Assume ground-water level is at grade level unless lower water table is noted on Drawings.

## **PART 2 - PRODUCTS**

### 2.1 METAL CONDUIT AND FITTINGS

- A. GRC: Comply with ANSI C80.1 and UL 6.
- B. Listed and labeled as defined in NFPA 70, by nationally recognized testing laboratory, and marked for intended location and application.

### 2.2 RIGID NONMETALLIC DUCT

- A. Underground Plastic Utilities Duct: Type EPC-80-PVC RNC, complying with NEMA TC 2 and UL 651, with matching fittings complying with NEMA TC 3 by same manufacturer as duct.
- B. Listed and labeled as defined in NFPA 70, by nationally recognized testing laboratory, and marked for intended location and application.
- C. Solvents and Adhesives: As recommended by conduit manufacturer.

### 2.3 DUCT ACCESSORIES

- A. Duct Spacers: Factory-fabricated, rigid, PVC interlocking spacers; sized for type and size of duct with which used and selected to provide minimum duct spacing indicated while supporting duct during concreting or backfilling.
- B. Underground-Line Warning Tape: Comply with requirements for underground-line warning tape specified in Section 260553 "Identification."

### 2.4 FIBERGLASS HANDHOLES AND BOXES

- A. Description: Molded of fiberglass-reinforced polyester resin, with covers made of polymer concrete.
- B. Standard: Comply with SCTE 77. Comply with tier requirements in "Underground Enclosure Application" Article.
- C. Color: Gray.
- D. Configuration: Units shall be designed for flush burial and have open bottom unless otherwise indicated.
- E. Cover: Weatherproof, secured by tamper-resistant locking devices and having structural load rating consistent with enclosure.
- F. Cover Finish: Nonskid finish shall have minimum coefficient of friction of 0.50.

- G. Cover Legend: Molded lettering, "ELECTRIC."
- H. Handholes 12 inches wide by 24 inches long and larger shall have factory-installed inserts for cable racks and pulling-in irons.

## 2.5 UTILITY STRUCTURE ACCESSORIES

- A. Accessories for Utility Structures: Utility equipment and accessory items used for utility structure access and utility support, listed and labeled for intended use and application.
- B. Pulling Eyes in Nonconcrete Walls: Eyebolt with reinforced fastening, 1-1/4-inch-diameter eye, rated 2500-pound-foot minimum tension.
- C. Duct-Sealing Compound: Nonhardening, safe for contact with human skin, not deleterious to cable insulation, and workable at temperatures as low as 35 degrees F. Capable of withstanding temperature of 300 degrees F without slump and adhering to clean surfaces of plastic ducts, metallic conduit, conduit and duct coatings, concrete, masonry, lead, cable sheaths, cable jackets, insulation materials, and common metals.
- D. Cover Hooks: Light duty, designed for lifts less than 60-pound-foot. Two required.

## 2.6 SOURCE QUALITY CONTROL

- A. Nonconcrete Handhole and Pull-Box Prototype Test: Test prototypes of boxes for compliance with SCTE 77. Strength tests shall be for specified tier ratings of products supplied.
  - 1. Tests of materials shall be performed by independent testing agency.
  - 2. Testing machine pressure gages shall have current calibration certification, complying with ISO 9000 and ISO 10012, and traceable to NIST standards.

# PART 3 - EXECUTION

## 3.1 PREPARATION

- A. Coordinate layout and installation of duct, duct bank, handholes, and boxes with final arrangement of other utilities, site grading, and surface features as determined in field. Notify Architect if there is conflict between areas of excavation and existing structures or archaeological sites to remain.
- B. Coordinate elevations of duct and duct-bank entrances into handholes, and boxes with final locations and profiles of duct and duct banks, as determined by coordination with other utilities, underground obstructions, and surface features. Revise locations and elevations as required to suit field conditions and to ensure that duct and duct bank will drain to handholes and as approved by Owner.

- C. Clear and grub vegetation to be removed and protect vegetation to remain per Section 311000 "Site Clearing." Remove and stockpile topsoil for reapplication per Section 311000 "Site Clearing."

### 3.2 UNDERGROUND DUCT APPLICATION

- A. Duct for Electrical Feeders and Branch Circuits: Type EPC-80-PVC RNC, direct-buried unless otherwise indicated.

### 3.3 UNDERGROUND ENCLOSURE APPLICATION

- A. Handholes and Boxes for 600 V and Less:
  1. Units in Driveway, Parking Lot, and Off-Roadway Locations, Subject to Occasional, Nondeliberate Loading by Heavy Vehicles: Fiberglass enclosures with polymer concrete frame and cover, SCTE 77, Tier 15 structural load rating.
  2. Units in Sidewalk and Similar Applications with Safety Factor for Nondeliberate Loading by Vehicles: Heavy-duty fiberglass units with polymer concrete frame and cover, SCTE 77, Tier 8 structural load rating.
  3. Units Subject to Light-Duty Pedestrian Traffic Only: Fiberglass-reinforced polyester resin, structurally tested per SCTE 77 with 3000-pound-foot vertical loading.
  4. Cover design load shall not exceed design load of handhole or box.

### 3.4 EARTHWORK

- A. Restoration: Replace area immediately after backfilling is completed or after construction vehicle traffic in immediate area is complete.
- B. Restore surface features at areas disturbed by excavation and re-establish original grades unless otherwise indicated. Replace removed sod immediately after backfilling is completed.
- C. Restore areas disturbed by trenching, storing of dirt, cable laying, and other work. Restore vegetation and include necessary topsoiling, fertilizing, liming, seeding, sodding, sprigging, and mulching.

### 3.5 DUCT AND DUCT-BANK INSTALLATION

- A. Where indicated on Drawings, install duct, spacers, and accessories into duct-bank configuration shown. Duct installation requirements in this Section also apply to duct bank.
- B. Install duct per NEMA TCB 2.
- C. Slope: Pitch duct minimum slope of 1:300 down toward handholes and away from buildings and equipment. Slope duct from high point between 2 handholes, to drain in both directions.

- D. Curves and Bends: Use 5-degree angle couplings for small changes in direction. Use manufactured long sweep bends with minimum radius of 48 inches, both horizontally and vertically, at other locations unless otherwise indicated.
- E. Joints: Use solvent-cemented joints in duct and fittings and make watertight per manufacturer's written instructions. Stagger couplings so those of adjacent duct do not lie in same plane.
- F. Building Wall Penetrations: Make transition from underground duct to GRC at least 10 feet outside building wall, without reducing duct line slope away from building and without forming trap in line. Use fittings manufactured for RNC-to-GRC transition. Install GRC penetrations of building walls as specified in Section 260544 "Sleeves and Sleeve Seals for Raceways and Cabling."
- G. Sealing: Provide temporary closure at terminations of duct with pulled cables. Seal spare duct at terminations. Use sealing compound and plugs to withstand at least 15-psig hydrostatic pressure.
- H. Pulling Cord: Install 200-pound-foot-test nylon cord in empty ducts.
- I. Direct-Buried Duct and Duct Bank:
  - 1. Excavate trench bottom to provide firm and uniform support for duct.
  - 2. Width: Excavate trench 3 inches wider than duct on each side.
  - 3. Depth: Install top of duct at least 36 inches below finished grade unless otherwise indicated.
  - 4. Set elevation of bottom of duct bank below frost line.
  - 5. Support ducts on duct spacers coordinated with duct size, duct spacing, and outdoor temperature.
  - 6. Spacer Installation: Place spacers close enough to prevent sagging and deforming of duct, with not less than 4 spacers per 20 feet of duct. Place spacers within 24 inches of duct ends. Stagger spacers approximately 6 inches between tiers. Secure spacers to earth and to ducts to prevent floating during concreting. Tie entire assembly together using fabric straps; do not use tie wires or reinforcing steel that may form conductive or magnetic loops around ducts or duct groups.
  - 7. Install duct with minimum of 3 inches between ducts for like services and 6 inches between power and communications duct.
  - 8. Elbows: Install manufactured duct elbows for stub-ups, at building entrances, and at changes of direction in duct direction unless otherwise indicated. Encase elbows for stub-up ducts throughout length of elbow.
  - 9. Install manufactured GRC elbows for stub-ups, at building entrances, and at changes of direction in duct.
    - a. Couple RNC duct to GRC with adapters designed for this purpose and encase coupling with 3 inches of concrete.
    - b. Stub-ups to Outdoor Equipment: Extend concrete-encased GRC horizontally minimum of 60 inches from edge of base. Install insulated grounding bushings on terminations at equipment.
      - 1) Stub-ups shall be minimum 4 inches above finished floor and minimum 3 inches from conduit side to edge of slab.

10. After installing first tier of duct, backfill and compact. Start at tie-in point and work toward end of duct run, leaving ducts at end of run free to move with expansion and contraction as temperature changes during this process. Repeat procedure after placing each tier. After placing last tier, hand place backfill to 4 inches over duct and hand tamp. Firmly tamp backfill around ducts to provide maximum supporting strength. Use hand tamper only. After placing controlled backfill over final tier, make final duct connections at end of run and complete backfilling with normal compaction. Comply with requirements in Section 312000 "Earth Moving" for installation of backfill materials.
  - a. Place minimum 3 inches of sand as bed for duct. Place sand to minimum of 6 inches above top level of duct.

- J. Underground-Line Warning Tape: Bury conducting underground line specified in Section 260553 "Identification" no less than 12 inches above duct banks and approximately 12 inches below grade. Align tape parallel to and within 3 inches of centerline of duct bank. Provide additional warning tape for each 12-inch increment of duct bank width over nominal 18 inches. Space additional tapes 12 inches apart, horizontally.

### 3.6 INSTALLATION OF HANDHOLES AND BOXES OTHER THAN PRECAST CONCRETE

- A. Install handholes and boxes level and plumb and with orientation and depth coordinated with connecting duct, to minimize bends and deflections required for proper entrances. Use box extension if required to match depths of duct, and seal joint between box and extension as recommended by manufacturer.
- B. Unless otherwise indicated, support units on level bed of crushed stone or gravel, graded from 1/2-inch sieve to No. 4 sieve and compacted to same density as adjacent undisturbed earth.
- C. Elevation: In paved areas and trafficways, set cover flush with finished grade. Set covers of other handholes one inch above finished grade.
- D. Install handholes and boxes with bottom below frost line.
- E. Install removable hardware, including pulling eyes, cable stanchions, cable arms, and insulators, as required for installation and support of cables and conductors and as indicated. Select arm lengths to be long enough to provide spare space for future cables, but short enough to preserve adequate working clearances in enclosure.
- F. Field cut openings for duct per enclosure manufacturer's written instructions. Cut wall of enclosure with tool designed for material to be cut. Size holes for terminating fittings to be used, and seal around penetrations after fittings are installed.

### 3.7 GROUNDING

- A. Ground underground ducts and utility structures per Section 260526 "Grounding and Bonding."

### 3.8 FIELD QUALITY CONTROL

- A. Perform following tests and inspections:
  - 1. Demonstrate capability and compliance with requirements on completion of installation of underground duct, duct bank, and utility structures.
  - 2. Pull solid aluminum or wood test mandrel through duct to prove joint integrity and adequate bend radii, and test for out-of-round duct. Provide minimum 12-inch-long mandrel equal to duct size minus 1/4 inch. If obstructions are indicated, remove obstructions and retest.
- B. Correct deficiencies and retest as specified above to demonstrate compliance.
- C. Prepare test and inspection reports.

### 3.9 CLEANING

- A. Pull leather-washer-type duct cleaner, with graduated washer sizes, through full length of duct until duct cleaner indicates that duct is clear of dirt and debris. Follow with rubber duct swab for final cleaning and to assist in spreading lubricant throughout ducts.

**END OF SECTION 260543**

## SECTION 260544 - SLEEVES AND SLEEVE SEALS FOR RACEWAYS AND CABLING

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

#### 1.2 SUMMARY

- A. Section Includes:
  - 1. Sleeves for raceway and cable penetration of non-fire-rated construction walls and floors.
  - 2. Sleeve-seal systems.
  - 3. Sleeve-seal fittings.
  - 4. Grout.p

#### 1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.

### PART 2 - PRODUCTS

#### 2.1 SLEEVES

- A. Wall Sleeves: Steel Pipe Sleeves: ASTM A53/A53M, Type E, Grade B, Schedule 40, zinc coated, plain ends.
- B. Sleeves for Conduits Penetrating Non-Fire-Rated Gypsum Board Assemblies: Galvanized-steel sheet; 0.0239-inch minimum thickness; round tube closed with welded longitudinal joint, with tabs for screw-fastening sleeve to board.
- C. Molded-PE or -PP Sleeves: Removable, tapered-cup shaped, and smooth outer surface with nailing flange for attaching to wooden forms.
- D. Sleeves for Rectangular Openings:
  - 1. Material: Galvanized sheet steel.
  - 2. Minimum Metal Thickness:
    - a. For sleeve cross-section rectangle perimeter less than 50 inches and with no side larger than 16 inches, thickness shall be 0.052 inch.
    - b. For sleeve cross-section rectangle perimeter 50 inches or more and one or more sides larger than 16 inches, thickness shall be 0.138 inch.

## 2.2 SLEEVE-SEAL SYSTEMS

- A. Description: Modular sealing device, designed for field assembly, to fill annular space between sleeve and raceway or cable.
  - 1. Sealing Elements: EPDM rubber interlocking links shaped to fit surface of pipe. Include type and number required for pipe material and size of pipe.
  - 2. Pressure Plates: Carbon steel.
  - 3. Connecting Bolts and Nuts: Carbon steel, with corrosion-resistant coating, of length required to secure pressure plates to sealing elements.

## 2.3 SLEEVE-SEAL FITTINGS

- A. Description: Manufactured plastic, sleeve-type, water-stop assembly made for embedding in concrete slab or wall. Unit shall have plastic or rubber water-stop collar with center opening to match piping OD.

## 2.4 GROUT

- A. Description: Non-shrink; recommended for interior and exterior sealing openings in non-fire-rated walls or floors.
- B. Standard: ASTM C1107/C1107M, Grade B, post-hardening and volume-adjusting, dry, hydraulic-cement grout.
- C. Design Mix: 5000-psi, 28-day compressive strength.
- D. Packaging: Premixed and factory packaged.

## PART 3 - EXECUTION

### 3.1 SLEEVE INSTALLATION FOR NON-FIRE-RATED ELECTRICAL PENETRATIONS

- A. Comply with NECA 1.
- B. Comply with NEMA VE 2 for cable tray and cable penetrations.
- C. Sleeves for Conduits Penetrating Above-Grade Non-Fire-Rated Concrete and Masonry-Unit Floors and Walls:
  - 1. Interior Penetrations of Non-Fire-Rated Walls and Floors:
    - a. Seal annular space between sleeve and raceway or cable, using joint sealant appropriate for size, depth, and location of joint. Comply with requirements in Section 079200 "Joint Sealants."
    - b. Seal space outside of sleeves with mortar or grout. Pack sealing material solidly between sleeve and wall so no voids remain. Tool exposed surfaces smooth; protect material while curing.

2. Use pipe sleeves unless penetration arrangement requires rectangular sleeved opening.
  3. Size pipe sleeves to provide 1/4-inch annular clear space between sleeve and raceway or cable unless sleeve seal is to be installed.
  4. Install sleeves for wall penetrations unless core-drilled holes or formed openings are used. Install sleeves during erection of walls. Cut sleeves to length for mounting flush with both surfaces of walls. Deburr after cutting.
- D. Sleeves for Conduits Penetrating Non-Fire-Rated Gypsum Board Assemblies:
1. Use circular metal sleeves unless penetration arrangement requires rectangular sleeved opening.
  2. Seal space outside of sleeves with approved joint compound for gypsum board assemblies.
- E. Aboveground, Exterior-Wall Penetrations: Seal penetrations using steel pipe sleeves and mechanical sleeve seals. Select sleeve size to allow for one-inch annular clear space between pipe and sleeve for installing mechanical sleeve seals.
- F. Underground, Exterior-Wall and Floor Penetrations: Install cast-iron pipe sleeves. Size sleeves to allow for one-inch annular clear space between raceway or cable and sleeve for installing sleeve-seal system.

### 3.2 SLEEVE-SEAL-FITTING INSTALLATION

- A. Install sleeve-seal fittings in new walls and slabs as they are constructed.
- B. Assemble fitting components of length to be flush with both surfaces of concrete slabs and walls. Position water-stop flange to be centered in concrete slab or wall.
- C. Secure nailing flanges to concrete forms.
- D. Using grout, seal space around outside of sleeve-seal fittings.

**END OF SECTION 260544**

## **SECTION 260553 - IDENTIFICATION**

### **PART 1 - GENERAL**

#### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

#### 1.2 SUMMARY

- A. Section Includes:
  - 1. Color and legend requirements for raceways, conductors, and warning labels and signs.
  - 2. Labels.
  - 3. Bands and tubes.
  - 4. Tapes and stencils.
  - 5. Tags.
  - 6. Signs.
  - 7. Cable ties.
  - 8. Paint for identification.
  - 9. Fasteners for labels and signs.

#### 1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
  - 1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for electrical identification products.
- B. Identification Schedule: For each piece of electrical equipment and electrical system components to be index of nomenclature for electrical equipment and system components used in identification signs and labels. Use same designations indicated on Drawings.
- C. Delegated-Design Submittal: For arc-flash hazard study.

### **PART 2 - PRODUCTS**

#### 2.1 PERFORMANCE REQUIREMENTS

- A. Comply with ASME A13.1.
- B. Comply with NFPA 70.

- C. Comply with 29 CFR 1910.144 and 29 CFR 1910.145.
- D. Comply with ANSI Z535.4 for safety signs and labels.
- E. Comply with NFPA 70E and Section 260573.19 "Arc-Flash Hazard Analysis" requirements for arc-flash warning labels.
- F. Adhesive-attached labeling materials, including label stocks, laminating adhesives, and inks used by label printers, shall comply with UL 969.
- G. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes.
  - 1. Temperature Change: 120 degrees F, ambient; 180 degrees F, material surfaces.

## 2.2 COLOR AND LEGEND REQUIREMENTS

- A. Raceways and Cables Carrying Circuits at 600V or Less:
  - 1. Black letters on orange field.
  - 2. Legend: Indicate voltage and system or service type.
- B. Color-Coding for Phase- and Voltage-Level Identification, 600V or Less: Use colors listed below for ungrounded service, feeder, and branch-circuit conductors.
  - 1. Color shall be factory applied or field applied for sizes larger than 8 AWG if authorities having jurisdiction permit.
  - 2. Colors for 208/120V Circuits:
    - a. Phase A: Black.
    - b. Phase B: Red.
    - c. Phase C: Blue.
    - d. Neutral: White.
  - 3. Colors for 240V High Leg Circuits:
    - a. Phase A: Black.
    - b. Phase B (High Leg): Orange.
    - c. Phase C: Red.
    - d. Neutral: White.
  - 4. Colors for 120/240V Circuits:
    - a. Phase A: Black.
    - b. Phase B: Red.
    - c. Neutral: White.
  - 5. Colors for 480/277V Circuits:
    - a. Phase A: Brown.
    - b. Phase B: Orange.
    - c. Phase C: Yellow.
    - d. Neutral: Gray.
  - 6. Color for Equipment Grounds: Green.
- C. Warning Label Colors:
  - 1. Identify system voltage with black letters on orange background.

- D. Warning labels and signs shall include, but are not limited to, following legends:
  - 1. Multiple Power Source Warning: "DANGER - ELECTRICAL SHOCK HAZARD - EQUIPMENT HAS MULTIPLE POWER SOURCES."
  - 2. Workspace Clearance Warning: "WARNING - OSHA REGULATION - AREA IN FRONT OF ELECTRICAL EQUIPMENT MUST BE KEPT CLEAR FOR 36 INCHES."
- E. Equipment Identification Labels: Black letters on white field.

## 2.3 LABELS

- A. Vinyl Wraparound Labels: Preprinted, flexible labels laminated with clear, weather- and chemical-resistant coating and matching wraparound clear adhesive tape for securing label ends.
- B. Self-Adhesive Labels: Polyester, thermal, transfer-printed, 3-mil-thick, multicolor, weather- and UV-resistant, pressure-sensitive adhesive labels, configured for intended use and location.
  - 1. Minimum Nominal Size:
    - a. 1-1/2 by 6 inches for raceway and conductors.
    - b. 3-1/2 by 5 inches for equipment.
    - c. As required by authorities having jurisdiction.

## 2.4 BANDS AND TUBES

- A. Heat-Shrink Preprinted Tubes: Flame-retardant polyolefin tubes with machine-printed identification labels, sized to suit diameter and shrunk to fit firmly. Full shrink recovery occurs at maximum of 200 degrees F. Comply with UL 224.

## 2.5 TAPES AND STENCILS

- A. Marker Tapes: Vinyl or vinyl-cloth, self-adhesive wraparound type, with circuit identification legend machine printed by thermal transfer or equivalent process.
- B. Underground-Line Warning Tape:
  - 1. Tape:
    - a. Recommended by manufacturer for method of installation and suitable to identify and locate underground electrical, communications, and utility lines.
    - b. Printing on tape shall be permanent and shall not be damaged by burial operations.
    - c. Tape material and ink shall be chemically inert and not subject to degradation when exposed to acids, alkalis, and other destructive substances commonly found in soils.
  - 2. Color and Printing:
    - a. Comply with ANSI Z535.1, ANSI Z535.2, ANSI Z535.3, ANSI Z535.4, and ANSI Z535.5.
    - b. Inscriptions for Red-Colored Tapes: "ELECTRIC LINE, HIGH VOLTAGE".
    - c. Inscriptions for Orange-Colored Tapes: "COMMUNICATIONS CABLE, OPTICAL FIBER CABLE".

## 2.6 TAGS

- A. Write-on Tags:
  - 1. Polyester Tags: 0.015 inch thick, with corrosion-resistant grommet and cable tie for attachment.
  - 2. Marker for Tags: Machine-printed, permanent, waterproof, black ink marker recommended by printer manufacturer.

## 2.7 SIGNS

- A. Laminated Acrylic or Melamine Plastic Signs:
  - 1. Engraved legend.
  - 2. Thickness:
    - a. For signs up to 20 square inches, minimum 1/16 inch thick.
    - b. For signs larger than 20 square inches, 1/8 inch thick.
    - c. Engraved legend with black letters on white face.
    - d. Punched or drilled for mechanical fasteners with 1/4-inch grommets in corners for mounting.
    - e. Framed with mitered acrylic molding and arranged for attachment at applicable equipment.

## 2.8 CABLE TIES

- A. General-Purpose Cable Ties: Fungus inert, self-extinguishing, one piece, self-locking, and Type 6/6 nylon.
  - 1. Minimum Width: 3/16 inch.
  - 2. Tensile Strength at 73 degrees F per ASTM D638: 12,000 psi.
  - 3. Temperature Range: Minus 40 to plus 185 degrees F.
  - 4. Color: Black, except where used for color-coding.
- B. UV-Stabilized Cable Ties: Fungus inert, designed for continuous exposure to exterior sunlight, self-extinguishing, one piece, self-locking, and Type 6/6 nylon.
  - 1. Minimum Width: 3/16 inch.
  - 2. Tensile Strength at 73 degrees F per ASTM D638: 12,000 psi.
  - 3. Temperature Range: Minus 40 to plus 185 degrees F.
  - 4. Color: Black.

## 2.9 MISCELLANEOUS IDENTIFICATION PRODUCTS

- A. Paint: Comply with requirements in painting Sections for paint materials and application requirements. Retain paint system applicable for surface material and location (exterior or interior).
- B. Fasteners for Labels and Signs: Self-tapping, stainless-steel screws or stainless-steel machine screws with nuts and flat and lock washers.

## PART 3 - EXECUTION

### 3.1 PREPARATION

- A. Self-Adhesive Identification Products: Before applying electrical identification products, clean substrates of substances that could impair bond, using materials and methods recommended by manufacturer of identification product.

### 3.2 INSTALLATION

- A. Verify and coordinate identification names, abbreviations, colors, and other features with requirements in other Sections requiring identification applications, Drawings, Shop Drawings, manufacturer's wiring diagrams, and operation and maintenance manual. Use consistent designations throughout Project.
- B. Install identifying devices before installing acoustical ceilings and similar concealment.
- C. Verify identity of each item before installing identification products.
- D. Coordinate identification with Project Drawings, manufacturer's wiring diagrams, and operation and maintenance manual.
- E. Apply identification devices to surfaces that require finish after completing finish work.
- F. Install signs with approved legend to facilitate proper identification, operation, and maintenance of electrical systems and connected items.
- G. System Identification for Raceways and Cables under 600V: Identification shall completely encircle cable or conduit. Place identification of 2-color markings in contact, side by side.
  - 1. Secure tight to surface of conductor, cable, or raceway.
- H. Auxiliary Electrical Systems Conductor Identification: Identify field-installed alarm, control, and signal connections.
- I. Emergency Operating Instruction Signs: Install instruction signs with white legend on red background with minimum 3/8-inch-high letters for emergency instructions at equipment used for power transfer.
- J. Elevated Components: Increase sizes of labels, signs, and letters to those appropriate for viewing from floor.
- K. Accessible Fittings for Raceways: Identify covers of each junction and pull box of following systems with wiring system legend and system voltage. System legends shall be as follows:
  - 1. "EMERGENCY POWER."
  - 2. "POWER."

- L. Vinyl Wraparound Labels:
  - 1. Secure tight to surface of raceway or cable at location with high visibility and accessibility.
  - 2. Attach labels that are not self-adhesive type with clear vinyl tape, with adhesive appropriate to location and substrate.
- M. Self-Adhesive Wraparound Labels: Secure tight to surface at location with high visibility and accessibility.
- N. Self-Adhesive Labels:
  - 1. On each item, install unique designation label that is consistent with wiring diagrams, schedules, and operation and maintenance manual.
  - 2. Unless otherwise indicated, provide single line of text with 1/2-inch-high letters on 1-1/2-inch-high label; where 2 lines of text are required, use labels 2 inches high.
- O. Heat-Shrink, Preprinted Tubes: Secure tight to surface at location with high visibility and accessibility.
- P. Marker Tapes: Secure tight to surface at location with high visibility and accessibility.
- Q. Underground Line Warning Tape:
  - 1. During backfilling of trenches, install continuous underground-line warning tape directly above cable or raceway at 6 to 8 inches below finished grade.
  - 2. Install underground-line warning tape for direct-buried cables and cables in raceways.
- R. Write-on Tags:
  - 1. Place in location with high visibility and accessibility.
  - 2. Secure using general-purpose or UV-stabilized cable ties.
- S. Laminated Acrylic or Melamine Plastic Signs:
  - 1. Attach signs that are not self-adhesive type with mechanical fasteners appropriate to location and substrate.
  - 2. Unless otherwise indicated, provide single line of text with 1/2-inch-high letters on 1-1/2-inch-high sign; where 2 lines of text are required, use labels 2 inches high.
- T. Cable Ties: General purpose, for attaching tags, except as listed below:
  - 1. Outdoors: UV-stabilized nylon.
  - 2. In Spaces Handling Environmental Air: Plenum rated.

### 3.3 IDENTIFICATION SCHEDULE

- A. Install identification materials and devices at locations for most convenient viewing without interference with operation and maintenance of equipment. Install access doors or panels to provide view of identifying devices.
- B. Identify conductors, cables, and terminals in enclosures and at junctions, terminals, pull points, and locations of high visibility. Identify by system and circuit designation.

- C. Accessible Raceways and Metal-Clad Cables, for Service, Feeder, and Branch Circuits, More Than 30A and 120V to Ground: Identify with self-adhesive raceway labels.
  - 1. Locate identification at changes in direction, at penetrations of walls and floors, at 50-foot maximum intervals in straight runs, and at 25-foot maximum intervals in congested areas.
- D. Power-Circuit Conductor Identification: For conductors in pull and junction boxes, and handholes, use vinyl wraparound labels to identify phase.
  - 1. Locate identification at changes in direction, at penetrations of walls and floors, at 50-foot maximum intervals in straight runs, and at 25-foot maximum intervals in congested areas.
- E. Control-Circuit Conductor Identification: For conductors and cables in pull and junction boxes and handholes, use write-on tags with conductor or cable designation, origin, and destination.
- F. Control-Circuit Conductor Termination Identification: For identification at terminations, provide heat-shrink preprinted tubes with conductor designation.
- G. Auxiliary Electrical Systems Conductor Identification: Marker tape that is uniform and consistent with system used by manufacturer for factory-installed connections.
  - 1. Identify conductors, cables, and terminals in enclosures and at junctions, terminals, and pull points. Identify by system and circuit designation.
- H. Locations of Underground Lines: Underground-line warning tape for power and control wiring and optical-fiber cable.
- I. Instructional Signs: Self-adhesive labels, including color code for grounded and ungrounded conductors.
- J. Warning Labels for Indoor Cabinets, Boxes, and Enclosures for Power: Self-adhesive labels.
  - 1. Apply to exterior of door, cover, or other access.
  - 2. For equipment with multiple power or control sources, apply to door or cover of equipment, including, but not limited to, following:
    - a. Power-transfer switches.
    - b. Controls with external control power connections.
- K. Arc Flash Warning Labeling: Self-adhesive labels.
- L. Operating Instruction Signs: Self-adhesive labels.
- M. Emergency Operating Instruction Signs: Self-adhesive labels with white legend on red background with minimum 3/8-inch-high letters for emergency instructions at equipment used for power transfer.
- N. Equipment Identification Labels:
  - 1. Indoor Equipment: Self-adhesive label.
  - 2. Outdoor Equipment: Laminated acrylic or melamine sign.
  - 3. Equipment to Be Labeled:

- a. Panelboards: Typewritten directory of circuits in location provided by panelboard manufacturer. Panelboard identification shall be in form of self-adhesive, engraved, laminated acrylic or melamine label.
- b. Enclosures and electrical cabinets.
- c. Access doors and panels for concealed electrical items.
- d. Transformers: Label that includes tag designation indicated on Drawings for transformer, feeder, and panelboards or equipment supplied by secondary.
- e. Emergency system boxes and enclosures.
- f. Enclosed switches.
- g. Enclosed circuit breakers.
- h. Enclosed controllers.
- i. Variable-speed controllers.
- j. Push-button stations.
- k. Power-transfer equipment.
- l. Contactors.
- m. Power-generating units.
- n. Monitoring and control equipment.

**END OF SECTION 260553**

## SECTION 260573.13 - SHORT-CIRCUIT STUDIES

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

#### 1.2 SUMMARY

- A. Section includes computer-based, fault-current study to determine minimum interrupting capacity of circuit protective devices.

#### 1.3 DEFINITIONS

- A. Existing to Remain: Existing items of construction that are not to be removed and that are not otherwise indicated to be removed and salvaged or removed and reinstalled. Existing to remain items shall remain functional throughout construction period.
- B. Field Adjusting Agency: Independent electrical testing agency with full-time employees and capability to adjust devices and conduct testing indicated and that is member company of NETA.
- C. One-Line Diagram: Diagram that shows, by means of single lines and graphic symbols, course of electric circuit or system of circuits and component devices or parts used therein.
- D. Power System Analysis Software Developer: Entity that commercially develops, maintains, and distributes computer software used for power system studies.
- E. Power Systems Analysis Specialist: Professional engineer in charge of performing study and documenting recommendations, licensed in state where Project is located.
- F. Protective Device: Device that senses when abnormal current flow exists and then removes affected portion of circuit from system.
- G. SCCR: Short-circuit current rating.
- H. Service: Conductors and equipment for delivering electric energy from serving utility to wiring system of premises served.
- I. Single-Line Diagram: See "One-Line Diagram."

#### 1.4 ACTION SUBMITTALS

##### A. Product Data:

1. For computer software program to be used for studies.
2. Following shall be submitted after approval of system protective devices submittals. Submittals shall be in digital form.
  - a. Short-circuit study input data, including completed computer program input data sheets.
  - b. Short-circuit study and equipment evaluation report; signed, dated, and sealed by qualified professional engineer.
    - 1) Submit study report for action before receiving final approval of distribution equipment submittals. If formal completion of studies will cause delay in equipment manufacturing, obtain approval from Architect for preliminary submittal of sufficient study data to ensure that selection of devices and associated characteristics is satisfactory.
    - 2) Revised one-line diagram, reflecting field investigation results and results of short-circuit study.

#### 1.5 INFORMATIONAL SUBMITTALS

##### A. Qualification Data:

1. For Power Systems Analysis Software Developer.
2. For Power System Analysis Specialist.
3. For Field Adjusting Agency.

- B. Product Certificates: For short-circuit study software, certifying compliance with IEEE 399.

#### 1.6 CLOSEOUT SUBMITTALS

##### A. Operation and Maintenance Data:

1. For overcurrent protective devices to include in emergency, operation, and maintenance manuals.
2. Following are from Short-Circuit Study Report:
  - a. Final one-line diagram.
  - b. Final Short-Circuit Study Report.
  - c. Short-circuit study data files.
  - d. Power system data.

#### 1.7 QUALITY ASSURANCE

- A. Study shall be performed using commercially developed and distributed software designed specifically for power system analysis.
- B. Software algorithms shall comply with requirements of standards and guides specified in this Section.

- C. Manual calculations are unacceptable.
  - 1. Power System Analysis Software Qualifications: Computer program shall be designed to perform short-circuit studies or have function, component, or add-on module designed to perform short-circuit studies.
  - 2. Computer program shall be developed under charge of licensed professional engineer who holds IEEE Computer Society's Certified Software Development Professional certification.
- D. Power Systems Analysis Specialist Qualifications: Professional engineer licensed in state where Project is located. Elements of study shall be performed under direct supervision and control of this professional engineer.
- E. Short-Circuit Study Certification: Short-Circuit Study Report shall be signed and sealed by Power Systems Analysis Specialist.
- F. Field Adjusting Agency Qualifications:
  - 1. Employer of NETA ETT-Certified Technician Level III or NICET Electrical Power Testing Level III certification responsible for field adjusting of Work.
  - 2. A member company of NETA.
  - 3. Acceptable to authorities having jurisdiction.

## **PART 2 - PRODUCTS**

### 2.1 POWER SYSTEM ANALYSIS SOFTWARE DEVELOPERS

- A. SKM PowerTools or approved equal.
- B. Comply with IEEE 399 and IEEE 551.
  - 1. Analytical features of power systems analysis software program shall have capability to calculate "mandatory," "very desirable," and "desirable" features as listed in IEEE 399.
- C. Computer software program shall be capable of plotting and diagramming time-current-characteristic curves as part of its output.

### 2.2 SHORT-CIRCUIT STUDY REPORT CONTENTS

- A. Executive summary of study findings.
- B. Study descriptions, purpose, basis, and scope. Include case descriptions, definition of terms, and guide for interpretation of results.
- C. One-line diagram of modeled power system, showing following:
  - 1. Protective device designations and ampere ratings.
  - 2. Conductor types, sizes, and lengths.
  - 3. Transformer kilovolt ampere (kVA) and voltage ratings.
  - 4. Motor and generator designations and kVA ratings.

5. Switchgear, switchboard, motor-control center, and panelboard designations and ratings.
  6. Derating factors and environmental conditions.
  7. Any revisions to electrical equipment required by study.
- D. Comments and recommendations for system improvements or revisions in written document, separate from one-line diagram.
- E. Protective Device Evaluation:
1. Evaluate equipment and protective devices and compare to available short-circuit currents. Verify that equipment withstand ratings exceed available short-circuit current at equipment installation locations.
  2. Tabulations of circuit breaker, fuse, and other protective device ratings versus calculated short-circuit duties.
  3. For 600V overcurrent protective devices, ensure that interrupting ratings are equal to or higher than calculated 1/2-cycle symmetrical fault current.
  4. For devices and equipment rated for asymmetrical fault current, apply multiplication factors listed in standards to 1/2-cycle symmetrical fault current.
  5. Verify adequacy of phase conductors at maximum 3-phase bolted fault currents; verify adequacy of equipment grounding conductors and grounding electrode conductors at maximum ground-fault currents. Ensure that short-circuit withstand ratings are equal to or higher than calculated 1/2-cycle symmetrical fault current.
- F. Short-Circuit Study Input Data:
1. One-line diagram of system being studied.
  2. Power sources available.
  3. Manufacturer, model, and interrupting rating of protective devices.
  4. Conductors.
  5. Transformer data.
- G. Short-Circuit Study Output Reports:
1. Low-Voltage Fault Report: Three-phase and unbalanced fault calculations, showing following for each overcurrent device location:
    - a. Voltage.
    - b. Calculated fault-current magnitude and angle.
    - c. Fault-point X/R ratio.
    - d. Equivalent impedance.
  2. Momentary Duty Report: Three-phase and unbalanced fault calculations, showing following for each overcurrent device location:
    - a. Voltage.
    - b. Calculated symmetrical fault-current magnitude and angle.
    - c. Fault-point X/R ratio.
    - d. Calculated asymmetrical fault currents:
      - 1) Based on fault-point X/R ratio.
      - 2) Based on calculated symmetrical value multiplied by 1.6.
      - 3) Based on calculated symmetrical value multiplied by 2.7.
  3. Interrupting Duty Report: Three-phase and unbalanced fault calculations, showing following for each overcurrent device location:
    - a. Voltage.

- b. Calculated symmetrical fault-current magnitude and angle.
- c. Fault-point X/R ratio.
- d. No AC Decrement (NACD) ratio.
- e. Equivalent impedance.
- f. Multiplying factors for 2-, 3-, 5-, and 8-cycle circuit breakers rated on symmetrical basis.
- g. Multiplying factors for 2-, 3-, 5-, and 8-cycle circuit breakers rated on total basis.

## PART 3 - EXECUTION

### 3.1 POWER SYSTEM DATA

- A. Obtain data necessary for conduction of study.
  - 1. Verify completeness of data supplied on one-line diagram. Call discrepancies to Architect's attention.
  - 2. For equipment included as Work of this Project, use characteristics submitted under provisions of action submittals and information submittals for this Project.
  - 3. For equipment that is existing to remain but modified by Work of this Project, obtain required electrical distribution system data by field investigation and surveys, conducted by qualified technicians and engineers. Qualifications of technicians and engineers shall be as defined by NFPA 70E.
  
- B. Gather and tabulate required input data to support short-circuit study. Comply with requirements in Section 017839 "Project Record Documents" for recording circuit protective device characteristics. Record data on Record Document copy of one-line diagram. Comply with recommendations in IEEE 551 as to amount of detail that is required to be acquired in field. Field data gathering shall be under direct supervision and control of engineer in charge of performing study, and shall be by engineer or its representative who holds NETA ETT-Certified Technician Level III or NICET Electrical Power Testing Level III certification. Data include, but are not limited to, following:
  - 1. Product Data for Project's overcurrent protective devices involved in overcurrent protective device coordination studies. Use equipment designation tags that are consistent with electrical distribution system diagrams, overcurrent protective device submittals, input and output data, and recommended device settings.
  - 2. Obtain electrical power utility impedance at service.
  - 3. Power sources and ties.
  - 4. For transformers, include kVA, primary and secondary voltages, connection type, impedance, X/R ratio, taps measured in percent, and phase shift.
  - 5. For circuit breakers and fuses, provide manufacturer and model designation. List type of breaker, type of trip, SCCR, current rating, and breaker settings.
  - 6. Generator short-circuit current contribution data, including short-circuit reactance, rated kVA, rated voltage, and X/R ratio.
  - 7. Motor horsepower and NEMA MG 1 code letter designation.
  - 8. Conductor sizes, lengths, number, conductor material and conduit material (magnetic or nonmagnetic).
  - 9. Derating factors.

### 3.2 SHORT-CIRCUIT STUDY

- A. Perform study following general study procedures contained in IEEE 399.
- B. Calculate short-circuit currents per IEEE 551.
- C. Base study on device characteristics supplied by device manufacturer.
- D. Begin short-circuit current analysis at each new service, extending down to system overcurrent protective devices as follows:
  - 1. To normal system low-voltage load buses where fault current is 10 kA or less.
  - 2. Exclude existing equipment not modified by Work of this Project.
- E. Study electrical distribution system from normal and alternate power sources throughout electrical distribution system for Project. Study cases of system-switching configurations and alternate operations that could result in maximum fault conditions.
- F. Include ac fault-current decay from induction motors, synchronous motors, and asynchronous generators and apply to low- and medium-voltage, 3-phase ac systems. Also account for fault-current dc decrement to address asymmetrical requirements of interrupting equipment.
- G. Calculate short-circuit momentary and interrupting duties for 3-phase bolted fault and single line-to-ground fault at each equipment indicated on one-line diagram.
  - 1. For grounded systems, provide bolted line-to-ground fault-current study for areas as defined for 3-phase bolted fault short-circuit study.
- H. Include in report identification of protective device applied outside its capacity.

**END OF SECTION 260573.13**

## SECTION 260573.16 - COORDINATION STUDIES

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

#### 1.2 SUMMARY

- A. Section includes computer-based, overcurrent protective device coordination studies to determine overcurrent protective devices and to determine overcurrent protective device settings for selective tripping.

#### 1.3 DEFINITIONS

- A. Existing to Remain: Existing items of construction that are not to be removed and that are not otherwise indicated to be removed, removed and salvaged, or removed and reinstalled. Existing to remain items shall remain functional throughout construction period.
- B. Field Adjusting Agency: Independent electrical testing agency with full-time employees and capability to adjust devices and conduct testing indicated and that is member company of NETA.
- C. One-Line Diagram: Diagram that shows, by means of single lines and graphic symbols, course of electric circuit or system of circuits and component devices or parts used therein.
- D. Power System Analysis Software Developer: Entity that commercially develops, maintains, and distributes computer software used for power system studies.
- E. Power System Analysis Specialist: Professional engineer in charge of performing study and documenting recommendations, licensed in state where Project is located.
- F. Protective Device: Device that senses when abnormal current flow exists and then removes affected portion of circuit from system.
- G. SCCR: Short-circuit current rating.
- H. Service: Conductors and equipment for delivering electric energy from serving utility to wiring system of premises served.
- I. Single-Line Diagram: See "One-Line Diagram."

#### 1.4 ACTION SUBMITTALS

##### A. Product Data:

1. For computer software program to be used for studies.
2. Submit following after approval of system protective devices submittals. Submittals shall be in digital form.
  - a. Coordination-study input data, including completed computer program input data sheets.
  - b. Study and equipment evaluation reports.
3. Overcurrent protective device coordination study report; signed, dated, and sealed by qualified professional engineer.
  - a. Submit study report for action before receiving final approval of distribution equipment submittals. If formal completion of studies will cause delay in equipment manufacturing, obtain approval from Architect for preliminary submittal of sufficient study data to ensure that selection of devices and associated characteristics is satisfactory.

#### 1.5 INFORMATIONAL SUBMITTALS

##### A. Qualification Data:

1. For Power System Analysis Software Developer.
2. For Power Systems Analysis Specialist.
3. For Field Adjusting Agency.

##### B. Product Certificates: For overcurrent protective device coordination study software, certifying compliance with IEEE 399.

#### 1.6 CLOSEOUT SUBMITTALS

##### A. Operation and Maintenance Data: For overcurrent protective devices to include in emergency, operation, and maintenance manuals.

1. The following are from Coordination Study Report:
  - a. Final one-line diagram.
  - b. Final protective device coordination study.
  - c. Coordination study data files.
  - d. List of protective device settings.
  - e. Time-current coordination curves.
  - f. Power system data.

#### 1.7 QUALITY ASSURANCE

##### A. Studies shall be performed using commercially developed and distributed software designed specifically for power system analysis.

##### B. Software algorithms shall comply with requirements of standards and guides specified in this Section.

- C. Manual calculations are unacceptable.
- D. Power System Analysis Software Qualifications:
  1. Computer program shall be designed to perform coordination studies or have function, component, or add-on module designed to perform coordination studies.
  2. Computer program shall be developed under charge of licensed professional engineer who holds IEEE Computer Society's Certified Software Development Professional certification.
- E. Power Systems Analysis Specialist Qualifications: Professional engineer licensed in state where Project is located. Elements of study shall be performed under direct supervision and control of this professional engineer.
- F. Field Adjusting Agency Qualifications:
  1. Employer of NETA ETT-Certified Technician Level III responsible for field adjusting of Work.
  2. Member company of NETA.
  3. Acceptable to authorities having jurisdiction.

## **PART 2 - PRODUCTS**

### 2.1 POWER SYSTEM ANALYSIS SOFTWARE DEVELOPERS

- A. SKM PowerTools or approved equal.
- B. Comply with IEEE 242 and IEEE 399.
- C. Analytical features of device coordination study computer software program shall have capability to calculate "mandatory," "very desirable," and "desirable" features as listed in IEEE 399.
- D. Computer software program shall be capable of plotting and diagramming time-current-characteristic curves as part of its output. Computer software program shall report device settings and ratings of overcurrent protective devices and shall demonstrate selective coordination by computer-generated, time-current coordination plots.

### 2.2 COORDINATION STUDY REPORT CONTENTS

- A. Executive summary of study findings.
- B. Study descriptions, purpose, basis, and scope. Include case descriptions, definition of terms, and guide for interpretation of results.
- C. One-line diagram of modeled power system, showing following:
  1. Protective device designations and ampere ratings.
  2. Conductor types, sizes, and lengths.

3. Transformer kilovolt ampere (kVA) and voltage ratings.
  4. Motor and generator designations and kVA ratings.
  5. Switchgear, switchboard, motor-control center, and panelboard designations.
  6. Any revisions to electrical equipment required by study.
  7. Study Input Data: As described in "Power System Data" Article.
    - a. Short-Circuit Study Output: As specified in "Short-Circuit Study Output Reports" Paragraph in "Short-Circuit Study Report Contents" Article in Section 260573.13 "Short-Circuit Studies."
- D. Protective Device Coordination Study:
1. Report recommended settings of protective devices, ready to be applied in field. Use manufacturer's data sheets for recording recommended setting of overcurrent protective devices when available.
    - a. Phase and Ground Relays:
      - 1) Device tag.
      - 2) Relay current transformer ratio and tap, time dial, and instantaneous pickup value.
      - 3) Recommendations on improved relaying systems, if applicable.
    - b. Circuit Breakers:
      - 1) Adjustable pickups and time delays (long time, short time, and ground).
      - 2) Adjustable time-current characteristic.
      - 3) Adjustable instantaneous pickup.
      - 4) Recommendations on improved trip systems, if applicable.
    - c. Fuses: Show current rating, voltage, and class.
- E. Time-Current Coordination Curves: Determine settings of overcurrent protective devices to achieve selective coordination. Graphically illustrate that adequate time separation exists between devices installed in series, including power utility company's upstream devices. Prepare separate sets of curves for switching schemes and for emergency periods where power source is local generation. Show following information:
1. Device tag and title, one-line diagram with legend identifying portion of system covered.
  2. Terminate device characteristic curves at point reflecting maximum symmetrical or asymmetrical fault current to which device is exposed.
  3. Identify device associated with each curve by manufacturer type, function, and, if applicable, tap, time delay, and instantaneous settings recommended.
  4. Plot following listed characteristic curves, as applicable:
    - a. Power utility's overcurrent protective device.
    - b. Medium-voltage equipment overcurrent relays.
    - c. Medium- and low-voltage fuses including manufacturer's minimum melt, total clearing, tolerance, and damage bands.
    - d. Low-voltage equipment circuit-breaker trip devices, including manufacturer's tolerance bands.
    - e. Transformer full-load current, magnetizing inrush current, and ANSI through-fault protection curves.
    - f. Cables and conductors damage curves.
    - g. Ground-fault protective devices.
    - h. Motor-starting characteristics and motor damage points.
    - i. Generator short-circuit decrement curve and generator damage point.

- j. The largest feeder circuit breaker in each motor-control center and panelboard.
5. Maintain selectivity for tripping currents caused by overloads.
6. Maintain maximum achievable selectivity for tripping currents caused by overloads on series-rated devices.
7. Provide adequate time margins between device characteristics such that selective operation is achieved.
8. Comments and recommendations for system improvements.

## **PART 3 - EXECUTION**

### **3.1 EXAMINATION**

- A. Examine Project overcurrent protective device submittals for compliance with electrical distribution system coordination requirements and other conditions affecting performance of Work. Devices to be coordinated are indicated on Drawings.
  1. Proceed with coordination study only after relevant equipment submittals have been assembled. Overcurrent protective devices that have not been submitted and approved before coordination study may not be used in study.

### **3.2 POWER SYSTEM DATA**

- A. Obtain data necessary for conduct of overcurrent protective device study.
  1. Verify completeness of data supplied in one-line diagram on Drawings. Call discrepancies to Architect's attention.
  2. For equipment included as Work of this Project, use characteristics submitted under provisions of action submittals and information submittals for this Project.
  3. For equipment that is existing to remain but modified by Work of this Project, obtain required electrical distribution system data by field investigation and surveys, conducted by qualified technicians and engineers. Qualifications of technicians and engineers shall be as defined by NFPA 70E.
- B. Gather and tabulate required input data to support coordination study. List below is guide. Comply with recommendations in IEEE 551 for amount of detail required to be acquired in field. Field data gathering shall be under direct supervision and control of engineer in charge of performing study, and shall be by engineer or its representative who holds NETA ETT-Certified Technician Level III or NICET Electrical Power Testing Level III certification. Data include, but are not limited to, following:
  1. Product Data for overcurrent protective devices specified in other Sections and involved in overcurrent protective device coordination studies. Use equipment designation tags that are consistent with electrical distribution system diagrams, overcurrent protective device submittals, input and output data, and recommended device settings.
  2. Electrical power utility impedance at service.
  3. Power sources and ties.
  4. Short-circuit current at each system bus (3 phase and line to ground).
  5. Full-load current of loads.
  6. Voltage level at each bus.

7. For transformers, include kVA, primary and secondary voltages, connection type, impedance, X/R ratio, taps measured in percent, and phase shift.
8. For circuit breakers and fuses, provide manufacturer and model designation. List type of breaker, type of trip and available range of settings, SCCR, current rating, and breaker settings.
9. Generator short-circuit current contribution data, including short-circuit reactance, rated kVA, rated voltage, and X/R ratio.
10. For relays, provide manufacturer and model designation, current transformer ratios, potential transformer ratios, and relay settings.
11. Maximum demands from service meters.
12. Motor horsepower and NEMA MG 1 code letter designation.
13. Low-voltage cable sizes, lengths, number, conductor material, and conduit material (magnetic or nonmagnetic).
14. Data sheets to supplement electrical distribution system one-line diagram, cross-referenced with tag numbers on diagram, showing following:
  - a. Special load considerations, including starting inrush currents and frequent starting and stopping.
  - b. Transformer characteristics, including primary protective device, magnetic inrush current, and overload capability.
  - c. Motor full-load current, locked rotor current, service factor, starting time, type of start, and thermal-damage curve.
  - d. Generator thermal-damage curve.
  - e. Ratings, types, and settings of utility company's overcurrent protective devices.
  - f. Special overcurrent protective device settings or types stipulated by utility company.
  - g. Time-current-characteristic curves of devices indicated to be coordinated.
  - h. Manufacturer, frame size, interrupting rating in amperes root mean square (rms) symmetrical, ampere or current sensor rating, long-time adjustment range, short-time adjustment range, and instantaneous adjustment range for circuit breakers.
  - i. Manufacturer and type, ampere-tap adjustment range, time-delay adjustment range, instantaneous attachment adjustment range, and current transformer ratio for overcurrent relays.
  - j. Switchboards and panelboards ampacity, and SCCR in amperes rms symmetrical.
  - k. Identify series-rated interrupting devices for condition where available fault current is greater than interrupting rating of downstream equipment. Obtain device data details to allow verification that series application of these devices complies with NFPA 70 and UL 489 requirements.

### 3.3 COORDINATION STUDY

- A. Comply with IEEE 242 for calculating short-circuit currents and determining coordination time intervals.
- B. Comply with IEEE 399 for general study procedures.
- C. Base study on device characteristics supplied by device manufacturer.

- D. Begin analysis at service, extending down to system overcurrent protective devices as follows:
  - 1. To normal system low-voltage load buses where fault current is 10 kA or less.
  - 2. Exclude existing equipment not modified by Work of this Project.
- E. Study electrical distribution system from normal and alternate power sources throughout electrical distribution system for Project. Study cases of system-switching configurations and alternate operations that could result in maximum fault conditions.
- F. Transformer Primary Overcurrent Protective Devices:
  - 1. Device shall not operate in response to following:
    - a. Inrush current when first energized.
    - b. Self-cooled, full-load current or forced-air-cooled, full-load current, whichever is specified for that transformer.
    - c. Permissible transformer overloads per IEEE C57.96 if required by unusual loading or emergency conditions.
  - 2. Device settings shall protect transformers per IEEE C57.12.00, for fault currents.
- G. Motor Protection:
  - 1. Select protection for low-voltage motors per IEEE 242 and NFPA 70.
  - 2. Select protection for motors served at voltages more than 600V per IEEE 620.
- H. Conductor Protection: Protect cables against damage from fault currents per ICEA P-32-382, ICEA P-45-482, and protection recommendations in IEEE 242. Demonstrate that equipment withstands maximum short-circuit current for time equivalent to tripping time of primary relay protection or total clearing time of fuse. To determine temperatures that damage insulation, use curves from cable manufacturers or from listed standards indicating conductor size and short-circuit current.
- I. Generator Protection: Select protection per manufacturer's written instructions and to IEEE 242.
- J. Include ac fault-current decay from induction motors, synchronous motors, and asynchronous generators and apply to low- and medium-voltage, 3-phase ac systems. Also account for fault-current dc decrement, to address asymmetrical requirements of interrupting equipment.
- K. Calculate short-circuit momentary and interrupting duties for 3-phase bolted fault and single line-to-ground fault at each equipment indicated on one-line diagram.
  - 1. For grounded systems, provide bolted line-to-ground fault-current study for areas as defined for 3-phase bolted fault short-circuit study.
- L. Protective Device Evaluation:
  - 1. Evaluate equipment and protective devices and compare to short-circuit ratings.
  - 2. Adequacy of switchgear, motor-control centers, and panelboard bus bars to withstand short-circuit stresses.
  - 3. Include in report identification of protective device applied outside its capacity.

### 3.4 LOAD-FLOW AND VOLTAGE-DROP STUDY

- A. Perform load-flow and voltage-drop study to determine steady-state loading profile of system. Analyze power system performance 2 times as follows:
  - 1. Determine load flow and voltage drop based on full-load currents obtained in "Power System Data" Article.
  - 2. Determine load flow and voltage drop based on 80 percent of design capacity of load buses.
  - 3. Prepare load-flow and voltage-drop analysis and report to show power system components that are overloaded, or might become overloaded; show bus voltages that are less than as prescribed by NFPA 70.

### 3.5 FIELD ADJUSTING

- A. Adjust relay and protective device settings per recommended settings provided by coordination study. Field adjustments shall be completed by engineering service division of equipment manufacturer under "Startup and Acceptance Testing" contract portion.
- B. Testing and adjusting shall be by full-time employee of Field Adjusting Agency, who holds NETA ETT-Certified Technician Level III or NICET Electrical Power Testing Level III certification.
  - 1. Perform each visual and mechanical inspection and electrical test stated in NETA ATS. Certify compliance with test parameters. Perform NETA tests and inspections for adjustable overcurrent protective devices.

### 3.6 DEMONSTRATION

- A. Engage Power Systems Analysis Specialist to train Owner's maintenance personnel in following:
  - 1. Acquaint personnel in fundamentals of operating power system in normal and emergency modes.
  - 2. Hand-out and explain coordination study objectives, study descriptions, purpose, basis, and scope. Include case descriptions, definition of terms, and guide for interpreting time-current coordination curves.
  - 3. For Owner's maintenance staff certified as NETA ETT-Certified Technicians Level III or NICET Electrical Power Testing Level III Technicians, teach how to adjust, operate, and maintain overcurrent protective device settings.

**END OF SECTION 260573.16**

## SECTION 260573.19 - ARC-FLASH HAZARD ANALYSIS

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

#### 1.2 SUMMARY

- A. Section includes computer-based, arc-flash study to determine arc-flash hazard distance and incident energy to which personnel could be exposed during work on or near electrical equipment.

#### 1.3 DEFINITIONS

- A. Existing to Remain: Existing items of construction that are not to be removed and that are not otherwise indicated to be removed, removed and salvaged, or removed and reinstalled.
- B. Field Adjusting Agency: Independent electrical testing agency with full-time employees and capability to adjust devices and conduct testing indicated and that is member company of NETA.
- C. One-Line Diagram: Diagram that shows, by means of single lines and graphic symbols, course of electric circuit or system of circuits and component devices or parts used therein.
- D. Power System Analysis Software Developer: Entity that commercially develops, maintains, and distributes computer software used for power system studies.
- E. Power Systems Analysis Specialist: Professional engineer in charge of performing study and documenting recommendations, licensed in state where Project is located.
- F. Protective Device: Device that senses when abnormal current flow exists and then removes affected portion from system.
- G. SCCR: Short-circuit current rating.
- H. Service: Conductors and equipment for delivering electric energy from serving utility to wiring system of premises served.
- I. Single-Line Diagram: See "One-Line Diagram."

#### 1.4 ACTION SUBMITTALS

- A. Product Data: For computer software program to be used for studies.
- B. Study Submittals: Submit following submittals after approval of system protective devices submittals. Submittals shall be in digital form:
  - 1. Arc-flash study input data, including completed computer program input data sheets.
  - 2. Arc-flash study report; signed, dated, and sealed by Power Systems Analysis Specialist.
  - 3. Submit study report for action before receiving final approval of distribution equipment submittals. If formal completion of studies will cause delay in equipment manufacturing, obtain approval from Architect for preliminary submittal of sufficient study data to ensure that selection of devices and associated characteristics is satisfactory.

#### 1.5 INFORMATIONAL SUBMITTALS

- A. Qualification Data:
  - 1. For Power Systems Analysis Software Developer.
  - 2. For Power System Analysis Specialist.
  - 3. For Field Adjusting Agency.
- B. Product Certificates: For arc-flash hazard analysis software, certifying compliance with IEEE 1584 and NFPA 70E.

#### 1.6 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data:
  - 1. Provide maintenance procedures in equipment manuals per requirements in NFPA 70E.
  - 2. Operation and Maintenance Procedures: In addition to items specified in Section 017823 "Operation and Maintenance Data," provide maintenance procedures for use by Owner's personnel that comply with requirements in NFPA 70E.

#### 1.7 QUALITY ASSURANCE

- A. Study shall be performed using commercially developed and distributed software designed specifically for power system analysis.
- B. Software algorithms shall comply with requirements of standards and guides specified in this Section.
- C. Manual calculations are unacceptable.
- D. Power System Analysis Software Qualifications: Entity that owns and markets computer software used for studies, having performed successful studies of similar magnitude on electrical distribution systems using similar devices.
  - 1. Computer program shall be designed to perform arc-flash analysis or have function, component, or add-on module designed to perform arc-flash analysis.

2. Computer program shall be developed under charge of licensed professional engineer who holds IEEE Computer Society's Certified Software Development Professional certification.
- E. Power Systems Analysis Specialist Qualifications: Professional engineer in charge of performing arc-flash study, analyzing arc flash, and documenting recommendations, licensed in state where Project is located. Elements of study shall be performed under direct supervision and control of this professional engineer.
  - F. Arc-Flash Study Certification: Arc-Flash Study Report shall be signed and sealed by Power Systems Analysis Specialist.
  - G. Field Adjusting Agency Qualifications:
    1. Employer of NETA ETT-Certified Technician Level III or NICET Electrical Power Testing Level III certification responsible for field adjusting of Work.
    2. A member company of NETA.
    3. Acceptable to authorities having jurisdiction.

## **PART 2 - PRODUCTS**

### 2.1 COMPUTER SOFTWARE DEVELOPERS

- A. SKM PowerTools or approved equal.
- B. Comply with IEEE 1584 and NFPA 70E.
- C. Analytical features of device coordination study computer software program shall have capability to calculate "mandatory," "very desirable," and "desirable" features as listed in IEEE 399.

### 2.2 ARC-FLASH STUDY REPORT CONTENT

- A. Executive summary of study findings.
- B. Study descriptions, purpose, basis, and scope. Include case descriptions, definition of terms, and guide for interpretation of results.
- C. One-line diagram, showing following:
  1. Protective device designations and ampere ratings.
  2. Conductor types, sizes, and lengths.
  3. Transformer kilovolt ampere (kVA) and voltage ratings, including derating factors and environmental conditions.
  4. Motor and generator designations and kVA ratings.
  5. Switchboard and panelboard designations, and ratings.
- D. Study Input Data: As described in "Power System Data" Article.

- E. Short-Circuit Study Output Data: As specified in "Short-Circuit Study Output Reports" Paragraph in "Short-Circuit Study Report Contents" Article in Section 260573.13 "Short-Circuit Studies."
- F. Protective Device Coordination Study Report Contents: As specified in "Coordination Study Report Contents" Article in Section 260573.16 "Coordination Studies."
- G. Arc-Flash Study Output Reports:
  - 1. Interrupting Duty Report: Three-phase and unbalanced fault calculations, showing following for each equipment location included in report:
    - a. Voltage.
    - b. Calculated symmetrical fault-current magnitude and angle.
    - c. Fault-point X/R ratio.
    - d. No AC Decrement (NACD) ratio.
    - e. Equivalent impedance.
    - f. Multiplying factors for 2-, 3-, 5-, and 8-cycle circuit breakers rated on symmetrical basis.
    - g. Multiplying factors for 2-, 3-, 5-, and 8-cycle circuit breakers rated on total basis.
- H. Incident Energy and Flash Protection Boundary Calculations:
  - 1. Arcing fault magnitude.
  - 2. Protective device clearing time.
  - 3. Duration of arc.
  - 4. Arc-flash boundary.
  - 5. Restricted approach boundary.
  - 6. Limited approach boundary.
  - 7. Working distance.
  - 8. Incident energy.
  - 9. Hazard risk category.
  - 10. Recommendations for arc-flash energy reduction.
- I. Fault study input data, case descriptions, and fault-current calculations including definition of terms and guide for interpretation of computer printout.

### 2.3 ARC-FLASH WARNING LABELS

- A. Comply with requirements in Section 260553 "Identification" for self-adhesive equipment labels. Produce 3.5-by-5-inch self-adhesive equipment label for each work location included in analysis.
- B. Label shall have orange header with wording, "WARNING, ARC-FLASH HAZARD," and shall include following information taken directly from arc-flash hazard analysis:
  - 1. Location designation.
  - 2. Nominal voltage.
  - 3. Protection boundaries.
    - a. Arc-flash boundary.
    - b. Restricted approach boundary.
    - c. Limited approach boundary.

4. Arc flash PPE category.
  5. Required minimum arc rating of PPE in Cal/cm squared.
  6. Available incident energy.
  7. Working distance.
  8. Engineering report number, revision number, and issue date.
- C. Labels shall be machine printed, with no field-applied markings.

### **PART 3 - EXECUTION**

#### **3.1 EXAMINATION**

- A. Examine Project overcurrent protective device submittals. Proceed with arc-flash study only after relevant equipment submittals have been assembled. Overcurrent protective devices that have not been submitted and approved before arc-flash study may not be used in study.

#### **3.2 ARC-FLASH HAZARD ANALYSIS**

- A. Comply with NFPA 70E and its Annex D for hazard analysis study.
- B. Preparatory Studies: Perform Short-Circuit and Protective Device Coordination studies before starting Arc-Flash Hazard Analysis.
1. Short-Circuit Study Output: As specified in "Short-Circuit Study Output Reports" Paragraph in "Short-Circuit Study Report Contents" Article in Section 260573.13 "Short-Circuit Studies."
  2. Coordination Study Report Contents: As specified in "Coordination Study Report Contents" Article in Section 260573.16 "Coordination Studies."
- C. Calculate maximum and minimum contributions of fault-current size.
1. Maximum calculation shall assume maximum contribution from utility and shall assume motors to be operating under full-load conditions.
  2. Calculate arc-flash energy at 85 percent of maximum short-circuit current per IEEE 1584 recommendations.
- D. Calculate arc-flash protection boundary and incident energy at locations in electrical distribution system where personnel could perform work on energized parts.
- E. Calculate limited, restricted, and prohibited approach boundaries for each location.
- F. Incident energy calculations shall consider accumulation of energy over time when performing arc-flash calculations on buses with multiple sources. Iterative calculations shall take into account changing current contributions, as sources are interrupted or decremented with time. Fault contribution from motors and generators shall be decremented as follows:
1. Fault contribution from induction motors shall not be considered beyond 3 to 5 cycles.
  2. Fault contribution from synchronous motors and generators shall be decayed to match actual decrement of each as closely as possible (for example, contributions from

permanent magnet generators will typically decay from 10 per unit to 3 per unit after 10 cycles).

- G. Arc-flash energy shall generally be reported for maximum of line or load side of circuit breaker. However, arc-flash computation shall be performed and reported for both line and load side of circuit breaker as follows:
  - 1. When circuit breaker is in separate enclosure.
  - 2. When line terminals of circuit breaker are separate from work location.
- H. Base arc-flash calculations on actual overcurrent protective device clearing time. Cap maximum clearing time at 2 seconds based on IEEE 1584, Section B.1.2.

### 3.3 POWER SYSTEM DATA

- A. Obtain data necessary to conduct arc-flash hazard analysis.
  - 1. Verify completeness of data supplied on one-line diagram on Drawings and under "Preparatory Studies" Paragraph in "Arc-Flash Hazard Analysis" Article. Call discrepancies to Architect's attention.
  - 2. For new equipment, use characteristics from approved submittals under provisions of action submittals and information submittals for this Project.
  - 3. For existing equipment, whether or not relocated, obtain required electrical distribution system data by field investigation and surveys conducted by qualified technicians and engineers.
- B. Electrical Survey Data: Gather and tabulate following input data to support study. Comply with recommendations in IEEE 1584 and NFPA 70E as to amount of detail that is required to be acquired in field. Field data gathering shall be under direct supervision and control of engineer in charge of performing study, and shall be by engineer or its representative who holds NETA ETT-Certified Technician Level III or NICET Electrical Power Testing Level III certification. Data include, but are not limited to, following:
  - 1. Product Data for overcurrent protective devices specified in other Sections and involved in overcurrent protective device coordination studies. Use equipment designation tags that are consistent with electrical distribution system diagrams, overcurrent protective device submittals, input and output data, and recommended device settings.
  - 2. Obtain electrical power utility impedance or available short circuit current at service.
  - 3. Power sources and ties.
  - 4. Short-circuit current at each system bus (3 phase and line to ground).
  - 5. Full-load current of loads.
  - 6. Voltage level at each bus.
  - 7. For transformers, include kVA, primary and secondary voltages, connection type, impedance, X/R ratio, taps measured in percent, and phase shift.
  - 8. For circuit breakers and fuses, provide manufacturer and model designation. List type of breaker, type of trip and available range of settings, SCCR, current rating, and breaker settings.
  - 9. Generator short-circuit current contribution data, including short-circuit reactance, rated kVA, rated voltage, and X/R ratio.
  - 10. For relays, provide manufacturer and model designation, current transformer ratios, potential transformer ratios, and relay settings.

11. Motor horsepower and NEMA MG 1 code letter designation.
12. Low-voltage conductor sizes, lengths, number, conductor material and conduit material (magnetic or nonmagnetic).

### 3.4 LABELING

- A. Apply one arc-flash label on front cover of each section of equipment and on side or rear covers with accessible live parts and hinged doors or removable plates for each equipment included in study. Base arc-flash label data on highest values calculated at each location.
- B. Each piece of equipment listed below shall have arc-flash label applied to it:
  1. Low voltage transformers.
  2. Panelboards and safety switches.
  3. Applicable panelboard and safety switch under 250V.
  4. Control panel.
- C. Note on record Drawings location of equipment where personnel could be exposed to arc-flash hazard during their work.
  1. Indicate arc-flash energy.
  2. Indicate protection level required.

### 3.5 APPLICATION OF WARNING LABELS

- A. Install arc-flash warning labels under direct supervision and control of Power System Analysis Specialist.

### 3.6 DEMONSTRATION

- A. Engage Power Systems Analysis Specialist to train Owner's maintenance personnel in potential arc-flash hazards associated with working on energized equipment and significance of arc-flash warning labels.

**END OF SECTION 260573.19**

## SECTION 262213 - LOW-VOLTAGE DISTRIBUTION TRANSFORMERS

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

#### 1.2 SUMMARY

- A. Section includes distribution, dry-type transformers with nominal primary and secondary rating of 600V and less, with capacities up to 1500 kVA.

#### 1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
  - 1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for each type and size of transformer.
  - 2. Include rated nameplate data, capacities, weights, dimensions, minimum clearances, installed devices and features, and performance for each type and size of transformer.
- B. Shop Drawings:
  - 1. Detail equipment assemblies and indicate dimensions, weights, loads, required clearances, method of field assembly, components, and location and size of each field connection.
  - 2. Include diagrams for power, signal, and control wiring.

#### 1.4 INFORMATIONAL SUBMITTALS

- A. Source quality-control reports.
- B. Field quality-control reports.

#### 1.5 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data: For transformers to include in emergency, operation, and maintenance manuals.

## 1.6 DELIVERY, STORAGE, AND HANDLING

- A. Inspection: On receipt, inspect for and note any shipping damage to packaging and transformer.
  - 1. If manufacturer packaging is removed for inspection, and transformer will be stored after inspection, re-package transformer using original or new packaging materials that provide protection equivalent to manufacturer's packaging.
- B. Storage: Store in warm, dry, and temperature-stable location in original shipping packaging.
- C. Temporary Heating: Apply temporary heat according to manufacturer's written instructions within enclosure of each ventilated-type unit, throughout periods during which equipment is not energized and when transformer is not in space that is continuously under normal control of temperature and humidity.
- D. Handling: Follow manufacturer's instructions for lifting and transporting transformers.

## 1.7 WARRANTY

- A. Manufacturer's Warranty: Manufacturer agrees to repair or replace panelboards that fail in materials or workmanship within specified warranty period.
  - 1. Low-Voltage Distribution Transformer Warranty Period: Eighteen months from date of Substantial Completion.

## PART 2 - PRODUCTS

### 2.1 MANUFACTURERS

- A. Low-voltage distribution transformers shall be manufactured by ABB, Eaton, Schneider Electric, or Siemens.
- B. Source Limitations: Obtain each transformer type from single source from single manufacturer.

### 2.2 GENERAL TRANSFORMER REQUIREMENTS

- A. Description: Factory-assembled and -tested, air-cooled units for 60-hertz service.
- B. Comply with NFPA 70.
  - 1. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by qualified testing agency, and marked for intended location and use.
- C. Transformers Rated 15 kVA and Larger:
  - 1. Comply with 10 CFR 431 (DOE 2016) efficiency levels.
  - 2. Marked as compliant with DOE 2016 efficiency levels by NRTL.

- D. Shipping Restraints: Paint or otherwise color-code bolts, wedges, blocks, and other restraints that are to be removed after installation and before energizing. Use fluorescent colors that are easily identifiable inside transformer enclosure.

## 2.3 DISTRIBUTION TRANSFORMERS

- A. Comply with NFPA 70.
- B. Cores: Electrical grade, non-aging silicon steel with high permeability and low hysteresis losses.
  - 1. One leg per phase.
  - 2. Grounded to enclosure.
- C. Coils: Continuous windings except for taps.
  - 1. Coil Material: Aluminum.
  - 2. Internal Coil Connections: Brazed or pressure type.
  - 3. Terminal Connections: Welded.
- D. Enclosure: Ventilated.
  - 1. NEMA 250, Type 3R: Core and coil shall be encapsulated within resin compound, sealing out moisture and air.
  - 2. Wiring Compartment: Sized for conduit entry and wiring installation.
- E. Taps: Two 2.5 percent taps above and two 2.5 percent taps below normal full capacity.
- F. Insulation Class, 30 kVA and Larger: 220 degrees C, UL-component-recognized insulation system with maximum of 150 degrees C rise above 40 degrees C ambient temperature.
- G. Grounding: Provide ground-bar kit or ground bar installed on inside of transformer enclosure.
- H. Low-Sound-Level Requirements: Maximum sound levels when factory tested according to IEEE C57.12.91, as follows:
  - 1. 30.01 to 50.00 kVA: 45 dBA.
  - 2. 150.01 to 300.00 kVA: 55 dBA.

## 2.4 IDENTIFICATION

- A. Nameplates: Engraved, laminated-acrylic or melamine plastic signs for each distribution transformer, mounted with corrosion-resistant screws. Nameplates and label products are specified in Section 260553 "Identification."

## 2.5 SOURCE QUALITY CONTROL

- A. Test and inspect transformers according to IEEE C57.12.01 and IEEE C57.12.91.
  - 1. Resistance measurements of windings at rated voltage connections and at tap connections.
  - 2. Ratio tests at rated voltage connections and at tap connections.

3. Phase relation and polarity tests at rated voltage connections.
4. No load losses, and excitation current and rated voltage at rated voltage connections.
5. Impedance and load losses at rated current and rated frequency at rated voltage connections.
6. Applied and induced tensile tests.
7. Regulation and efficiency at rated load and voltage.
8. Insulation-Resistance Tests:
  - a. High-voltage to ground.
  - b. Low-voltage to ground.
  - c. High-voltage to low-voltage.
9. Temperature tests.

### **PART 3 - EXECUTION**

#### **3.1 EXAMINATION**

- A. Examine conditions for compliance with enclosure- and ambient-temperature requirements for each transformer.
- B. Verify that field measurements are as needed to maintain working clearances required by NFPA 70 and manufacturer's written instructions.
- C. Examine walls, floors, roofs, and concrete bases for suitable mounting conditions where transformers will be installed.
- D. Verify that ground connections are in place and requirements in Section 260526 "Grounding and Bonding" have been met. Maximum ground resistance shall be 5 ohms at location of transformer.
- E. Environment: Enclosures shall be rated for environment in which they are located. Covers for NEMA 250, Type 4X enclosures shall not cause accessibility problems.
- F. Proceed with installation only after unsatisfactory conditions have been corrected.

#### **3.2 INSTALLATION**

- A. Construct concrete bases and anchor floor-mounted transformers per manufacturer's written instructions and requirements in Section 260529 "Hangers and Supports."
  1. Coordinate size and location of concrete bases with actual transformer provided. Cast anchor-bolt inserts into bases. Concrete, reinforcement, and formwork requirements are specified with concrete.
- B. Secure transformer to concrete base according to manufacturer's written instructions.
- C. Secure covers to enclosure and tighten bolts to manufacturer-recommended torques to reduce noise generation.

- D. Remove shipping bolts, blocking, and wedges.

### 3.3 CONNECTIONS

- A. Ground equipment according to Section 260526 "Grounding and Bonding."
- B. Connect wiring according to Section 260519 "Low-Voltage Power Conductors and Cables."
- C. Tighten electrical connectors and terminals according to manufacturer's published torque-tightening values. If manufacturer's torque values are not indicated, use those specified in UL 486A-486B.
- D. Provide flexible connections at conduit and conductor terminations and supports to eliminate sound and vibration transmission to building structure.

### 3.4 FIELD QUALITY CONTROL

- A. Perform tests and inspections with assistance of factory-authorized service representative.
- B. Dry-Type Transformer Field Tests:
  - 1. Visual and Mechanical Inspection.
    - a. Inspect physical and mechanical condition.
    - b. Inspect anchorage, alignment, and grounding.
    - c. Verify that resilient mounts are free and that any shipping brackets have been removed.
    - d. Verify unit is clean.
    - e. Perform specific inspections and mechanical tests recommended by manufacturer.
    - f. Verify that as-left tap connections are as specified.
    - g. Verify presence of surge arresters and that their ratings are as specified.
  - 2. Electrical Tests:
    - a. Measure resistance at each winding, tap, and bolted connection.
    - b. Perform insulation-resistance tests winding-to-winding and each winding-to-ground. Apply voltage according to manufacturer's published data. In absence of manufacturer's published data, comply with NETA ATS, Table 100.5. Calculate polarization index: value of index shall not be less than 1.0.
    - c. Perform turns-ratio tests at tap positions. Test results shall not deviate by more than one-half percent from either adjacent coils or calculated ratio. If test fails, replace transformer.
    - d. Verify correct secondary voltage, phase-to-phase and phase-to-neutral, after energization and before loading.
- C. Remove and replace units that do not pass tests or inspections and retest as specified above.
- D. Infrared Scanning: Two months after Substantial Completion, perform infrared scan of transformer connections.
  - 1. Use infrared-scanning device designed to measure temperature or detect significant deviations from normal values. Provide documentation of device calibration.

2. Perform 2 follow-up infrared scans of transformers, one at 4 months and other at 11 months after Substantial Completion.
  3. Prepare certified report identifying transformer checked and describing results of scanning. Include notation of deficiencies detected, remedial action taken, and scanning observations after remedial action.
- E. Test Labeling: On completion of satisfactory testing of each unit, attach dated and signed "Satisfactory Test" label to tested component.

### 3.5 ADJUSTING

- A. Record transformer secondary voltage at each unit for at least 48 hours of typical occupancy period. Adjust transformer taps to provide optimum voltage conditions at secondary terminals. Optimum is defined as not exceeding nameplate voltage plus 5 percent and not being lower than nameplate voltage minus 3 percent at maximum load conditions. Submit recording and tap settings as test results.
- B. Output Settings Report: Prepare written report recording output voltages and tap settings.

### 3.6 CLEANING

- A. Vacuum dirt and debris; do not use compressed air to assist in cleaning.

**END OF SECTION 262213**

## SECTION 262416 - PANELBOARDS

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

#### 1.2 SUMMARY

- A. Section Includes distribution panelboards.

#### 1.3 DEFINITIONS

- A. ATS: Acceptance testing specification.
- B. MCCB: Molded-case circuit breaker.
- C. SPD: Surge protective device.

#### 1.4 ACTION SUBMITTALS

- A. Product Data: For each type of panelboard.
  - 1. Include materials, switching and overcurrent protective devices, SPDs, accessories, and components indicated.
  - 2. Include dimensions and manufacturers' technical data on features, performance, electrical characteristics, ratings, and finishes.
- B. Shop Drawings: For each panelboard and related equipment.
  - 1. Include dimensioned plans, elevations, sections, and details.
  - 2. Show tabulations of installed devices with nameplates, conductor termination sizes, equipment features, and ratings.
  - 3. Detail enclosure types including mounting and anchorage, environmental protection, knockouts, corner treatments, covers and doors, gaskets, hinges, and locks.
  - 4. Detail bus configuration, current, and voltage ratings.
  - 5. Short-circuit current rating of panelboards and overcurrent protective devices.
  - 6. Include evidence of NRTL listing for SPD as installed in panelboard.
  - 7. Detail features, characteristics, ratings, and factory settings of individual overcurrent protective devices and auxiliary components.
  - 8. Include wiring diagrams for power, signal, and control wiring.

9. Include time-current coordination curves for each type and rating of overcurrent protective device included in panelboards. Include Internet link for electronic access to downloadable PDF of coordination curves.

#### 1.5 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For testing agency.
- B. Panelboard Schedules: For installation in panelboards.

#### 1.6 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data: For panelboards and components to include in emergency, operation, and maintenance manuals. In addition to items specified in Section 017823 "Operation and Maintenance Data," include following:
  1. Manufacturer's written instructions for testing and adjusting overcurrent protective devices.
  2. Time-current curves, including selectable ranges for each type of overcurrent protective device that allows adjustments.

#### 1.7 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
  1. Keys: Two spares for each type of panelboard cabinet lock.

#### 1.8 QUALITY ASSURANCE

- A. Manufacturer Qualifications: ISO 9001 or ISO 9002 certified.

#### 1.9 DELIVERY, STORAGE, AND HANDLING

- A. Remove loose packing and flammable materials from inside panelboards; install temporary electric heating (250W per panelboard) to prevent condensation.
- B. Handle and prepare panelboards for installation per NECA 407.

## 1.10 FIELD CONDITIONS

- A. Environmental Limitations:
  - 1. Rate equipment for continuous operation under following conditions unless otherwise indicated:
    - a. Ambient Temperature: Not exceeding 23 degrees F to plus 104 degrees F.
- B. Interruption of Existing Electric Service: Do not interrupt electric service to facilities occupied by Owner or others unless permitted under following conditions and then only after arranging to provide temporary electric service per requirements indicated:
  - 1. Notify Owner no fewer than 14 days in advance of proposed interruption of electric service.
  - 2. Do not proceed with interruption of electric service without Owner's written permission.
  - 3. Comply with NFPA 70E.

## 1.11 WARRANTY

- A. Manufacturer's Warranty: Manufacturer agrees to repair or replace panelboards that fail in materials or workmanship within specified warranty period.
  - 1. Panelboard Warranty Period: Eighteen months from date of Substantial Completion.
- B. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace SPD that fails in materials or workmanship within specified warranty period.
  - 1. SPD Warranty Period: Five years from date of Substantial Completion.

## PART 2 - PRODUCTS

### 2.1 PANELBOARDS COMMON REQUIREMENTS

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by qualified testing agency, and marked for intended location and application.
- B. Comply with NEMA PB 1.
- C. Comply with NFPA 70.
- D. Enclosures: Surface-mounted, dead-front cabinets.
  - 1. NEMA 250, Type 3R.
  - 2. Height: 84 inches maximum.
  - 3. Hinged Front Cover: Entire front trim hinged to box and with standard door within hinged trim cover. Trims shall cover live parts and shall have no exposed hardware.
  - 4. Finishes:
    - a. Panels and Trim: Steel and galvanized steel, factory finished immediately after cleaning and pretreating with manufacturer's standard 2-coat, baked-on finish consisting of prime coat and thermosetting topcoat.
    - b. Back Boxes: Galvanized steel.

- E. Phase, Neutral, and Ground Buses:
  - 1. Material: Hard-drawn copper, 98 percent conductivity.
    - a. Plating shall run entire length of bus.
    - b. Bus shall be fully rated entire length.
  - 2. Interiors shall be factory assembled into unit. Replacing switching and protective devices shall not disturb adjacent units or require removing main bus connectors.
  - 3. Equipment Ground Bus: Adequate for feeder and branch-circuit equipment grounding conductors; bonded to box.
  - 4. Full-Sized Neutral: Equipped with full-capacity bonding strap for service entrance applications. Mount electrically isolated from enclosure. Do not mount neutral bus in gutter.
- F. Conductor Connectors: Suitable for use with conductor material and sizes.
  - 1. Material: Hard-drawn copper, 98 percent conductivity.
  - 2. Terminations shall allow use of 75 degrees C rated conductors without derating.
  - 3. Size: Lugs suitable for indicated conductor sizes, with additional gutter space, if required, for larger conductors.
  - 4. Main and Neutral Lugs: Compression type, with lug on neutral bar for each pole in panelboard.
  - 5. Ground Lugs and Bus-Configured Terminators: Compression type, with lug on bar for each pole in panelboard.
- G. Future Devices: Panelboards shall have mounting brackets, bus connections, filler plates, and necessary appurtenances required for future installation of devices.
- H. Panelboard Short-Circuit Current Rating: Fully rated to interrupt symmetrical short-circuit current available at terminals. Assembly listed by NRTL for 100 percent interrupting capacity.

## 2.2 PERFORMANCE REQUIREMENTS

- A. Surge Suppression: Factory installed as integral part of indicated panelboards, complying with UL 1449 SPD Type 2.

## 2.3 POWER PANELBOARDS

- A. Power panelboards shall be by Square D. Equal alternative manufacturers shall only be selected with owner approval.
- B. Panelboards: NEMA PB 1, distribution type.
- C. Doors: Secured with vault-type latch with tumbler lock; keyed alike.
  - 1. For doors more than 36 inches high, provide 2 latches, keyed alike.
- D. Mains: Lugs only.
- E. Branch Overcurrent Protective Devices: Bolt-on circuit breakers or plug-in circuit breakers where individual positive-locking device requires mechanical release for removal.

## 2.4 DISCONNECTING AND OVERCURRENT PROTECTIVE DEVICES

- A. MCCB: Comply with UL 489, with interrupting capacity to meet available fault currents.
  - 1. Thermal-Magnetic Circuit Breakers:
    - a. Inverse time-current element for low-level overloads.
    - b. Instantaneous magnetic trip element for short circuits.
  - 2. Electronic Trip Circuit Breakers:
    - a. RMS sensing.
    - b. Field-replaceable rating plug or electronic trip.
    - c. Digital display of settings, trip targets, and indicated metering displays.
    - d. Multi-button keypad to access programmable functions and monitored data.
    - e. Ten-event, trip-history log. Each trip event shall be recorded with type, phase, and magnitude of fault that caused trip.
    - f. Integral test jack for connection to portable test set or laptop computer.
    - g. Field-Adjustable Settings:
      - 1) Instantaneous trip.
      - 2) Long- and short-time pickup levels.
      - 3) Long and short time adjustments.
  - 3. MCCB Features and Accessories:
    - a. Standard frame sizes, trip ratings, and number of poles.
    - b. Breaker handle indicates tripped status.
    - c. UL listed for reverse connection without restrictive line or load ratings.
    - d. Lugs: Compression style, suitable for number, size, trip ratings, and conductor materials.
    - e. Application Listing: Appropriate for application.
    - f. Rating Plugs: Three-pole breakers with ampere ratings greater than 150A shall have interchangeable rating plugs or electronic adjustable trip units.
    - g. Auxiliary Contacts: One, SPDT switch with "a" and "b" contacts; "a" contacts mimic circuit-breaker contacts and "b" contacts operate in reverse of circuit-breaker contacts.
    - h. Multipole units enclosed in single housing with single handle.

## 2.5 IDENTIFICATION

- A. Panelboard Label: Manufacturer's name and trademark, voltage, amperage, number of phases, and number of poles shall be located on interior of panelboard door.
- B. Breaker Labels: Faceplate shall list current rating, UL and IEC certification standards, and AIC rating.
- C. Circuit Directory: Computer-generated circuit directory inside panelboard door, mounted in metal frame with transparent protective cover.
  - 1. Circuit directory shall identify specific purpose with detail sufficient to distinguish it from other circuits.

## 2.6 ACCESSORY COMPONENTS AND FEATURES

- A. Accessory Set: Include tools and miscellaneous items required for overcurrent protective device test, inspection, maintenance, and operation.
- B. Portable Test Set: For testing functions of solid-state trip devices without removing from panelboard. Include relay and meter test plugs suitable for testing panelboard meters and switchboard class relays.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Verify actual conditions with field measurements before ordering panelboards to verify that equipment fits in allocated space in, and comply with, minimum required clearances specified in NFPA 70.
- B. Receive, inspect, handle, and store panelboards per NECA 407.
- C. Examine panelboards before installation. Reject panelboards that are damaged, rusted, or have been subjected to water saturation.
- D. Examine elements and surfaces to receive panelboards for compliance with installation tolerances and other conditions affecting performance of Work.
- E. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.2 INSTALLATION

- A. Coordinate layout and installation of panelboards and components with other construction that penetrates walls or is supported by them, including electrical and other types of equipment, raceways, piping, encumbrances to workspace clearance requirements, and adjacent surfaces. Maintain required workspace clearances and required clearances for equipment access doors and panels.
- B. Comply with NECA 1.
- C. Install panelboards and accessories per NECA 407.
- D. Equipment Mounting:
  - 1. Install panelboards on cast-in-place concrete equipment base(s).
  - 2. Attach panelboard to vertical finished or structural surface behind panelboard.
- E. Temporary Lifting Provisions: Remove temporary lifting eyes, channels, and brackets and temporary blocking of moving parts from panelboards.

- F. Mount top of trim 90 inches above finished floor unless otherwise indicated.
- G. Mount panelboard cabinet plumb and rigid without distortion of box.
- H. Mount recessed panelboards with fronts uniformly flush with wall finish and mating with back box.
- I. Mount surface-mounted panelboards to steel slotted supports 5/8 inch in depth. Orient steel slotted supports vertically.
- J. Install overcurrent protective devices and controllers not already factory installed.
  - 1. Set field-adjustable, circuit-breaker trip ranges.
  - 2. Tighten bolted connections and circuit breaker connections using calibrated torque wrench or torque screwdriver per manufacturer's written instructions.
- K. Make grounding connections and bond neutral for services and separately derived systems to ground. Make connections to grounding electrodes, separate grounds for isolated ground bars, and connections to separate ground bars.
- L. Install filler plates in unused spaces.
- M. Arrange conductors in gutters into groups and bundle and wrap with wire ties.

### 3.3 IDENTIFICATION

- A. Identify field-installed conductors, interconnecting wiring, and components; install warning signs complying with requirements in Section 260553 "Identification."
- B. Create directory to indicate installed circuit loads; incorporate Owner's final room designations. Obtain approval before installing. Handwritten directories are not acceptable. Install directory inside panelboard door.
- C. Panelboard Nameplates: Label each panelboard with nameplate complying with requirements for identification specified in Section 260553 "Identification."
- D. Device Nameplates: Label each branch circuit device in power panelboards with nameplate complying with requirements for identification specified in Section 260553 "Identification."

### 3.4 FIELD QUALITY CONTROL

- A. Perform tests and inspections. Manufacturer's Field Service: Engage factory-authorized service representative to inspect components, assemblies, and equipment installations, including connections, and to assist in testing.
- B. Acceptance Testing Preparation:
  - 1. Test insulation resistance for each panelboard bus, component, connecting supply, feeder, and control circuit.

2. Test continuity of each circuit.
- C. Tests and Inspections:
1. Perform each visual and mechanical inspection and electrical test for low-voltage air circuit breakers and low-voltage surge arrestors stated in NETA ATS, Paragraph 7.6 Circuit Breakers and Paragraph 7.19.1 Surge Arrestors, Low-Voltage. Do not perform optional tests. Certify compliance with test parameters.
  2. Correct malfunctioning units on-site, where possible, and retest to demonstrate compliance; otherwise, replace with new units and retest.
  3. Perform following infrared scan tests and inspections and prepare reports:
    - a. Initial Infrared Scanning: After Substantial Completion, but not more than 60 days after Final Acceptance, perform infrared scan of each panelboard. Remove front panels so joints and connections are accessible to portable scanner.
    - b. Follow-up Infrared Scanning: Perform additional follow-up infrared scan of each panelboard 11 months after date of Substantial Completion.
    - c. Instruments and Equipment: Use infrared scanning device designed to measure temperature or to detect significant deviations from normal values. Provide calibration record for device.
- D. Panelboards will be considered defective if they do not pass tests and inspections.
- E. Prepare test and inspection reports, including certified report that identifies panelboards included and that describes scanning results, with comparisons of 2 scans. Include notation of deficiencies detected, remedial action taken, and observations after remedial action.

### 3.5 ADJUSTING

- A. Adjust moving parts and operable components to function smoothly and lubricate as recommended by manufacturer.
- B. Set field-adjustable circuit-breaker trip ranges as specified in Section 260573.16 "Coordination Studies."

### 3.6 PROTECTION

- A. Temporary Heating: Before energizing panelboards, apply temporary heat to maintain temperature per manufacturer's written instructions.

**END OF SECTION 262416**

## SECTION 262726 - WIRING DEVICES

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

#### 1.2 SUMMARY

- A. Section Includes:
  1. Standard-grade receptacles, 125V, 20A.
  2. GFCI receptacles, 125V, 20A.
  3. Toggle switches, 120/277V, 20A.
  4. Wall plates.

#### 1.3 DEFINITIONS

- A. GFCI: Ground-fault circuit interrupter.
- B. Pigtail: Short lead used to connect device to branch-circuit conductor.

#### 1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Shop Drawings: List of legends and description of materials and process used for pre-marking wall plates.

#### 1.5 INFORMATIONAL SUBMITTALS

- A. Field quality-control reports.

#### 1.6 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data: For wiring devices to include in manufacturers' packing-label warnings and instruction manuals that include labeling conditions.

## PART 2 - PRODUCTS

### 2.1 GENERAL WIRING-DEVICE REQUIREMENTS

- A. Wiring Devices, Components, and Accessories: Listed and labeled as defined in NFPA 70, by qualified testing agency, and marked for intended location and use.
- B. Comply with NFPA 70.
- C. RoHS compliant.
- D. Comply with NEMA WD 1.
- E. Device Color: As selected by Owner unless otherwise indicated or required by NFPA 70 or device listing.
- F. Provide factory markings on faces of receptacles that are controlled for energy management or building automation. Markings shall be compliant with National Electrical Code, Article 406.3(E), including symbol and word "Controlled."
- G. Wall Plate Color: For plastic covers, match device color.
- H. Source Limitations: Obtain each type of wiring device and associated wall plate from single source from single manufacturer.

### 2.2 STANDARD-GRADE RECEPTACLES, 125V, 20A

- A. Duplex Receptacles, 125V, 20A:
  - 1. Description: Two-pole, 3-wire, and self-grounding.
  - 2. Configuration: NEMA WD 6, Configuration 5-20R.
  - 3. Standards: Comply with UL 498 and FS W-C-596.
- B. Weather-Resistant Duplex Receptacle, 125V, 20A:
  - 1. Description: Two-pole, 3-wire, and self-grounding. Integral shutters that operate only when plug is inserted in receptacle. Square face.
  - 2. Configuration: NEMA WD 6, Configuration 5-20R.
  - 3. Standards: Comply with UL 498.
  - 4. Marking: Listed and labeled as complying with NFPA 70, "Receptacles in Damp or Wet Locations" Article.

### 2.3 GFCI RECEPTACLES, 125V, 20A

- A. Duplex GFCI Receptacles, 125V, 20A:
  - 1. Description: Integral GFCI with "Test" and "Reset" buttons and LED indicator light. Two-pole, 3 wire, and self-grounding.
  - 2. Configuration: NEMA WD 6, Configuration 5-20R.

3. Type: Non-feed through.
4. Standards: Comply with UL 498, UL 943 Class A, and FS W-C-596.

#### 2.4 TOGGLE SWITCHES, 120/277V, 20A

- A. Single-Pole Switches, 120/277V, 20A: Standards: Comply with UL 20 and FS W-S-896.

#### 2.5 WALL PLATES

- A. Single Source: Obtain wall plates from same manufacturer of wiring devices.
- B. Single and combination types shall match corresponding wiring devices.
  1. Plate-Securing Screws: Metal with head color to match plate finish.
  2. Material for Finished Spaces: Smooth, high-impact thermoplastic.
  3. Material for Unfinished Spaces: Galvanized steel.
  4. Material for Damp Locations: Thermoplastic with spring-loaded lift cover and listed and labeled for use in wet and damp locations.
- C. Wet-Location, Weatherproof Cover Plates: NEMA 250, complying with Type 3R, weather-resistant, die-cast aluminum with lockable cover.

### **PART 3 - EXECUTION**

#### 3.1 INSTALLATION

- A. Comply with NECA 1, including mounting heights listed in that standard, unless otherwise indicated.
- B. Coordination with Other Trades:
  1. Protect installed devices and their boxes. Do not place wall finish materials over device boxes, and do not cut holes for boxes with routers that are guided by riding against outside of boxes.
  2. Keep outlet boxes free of plaster, drywall joint compound, mortar, cement, concrete, dust, paint, and other material that may contaminate raceway system, conductors, and cables.
  3. Install device boxes in brick or block walls so that cover plate does not cross joint unless joint is troweled flush with face of wall.
  4. Install wiring devices after wall preparation, including painting, is complete.
- C. Conductors:
  1. Do not strip insulation from conductors until right before they are spliced or terminated on devices.
  2. Strip insulation evenly around conductor using tools designed for purpose. Avoid scoring or nicking of solid wire or cutting strands from stranded wire.
  3. Length of free conductors at outlets for devices shall comply with NFPA 70, Article 300, without pigtails.

4. Existing Conductors:
  - a. Cut back and pig-tail or replace damaged conductors.
  - b. Straighten conductors that remain and remove corrosion and foreign matter.
  - c. Pig-tailing existing conductors is permitted, provided outlet box is large enough.
  
- D. Device Installation:
  1. Replace devices that have been in temporary use during construction and that were installed before building finishing operations were complete.
  2. Keep each wiring device in its package or otherwise protected until it is time to connect conductors.
  3. Do not remove surface protection, such as plastic film and smudge covers, until last possible moment.
  4. Connect devices to branch circuits using pigtails that are not less than 6 inches in length.
  5. When there is choice, use side wiring with binding-head screw terminals. Wrap solid conductor tightly clockwise, two-thirds to three-fourths of way around terminal screw.
  6. Use torque screwdriver when torque is recommended or required by manufacturer.
  7. When conductors larger than 12 AWG are installed on 20A circuits, splice 12 AWG pigtails for device connections.
  8. Tighten unused terminal screws on device.
  9. When mounting into metal boxes, remove fiber or plastic washers used to hold device-mounting screws in yokes, allowing metal-to-metal contact.
  
- E. Device Plates: Do not use oversized or extra-deep plates. Repair wall finishes and remount outlet boxes when standard device plates do not fit flush or do not cover rough wall opening.
  
- F. Arrangement of Devices: Unless otherwise indicated, mount flush, with long dimension vertical. Group adjacent switches under single, multi-gang wall plates.

### 3.2 IDENTIFICATION

- A. Comply with Section 260553 "Identification."
  
- B. Identify each receptacle with panelboard identification and circuit number. Use hot, stamped, or engraved machine printing with black-filled lettering on face of plate, and durable wire markers or tags inside outlet boxes.

### 3.3 FIELD QUALITY CONTROL

- A. Perform following tests and inspections:
  1. Test Instruments: Use instruments that comply with UL 1436.
  2. Test Instrument for Receptacles: Digital wiring analyzer with digital readout or illuminated digital-display indicators of measurement.
  
- B. Tests for Receptacles:
  1. Line Voltage: Acceptable range is 105 to 132 V.
  2. Percent Voltage Drop under 15-A Load: A value of 6 percent or higher is unacceptable.
  3. Ground Impedance: Values of up to 2 ohms are acceptable.

4. GFCI Trip: Test for tripping values specified in UL 1436 and UL 943.
  5. Using test plug, verify that device and its outlet box are securely mounted.
  6. Tests shall be diagnostic, indicating damaged conductors, high resistance at circuit breaker, poor connections, inadequate fault-current path, defective devices, or similar problems. Correct circuit conditions, remove malfunctioning units and replace with new ones, and retest as specified above.
- C. Wiring device will be considered defective if it does not pass tests and inspections.
- D. Prepare test and inspection reports.

**END OF SECTION 262726**

## SECTION 262813 - FUSES

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

#### 1.2 SUMMARY

- A. Section Includes:
  - 1. Cartridge fuses rated 600V ac and less for use in following:
    - a. Control circuits.
    - b. Enclosed controllers.
    - c. Enclosed switches.

#### 1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product. Include construction details, material descriptions, dimensions of individual components and profiles. Include following for each fuse type indicated:
  - 1. Ambient Temperature Adjustment Information: If ratings of fuses have been adjusted to accommodate ambient temperatures, provide list of fuses with adjusted ratings.
    - a. For each fuse having adjusted ratings, include location of fuse, original fuse rating, local ambient temperature, and adjusted fuse rating.
    - b. Provide manufacturer's technical data on which ambient temperature adjustment calculations are based.
  - 2. Dimensions and manufacturer's technical data on features, performance, electrical characteristics, and ratings.

#### 1.4 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data: For fuses to include in emergency, operation, and maintenance manuals. Include following:
  - 1. Ambient temperature adjustment information.
  - 2. Current-limitation curves for fuses with current-limiting characteristics.
  - 3. Time-current coordination curves (average melt) and current-limitation curves (instantaneous peak let-through current) for each type and rating of fuse used on Project. Submit in PDF format.
  - 4. Coordination charts and tables and related data.

## 1.5 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
  - 1. Fuses: Equal to 10 percent of quantity installed for each size and type, but no fewer than 3 of each size and type.

## 1.6 FIELD CONDITIONS

- A. Where ambient temperature to which fuses are directly exposed is less than 40 degrees F or more than 100 degrees F, apply manufacturer's ambient temperature adjustment factors to fuse ratings.

## **PART 2 - PRODUCTS**

### 2.1 MANUFACTURERS

- A. Source Limitations: Obtain fuses, for use within specific product or circuit, from single source from single manufacturer.

### 2.2 CARTRIDGE FUSES

- A. Characteristics: NEMA FU 1, current-limiting, nonrenewable cartridge fuses with voltage ratings consistent with circuit voltages.
  - 1. Type RK-1: 250V, zero- to 600A rating, 200 kAIC, time delay.
  - 2. Type CC: 600V, zero- to 30A rating, 200 kAIC[, time delay.
  - 3. Type J: 600V, zero- to 600A rating, 200 kAIC.
- B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by qualified testing agency, and marked for intended location and application.
- C. Comply with NEMA FU 1 for cartridge fuses.
- D. Comply with NFPA 70.
- E. Coordinate fuse ratings with utilization equipment nameplate limitations of maximum fuse size and with system short-circuit current levels.

## **PART 3 - EXECUTION**

### **3.1 EXAMINATION**

- A. Examine fuses before installation. Reject fuses that are moisture damaged or physically damaged.
- B. Examine holders to receive fuses for compliance with installation tolerances and other conditions affecting performance, such as rejection features.
- C. Examine utilization equipment nameplates and installation instructions. Install fuses of sizes and with characteristics appropriate for each piece of equipment.
- D. Evaluate ambient temperatures to determine if fuse rating adjustment factors must be applied to fuse ratings.
- E. Proceed with installation only after unsatisfactory conditions have been corrected.

### **3.2 FUSE APPLICATIONS**

- A. Cartridge Fuses:
  - 1. Feeders: Class RK1, time delay.
  - 2. Motor Branch Circuits: Class RK1, time delay.
  - 3. Power Electronics Circuits: Class J, high speed.
  - 4. Other Branch Circuits: Class RK1, time delay.
  - 5. Control Transformer Circuits: Class CC, time delay, control transformer duty.

### **3.3 INSTALLATION**

- A. Install fuses in fusible devices. Arrange fuses so rating information is readable without removing fuse.

### **3.4 IDENTIFICATION**

- A. Install labels complying with requirements for identification specified in Section 260553 "Identification" and indicating fuse replacement information inside of door of each fused switch and adjacent to each fuse block, socket, and holder.

**END OF SECTION 262813**

## SECTION 263213.14 - DIESEL ENGINE GENERATORS

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

#### 1.2 SUMMARY

- A. Section includes packaged engine generators used to supply non-emergency power, with following features:
  - 1. Diesel engine.
  - 2. Diesel fuel-oil system.
  - 3. Control and monitoring.
  - 4. Generator overcurrent and fault protection.
  - 5. Generator, exciter, and voltage regulator.
  - 6. Outdoor engine generator enclosure.
  - 7. Vibration isolation devices.
  - 8. Finishes.
- B. Related Requirements: Section 263600 "Transfer Switches" for transfer switches including sensors and relays to initiate automatic-starting and -stopping signals for engine generators.

#### 1.3 DEFINITIONS

- A. Operational Bandwidth: Total variation from lowest to highest value of parameter over range of conditions indicated, expressed as percentage of nominal value of parameter.

#### 1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product.
  - 1. Include rated capacities, operating characteristics, electrical characteristics, and furnished specialties and accessories.
  - 2. Include thermal damage curve for generator.
  - 3. Include time-current characteristic curves for generator protective device.
  - 4. Include fuel consumption in gallons per hour at 0.8 power factor at 0.5, 0.75, and 1.0 times generator capacity.
  - 5. Include generator efficiency at 0.8 power factor at 0.5, 0.75, and 1.0 times generator capacity.

6. Include airflow requirements for cooling and combustion air in cubic feet per minute at 0.8 power factor, with air-supply temperature of 95, 80, 70, and 50 degrees F. Provide Drawings indicating requirements and limitations for location of air intake and exhausts.
7. Include generator characteristics, including, but not limited to, kilowatt rating, efficiency, reactances, and short-circuit current capability.

B. Shop Drawings:

1. Include plans and elevations for engine generator and other components specified. Indicate access requirements affected by height of subbase fuel tank.
2. Include details of equipment assemblies. Indicate dimensions, weights, loads, required clearances, method of field assembly, components, and location and size of each field connection.
3. Identify fluid drain ports and clearance requirements for proper fluid drain.
4. Design calculations for selecting vibration isolators and for designing vibration isolation bases.
5. Vibration Isolation Base Details: Detail fabrication including anchorages and attachments to structure and to supported equipment. Include base weights.
6. Include diagrams for power, signal, and control wiring. Complete schematic, wiring, and interconnection diagrams showing terminal markings for engine generators and functional relationship between electrical components.

## 1.5 INFORMATIONAL SUBMITTALS

A. Qualification Data: For Installer and manufacturer.

B. Source Quality-Control Reports: Including, but not limited to, following:

1. Certified summary of prototype-unit test report.
2. Certified Test Reports: For components and accessories that are equivalent, but not identical, to those tested on prototype unit.
3. Report of factory test on units to be shipped for this Project, showing evidence of compliance with specified requirements.
4. Report of sound generation.
5. Report of exhaust emissions showing compliance with applicable regulations.

C. Field quality-control reports.

**D. Submit manufacturer's startup and verification reports and NFPA 110 test reports to Engineer of Record for review.**

E. Warranty: For special warranty.

## 1.6 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For packaged engine generators to include in emergency, operation, and maintenance manuals.

1. In addition to items specified in Section 017823 "Operation and Maintenance Data," include following:

- a. List of tools and replacement items recommended to be stored at Project for ready access. Include part and drawing numbers, current unit prices, and source of supply.
- b. Operating instructions laminated and mounted adjacent to generator location.
- c. Training plan.

#### 1.7 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
  - 1. Fuses: One for every 10 of each type and rating, but no fewer than one of each.
  - 2. Indicator Lamps: Two for every 6 of each type used, but no fewer than 2 of each.
  - 3. Filters: One set each of lubricating oil, fuel, and combustion-air filters.
  - 4. Tools: Each tool listed by part number in operations and maintenance manual.

#### 1.8 QUALITY ASSURANCE

- A. Installer Qualifications: Authorized representative who is trained and approved by manufacturer.

#### 1.9 WARRANTY

- A. Manufacturer's Warranty: Manufacturer agrees to repair or replace components of packaged engine generators and associated auxiliary components that fail in materials or workmanship within specified warranty period.
  - 1. Warranty Period: Five years from date of Substantial Completion.

### **PART 2 - PRODUCTS**

#### 2.1 MANUFACTURERS

- A. Diesel engine generators shall be manufactured by Cummins or equal approved by Owner and Engineer.
- B. Source Limitations: Obtain packaged engine generators and auxiliary components from single source from single manufacturer.

#### 2.2 PERFORMANCE REQUIREMENTS

- A. B11 Compliance: Comply with B11.19.
- B. NFPA Compliance:

1. Comply with NFPA 37.
  2. Comply with NFPA 70.
- C. UL Compliance: Comply with UL 2200.
- D. Noise Emission: Comply with applicable state and local government requirements for maximum noise level at adjacent property boundaries due to sound emitted by engine generator including engine, engine exhaust, engine cooling-air intake and discharge, and other components of installation.
- E. Environmental Conditions: Engine generator system shall withstand following environmental conditions without mechanical or electrical damage or degradation of performance capability:
1. Ambient Temperature: 5 to 104 degrees F.
  2. Altitude: Sea level to 1000 feet.

### 2.3 ENGINE GENERATOR ASSEMBLY DESCRIPTION

- A. Factory-assembled and -tested, water-cooled engine, with brushless generator and accessories.
- B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by qualified testing agency, and marked for intended location and use.
- C. Power Rating: Standby.
- D. Service Load: 450 kW.
- E. Power Factor: 0.8, lagging.
- F. Frequency: 60 hertz.
- G. Voltage: 480V ac.
- H. Phase: Three-phase, 4-wire, wye.
- I. Induction Method: Naturally aspirated.
- J. Governor: Adjustable isochronous, with speed sensing.
- K. Mounting Frame: Structural steel framework to maintain alignment of mounted components without depending on concrete foundation. Provide lifting attachments sized and spaced to prevent deflection of base during lifting and moving.
1. Rigging Diagram: Inscribed on metal plate permanently attached to mounting frame to indicate location and lifting capacity of each lifting attachment and engine generator center of gravity.
- L. Capacities and Characteristics:

1. Power Output Ratings: Nominal ratings as indicated excluding power required for continued and repeated operation of unit and auxiliaries, with capacity as required to operate as unit as evidenced by records of prototype testing.
2. Nameplates: For each major system component to identify manufacturer's name and address, and model and serial number of component.

M. Engine Generator Performance:

1. Steady-State Voltage Operational Bandwidth: Three percent of rated output voltage from no load to full load.
2. Transient Voltage Performance: Not more than 20 percent variation for 50 percent step-load increase or decrease. Voltage shall recover and remain within steady-state operating band within 3 seconds.
3. Steady-State Frequency Operational Bandwidth: 0.5 percent of rated frequency from no load to full load.
4. Steady-State Frequency Stability: When system is operating at constant load within rated load, there shall be no random speed variations outside steady-state operational band and no hunting or surging of speed.
5. Transient Frequency Performance: Less than 5 percent variation for 50 percent step-load increase or decrease. Frequency shall recover and remain within steady-state operating band within 5 seconds.
6. Output Waveform: At no load, harmonic content measured line to line or line to neutral shall not exceed 5 percent total and 3 percent for single harmonics. Telephone influence factor, determined per NEMA MG 1, shall not exceed 50 percent.
7. Sustained Short-Circuit Current: For 3-phase, bolted short circuit at system output terminals, system shall supply minimum of 250 percent of rated full-load current for not less than 10 seconds and then clear fault automatically, without damage to generator system components.
8. Start Time: 10 seconds.

## 2.4 DIESEL ENGINE

- A. Fuel: ASTM D975, diesel fuel oil, Grade 2-D S15.
- B. Rated Engine Speed: 1800 rpm.
- C. Lubrication System: Engine or skid-mounted.
  1. Filter and Strainer: Rated to remove 90 percent of particles 5 micrometers and smaller while passing full flow.
  2. Thermostatic Control Valve: Control flow in system to maintain optimum oil temperature. Unit shall be capable of full flow and is designed to be fail-safe.
  3. Crankcase Drain: Arranged for complete gravity drainage to easily removable container with no disassembly and without use of pumps, siphons, special tools, or appliances.
- D. Jacket Coolant Heater: Electric-immersion type, factory installed in coolant jacket system. Comply with UL 499.
- E. Cooling System: Closed loop, liquid cooled, with radiator factory mounted on engine generator set mounting frame and integral engine-driven coolant pump.

1. Coolant: Solution of 50 percent ethylene-glycol-based antifreeze and 50 percent water, with anticorrosion additives as recommended by engine manufacturer.
  2. Size of Radiator: Adequate to contain expansion of total system coolant from cold start to 110 percent load condition.
  3. Temperature Control: Self-contained, thermostatic-control valve modulates coolant flow automatically to maintain optimum constant coolant temperature as recommended by engine manufacturer.
  4. Coolant Hose: Flexible assembly with inside surface of nonporous rubber and outer covering of aging-, UV-, and abrasion-resistant fabric.
    - a. Rating: 50-psig maximum working pressure with coolant at 180 degrees F, and non-collapsible under vacuum.
    - b. End Fittings: Flanges or steel pipe nipples with clamps to suit piping and equipment connections.
- F. Muffler/Silencer: Critical type, sized as recommended by engine manufacturer and selected with exhaust piping system to not exceed engine manufacturer's engine backpressure requirements.
1. Minimum sound attenuation of 25 dB at 500 hertz.
  2. Sound level measured at distance of 25 feet from exhaust discharge after installation is complete shall be 78 dBA or less.
- G. Air-Intake Filter: Heavy-duty, engine-mounted air cleaner with replaceable dry-filter element and "blocked filter" indicator.
- H. Starting System: 24V electric, with negative ground.
1. Components: Sized so they are not damaged during full engine-cranking cycle with ambient temperature at maximum specified in "Performance Requirements" Article.
  2. Cranking Motor: Heavy-duty unit that automatically engages and releases from engine flywheel without binding.
  3. Cranking Cycle: 60 seconds.
  4. Battery: Nickel cadmium, with capacity within ambient temperature range specified in "Performance Requirements" Article to provide specified cranking cycle at least 3 times without recharging.
  5. Battery Cable: Size as recommended by engine manufacturer for cable length indicated. Include required interconnecting conductors and connection accessories.
  6. Battery Compartment: Factory fabricated of metal with acid-resistant finish and thermal insulation. Thermostatically controlled heater shall be arranged to maintain battery above 50 degrees F regardless of external ambient temperature within range specified in "Performance Requirements" Article. Include accessories required to support and fasten batteries in place. Provide ventilation to exhaust battery gases.
  7. Battery Stand: Factory-fabricated, 2-tier metal with acid-resistant finish designed to hold quantity of battery cells required and to maintain arrangement to minimize lengths of battery interconnections.
  8. Battery-Charging Alternator: Factory mounted on engine with solid-state voltage regulation and 35A minimum continuous rating.
  9. Battery Charger: Current-limiting, automatic-equalizing, and float-charging type designed for lead-acid batteries. Unit shall comply with UL 1236 and include following features:

- a. Operation: Equalizing-charging rate of 10A shall be initiated automatically after battery has lost charge until adjustable equalizing voltage is achieved at battery terminals. Unit shall then be automatically switched to lower float-charging mode and shall continue to operate in that mode until battery is discharged again.
- b. Automatic Temperature Compensation: Adjust float and equalize voltages for variations in ambient temperature from minus 40 to 140 degrees F to prevent overcharging at high temperatures and undercharging at low temperatures.
- c. Automatic Voltage Regulation: Maintain constant output voltage regardless of input voltage variations up to plus or minus 10 percent.
- d. Ammeter and Voltmeter: Flush mounted in door. Meters shall indicate charging rates.
- e. Safety Functions: Sense abnormally low battery voltage and close contacts providing low battery voltage indication on control and monitoring panel. Sense high battery voltage and loss of ac input or dc output of battery charger. Either condition shall close contacts that provide battery-charger malfunction indication at system control and monitoring panel.
- f. Enclosure and Mounting: NEMA 250, Type 1, wall-mounted cabinet.

## 2.5 DIESEL FUEL-OIL SYSTEM

- A. Comply with NFPA 30.
- B. Piping: Fuel-oil piping shall be Schedule 40 black steel. Cast iron, aluminum, copper, and galvanized steel shall not be used in fuel-oil system.
- C. Main Fuel Pump: Mounted on engine to provide primary fuel flow under starting and load conditions.
- D. Fuel Filtering: Remove water and contaminants larger than one micron.
- E. Relief-Bypass Valve: Automatically regulates pressure in fuel line and returns excess fuel to source.
- F. Subbase-Mounted, Double-Wall, Fuel-Oil Tank: Factory installed and piped, complying with UL 2085 fuel-oil tank. Features include following:
  - 1. Tank level indicator.
  - 2. Fuel-Tank Capacity: Fuel tank capacity shall be rated for no less than 96 hours of the generator's run time at full load.
  - 3. Leak detection in interstitial space.
  - 4. Vandal-resistant fill cap.
  - 5. Containment Provisions: Comply with requirements of authorities having jurisdiction.

## 2.6 CONTROL AND MONITORING

- A. Automatic Starting System Sequence of Operation: When mode-selector switch on control and monitoring panel is in automatic position, remote-control contacts in one or more separate automatic transfer switches initiate starting and stopping of engine generator. When mode-

selector switch is switched to on position, engine generator starts. Off position of same switch initiates engine generator shutdown. When engine generator is running, specified system or equipment failures or derangements automatically shut down engine generator and initiate alarms.

- B. Provide minimum run time control set for 15 minutes with override only by operation of remote emergency-stop switch.
- C. Comply with UL 508A.
- D. Configuration: Operating and safety indications, protective devices, basic system controls, and engine gages shall be grouped in common control and monitoring panel mounted on engine generator. Mounting method shall isolate control panel from engine generator vibration. Panel shall be powered from engine generator battery.
- E. Control and Monitoring Panel:
  - 1. Digital engine generator controller with integrated LCD display, controls, and microprocessor, capable of local and remote control, monitoring, and programming, with battery backup.
  - 2. Instruments: Located on control and monitoring panel and viewable during operation.
    - a. Engine lubricating-oil pressure gage.
    - b. Engine-coolant temperature gage.
    - c. DC voltmeter (alternator battery charging).
    - d. Running-time meter.
    - e. AC voltmeter, for each phase.
    - f. AC ammeter, for each phase.
    - g. AC frequency meter.
    - h. Generator-voltage adjusting rheostat.
  - 3. Controls and Protective Devices: Controls, shutdown devices, and common alarm indication, including following:
    - a. Cranking control equipment.
    - b. Run-Off-Auto switch.
    - c. Control switch not in automatic position alarm.
    - d. Over-crank alarm.
    - e. Over-crank shutdown device.
    - f. Low-water temperature alarm.
    - g. High engine temperature pre-alarm.
    - h. High engine temperature.
    - i. High engine temperature shutdown device.
    - j. Overspeed alarm.
    - k. Overspeed shutdown device.
    - l. Low fuel main tank.
      - 1) Low-fuel-level alarm shall be initiated when level falls below that required for operation for duration required in "Fuel Tank Capacity" Subparagraph in "Diesel Fuel-Oil System" Article.
    - m. Coolant low-level alarm.
    - n. Coolant low-level shutdown device.
    - o. Coolant high-temperature pre-alarm.

- p. Coolant high-temperature alarm.
- q. Coolant low-temperature alarm.
- r. Coolant high-temperature shutdown device.
- s. Battery high-voltage alarm.
- t. Low cranking voltage alarm.
- u. Battery-charger malfunction alarm.
- v. Battery low-voltage alarm.
- w. Lamp test.
- x. Contacts for local and remote common alarm.
- y. Low-starting air pressure alarm.
- z. Low-starting hydraulic pressure alarm.
- aa. Remote manual stop shutdown device.
- bb. Air shutdown damper alarm when used.
- cc. Air shutdown damper shutdown device when used.
- dd. Hours of operation.
- ee. Engine generator metering, including voltage, current, hertz, kilowatt, kilovolt ampere, and power factor.

F. Connection to Datalink:

- 1. Separate terminal block, factory wired to Form C dry contacts, for each alarm and status indication.
- 2. Provide connections for datalink transmission of indications to remote data terminals via BACnet.

G. Remote Alarm Annunciator: LED indicator light labeled with proper alarm conditions shall identify each alarm event, and common audible signal shall sound for each alarm condition. Silencing switch in face of panel shall silence signal without altering visual indication. Connect so that after alarm is silenced, clearing of initiating condition will reactivate alarm until silencing switch is reset. Cabinet and faceplate are surface- or flush-mounting type to suit mounting conditions indicated.

- 1. Over-crank alarm.
- 2. Low water-temperature alarm.
- 3. High engine temperature pre-alarm.
- 4. High engine temperature alarm.
- 5. Low lube oil pressure alarm.
- 6. Overspeed alarm.
- 7. Low fuel main tank alarm.
- 8. Low coolant level alarm.
- 9. Low cranking voltage alarm.
- 10. Contacts for local and remote common alarm.
- 11. Audible-alarm silencing switch.
- 12. Air shutdown damper when used.
- 13. Run-Off-Auto switch.
- 14. Control switch not in automatic position alarm.
- 15. Fuel tank derangement alarm.
- 16. Fuel tank high-level shutdown of fuel supply alarm.
- 17. Lamp test.

- H. Supporting Items: Include sensors, transducers, terminals, relays, and other devices and include wiring required to support specified items. Locate sensors and other supporting items on engine or generator unless otherwise indicated.
- I. Remote Emergency-Stop Switch: Flush; wall mounted unless otherwise indicated; and labeled. Push button shall be protected from accidental operation.

## 2.7 GENERATOR OVERCURRENT AND FAULT PROTECTION

- A. Overcurrent protective devices shall be coordinated to optimize selective tripping when short circuit occurs.
- B. Generator Circuit Breaker: Molded-case, electronic-trip type; 100 percent rated; complying with UL 489.
  1. Tripping Characteristics: Adjustable long-time and short-time delay and instantaneous.
  2. Trip Settings: Selected to coordinate with generator thermal damage curve.
  3. Shunt Trip: Connected to trip breaker when engine generator is shut down by other protective devices.
  4. Mounting: Adjacent to, or integrated with, control and monitoring panel.

## 2.8 GENERATOR, EXCITER, AND VOLTAGE REGULATOR

- A. Comply with NEMA MG 1.
- B. Drive: Generator shaft shall be directly connected to engine shaft. Exciter shall be rotated integrally with generator rotor.
- C. Electrical Insulation: Class H.
- D. Stator-Winding Leads: Brought out to terminal box to permit future reconnection for other voltages if required. Provide 6-lead alternator.
- E. Range: Provide broad range of output voltage by adjusting excitation level.
- F. Construction shall prevent mechanical, electrical, and thermal damage due to vibration, overspeed up to 125 percent of rating, and heat during operation at 110 percent of rated capacity.
- G. Enclosure: Drip-proof.
- H. Instrument Transformers: Mounted within generator enclosure.
- I. Voltage Regulator: Solid-state type, separate from exciter, providing performance as specified.
  1. Adjusting Rheostat on Control and Monitoring Panel: Provide plus or minus 5 percent adjustment of output-voltage operating band.
  2. Maintain voltage within 20 percent on one step, full load.
  3. Provide anti-hunt provision to stabilize voltage.

4. Maintain frequency within 10 percent and stabilize at rated frequency within 5 seconds.

J. Sub-transient Reactance: 12 percent, maximum.

## 2.9 OUTDOOR ENGINE GENERATOR ENCLOSURE

A. Description: Vandal-resistant, sound-attenuating, weatherproof steel housing; wind resistant up to 100 miles per hour. Multiple panels shall be lockable and provide adequate access to components requiring maintenance. Panels shall be removable by one person without tools. Instruments and control shall be mounted within enclosure.

B. Structural Design and Anchorage: Comply with ASCE/SEI 7 for wind loads up to 100 mph.

C. Hinged Doors: With padlocking provisions.

D. Space Heater: Thermostatically controlled and sized to prevent condensation.

E. Lighting: Provide weather-resistant LED lighting with 30 fc average maintained.

F. Thermal Insulation: Manufacturer's standard materials and thickness selected in coordination with space heater to maintain winter interior temperature within operating limits required by engine generator components.

G. Muffler Location: Within enclosure.

H. Engine-Cooling Airflow through Enclosure: Maintain temperature rise of system components within required limits when unit operates at 110 percent of rated load for 2 hours with ambient temperature at top of range specified in system service conditions.

1. Louvers: Fixed-engine, cooling-air inlet and discharge. Stormproof and drainable louvers prevent entry of rain and snow.

2. Ventilation: Provide temperature-controlled exhaust fan interlocked to prevent operation when engine is running.

I. Interior Lights with Switch: Factory-wired, vaporproof luminaires within housing; arranged to illuminate controls and accessible interior. Arrange for external electrical connection.

1. AC lighting system and connection point for operation when remote source is available.

J. Convenience Outlets: Factory-wired, GFCI. Arrange for external electrical connection.

## 2.10 VIBRATION ISOLATION DEVICES

A. Elastomeric Isolator Pads: Oil- and water-resistant elastomer or natural rubber, arranged in single or multiple layers, molded with nonslip pattern and galvanized-steel baseplates of sufficient stiffness for uniform loading over pad area, and factory cut to sizes that match requirements of supported equipment.

1. Material: Standard neoprene separated by steel shims.

2. Shore A Scale Durometer Rating: 30.

3. Number of Layers: Three.
4. Minimum Deflection: one inch.

B. Vibration isolation devices shall not be used to accommodate misalignments or to make bends.

## 2.11 MAINTENANCE PLATFORM

- A. Generator manufacturer shall provide turnkey maintenance platform with the generator set.
1. An OSHA-approved service platform shall be provided on each side of the enclosure.
  2. The platform should be designed so that all doors can open approximately 180 degrees.
  3. The platform should extend past each service door.
  4. Construction shall consist of A-36 structural frame members, stairs on one end, and handrails.
  5. Walk area shall have surface grating, with safety treads, shall consist of 1"x1/8" type 19-W-4 hot dipped galvanized steel or aluminum, which shall be fastened to the frame with galvanized steel clips and plated bolts.

## 2.12 FINISHES

- A. Indoor and Outdoor Enclosures and Components: Manufacturer's standard finish over corrosion-resistant pretreatment and compatible primer.

## 2.13 SOURCE QUALITY CONTROL

- A. Prototype Testing: Factory test engine generator using same engine model, constructed of identical or equivalent components and equipped with identical or equivalent accessories.
1. Tests: Comply with IEEE 115.

# PART 3 - EXECUTION

## 3.1 EXAMINATION

- A. Examine areas, equipment bases, and conditions, with Installer present, for compliance with requirements for installation and other conditions affecting packaged engine generator performance.
- B. Examine roughing-in for piping systems and electrical connections. Verify actual locations of connections before packaged engine generator installation.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.2 PREPARATION

- A. Interruption of Existing Electrical Service: Do not interrupt electrical service to facilities occupied by Owner or others unless permitted under following conditions and then only after arranging to provide temporary electrical service per requirements indicated:
  - 1. Notify Owner no fewer than 14 working days in advance of proposed interruption of electrical service.
  - 2. Do not proceed with interruption of electrical service without Owner's written permission.

### 3.3 INSTALLATION

- A. Comply with NECA 1 and NECA 404.
- B. Comply with packaged engine generator manufacturers' written installation and alignment instructions.
- C. Equipment Mounting:
  - 1. Install packaged engine generators on cast-in-place concrete equipment bases.
  - 2. Coordinate size and location of concrete bases for packaged engine generators. Cast anchor-bolt inserts into bases. Concrete, reinforcement, and formwork requirements are specified with concrete.
  - 3. Install packaged engine generator with elastomeric isolator pads having minimum deflection of one inch on 4-inch-high concrete base. Secure enclosure to anchor bolts installed in concrete bases.
- D. Install packaged engine generator to provide access, without removing connections or accessories, for periodic maintenance.
- E. Exhaust System: Install Schedule 40 black steel piping with welded joints and connect to engine muffler. Install thimble at wall. Piping shall be same diameter as muffler outlet.
- F. Drain Piping: Install condensate drain piping to muffler drain outlet full size of drain connection with shutoff valve, stainless-steel flexible connector, and Schedule 40 black steel pipe with welded joints.
- G. Fuel Piping: Copper and galvanized steel shall not be used in fuel-oil piping system.
- H. Install electrical devices furnished by equipment manufacturers but not specified to be factory mounted.

### 3.4 CONNECTIONS

- A. Piping installation requirements are specified in other Sections. Drawings indicate general arrangement of piping and specialties.

- B. Connect fuel, cooling-system, and exhaust-system piping adjacent to packaged engine generator to allow space for service and maintenance.
- C. Connect cooling-system water piping to engine generator and with flexible connectors.
- D. Connect engine exhaust pipe to engine with flexible connector.
- E. Connect fuel piping to engines with gate valve and union and flexible connector.
- F. Ground equipment per Section 260526 "Grounding and Bonding."
- G. Connect wiring per Section 260519 "Low-Voltage Power Conductors and Cables." Provide minimum of one 90-degree bend in flexible conduit routed to engine generator from stationary element.
- H. Balance single-phase loads to obtain maximum of 10 percent unbalance between any 2 phases.

### 3.5 IDENTIFICATION

- A. Identify system components per Section 260553 "Identification."

### 3.6 FIELD QUALITY CONTROL

- A. Manufacturer's Field Service: Engage factory-authorized service representative to test and inspect components, assemblies, and equipment installations, including connections.
- B. Tests and Inspections:
  - 1. Perform tests recommended by manufacturer and each visual and mechanical inspection and electrical and mechanical test listed in first 2 subparagraphs below, as specified in NETA ATS. Certify compliance with test parameters.
    - a. Visual and Mechanical Inspection:
      - 1) Compare equipment nameplate data with Drawings and Specifications.
      - 2) Inspect physical and mechanical condition.
      - 3) Inspect anchorage, alignment, and grounding.
      - 4) Verify that unit is clean.
    - b. Electrical and Mechanical Tests:
      - 1) Perform insulation-resistance tests per IEEE 43.
        - a) Machines Larger Than 200 hp: Test duration shall be 10 minutes. Calculate polarization index.
        - b) Machines 200 hp or Less: Test duration shall be one minute. Calculate dielectric-absorption ratio.
      - 2) Test protective relay devices.
      - 3) Verify phase rotation, phasing, and synchronized operation as required by application.
      - 4) Functionally test engine shutdown for low oil pressure, overtemperature, overspeed, and other protection features as applicable.
      - 5) Verify correct functioning of governor and regulator.

2. Battery Tests: Equalize charging of battery cells per manufacturer's written instructions. Record individual cell voltages.
    - a. Measure charging voltage and voltages between available battery terminals for full-charging and float-charging conditions. Check electrolyte level and specific gravity under both conditions.
    - b. Test for contact integrity of connectors. Perform integrity load test and capacity load test for battery.
    - c. Verify acceptance of charge for each element of battery after discharge.
    - d. Verify that measurements are within manufacturer's specifications.
  3. Battery-Charger Tests: Verify specified rates of charge for both equalizing and float-charging conditions.
  4. System Integrity Tests: Methodically verify proper installation, connection, and integrity of each element of engine generator system before and during system operation. Check for air, exhaust, and fluid leaks.
  5. Voltage and Frequency Transient Stability Tests: Use recording oscilloscope to measure voltage and frequency transients for 50 and 100 percent step-load increases and decreases, and verify that performance is as specified.
  6. Harmonic-Content Tests: Measure harmonic content of output voltage at 25 and 100 percent of rated linear load. Verify that harmonic content is within specified limits.
  7. Noise Level Tests: Measure A-weighted level of noise emanating from engine generator installation, including engine exhaust and cooling-air intake and discharge, at 4 locations 25 feet from edge of generator enclosure, and compare measured levels with required values.
- C. Coordinate tests with tests for transfer switches and run them concurrently.
- D. Test instruments shall have been calibrated within past 12 months, traceable to NIST Calibration Services, and adequate for making positive observation of test results. Make calibration records available for examination on request.
- E. Leak Test: After installation, charge exhaust, coolant, and fuel systems and test for leaks. Repair leaks and retest until no leaks exist.
- F. Operational Test: After electrical circuitry has been energized, start units to confirm proper motor rotation and unit operation for generator and associated equipment.
- G. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.
- H. Remove and replace malfunctioning units and retest as specified above.
- I. Retest: Correct deficiencies identified by tests and observations, and retest until specified requirements are met.
- J. Report results of tests and inspections in writing. Record adjustable relay settings and measured insulation resistances, time delays, and other values and observations. Attach label or tag to each tested component indicating satisfactory completion of tests.

- K. Infrared Scanning: After Substantial Completion, but not more than 60 days after final acceptance, perform infrared scan of each power wiring termination and each bus connection while running with maximum load. Remove access panels so terminations and connections are accessible to portable scanner.
1. Follow-up Infrared Scanning: Perform additional follow-up infrared scan 11 months after date of Substantial Completion.
  2. Instrument: Use infrared scanning device designed to measure temperature or to detect significant deviations from normal values. Provide calibration record for device.
  3. Record of Infrared Scanning: Prepare certified report that identifies terminations and connections checked and that describes scanning results. Include notation of deficiencies detected, remedial action taken, and observations after remedial action.

### 3.7 MAINTENANCE SERVICE

- A. Initial Maintenance Service: Beginning at Substantial Completion, maintenance service shall include 12 months' full maintenance by skilled employees of manufacturer's authorized service representative. Include quarterly preventive maintenance and exercising to check for proper starting, load transfer, and running under load. Include routine preventive maintenance as recommended by manufacturer and adjusting as required for proper operation. Parts shall be manufacturer's authorized replacement parts and supplies.

### 3.8 DEMONSTRATION

- A. Engage factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain packaged engine generators.

**END OF SECTION 263213.14**

## **SECTION 263600 - TRANSFER SWITCHES**

### **PART 1 - GENERAL**

#### **1.1 RELATED DOCUMENTS**

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

#### **1.2 SUMMARY**

- A. Section includes automatic transfer switches rated 600V and less, including remote annunciator system.

#### **1.3 ACTION SUBMITTALS**

- A. Product Data: For each type of product.
  - 1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for transfer switches.
  - 2. Include rated capacities, operating characteristics, electrical characteristics, and accessories.
- B. Shop Drawings:
  - 1. Include plans, elevations, sections, details showing minimum clearances, conductor entry provisions, gutter space, and installed features and devices.
  - 2. Include material lists for each switch specified.
  - 3. Single-Line Diagram: Show connections between transfer switch, power sources, and load; and show interlocking provisions for each combined transfer switch.

#### **1.4 INFORMATIONAL SUBMITTALS**

- A. Qualification Data: For manufacturer-authorized service representative.
- B. Field quality-control reports.

## 1.5 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data: For each type of product to include in emergency, operation, and maintenance manuals.
  - 1. In addition to items specified in Section 017823 "Operation and Maintenance Data," include following:
    - a. Features and operating sequences, both automatic and manual.
    - b. List of factory settings of relays; provide relay-setting and calibration instructions, including software, where applicable.

## 1.6 FIELD CONDITIONS

- A. Interruption of Existing Electrical Service: Do not interrupt electrical service to facilities occupied by Owner or others unless permitted under following conditions and then only after arranging to provide temporary electrical service:
  - 1. Notify Owner no fewer than 14 days in advance of proposed interruption of electrical service.
  - 2. Do not proceed with interruption of electrical service without Owner's written permission.

## 1.7 WARRANTY

- A. Manufacturer's Warranty: Manufacturer agrees to repair or replace components of transfer switch or transfer switch components that fail in materials or workmanship within 2 years from date of Substantial Completion.

## **PART 2 - PRODUCTS**

### 2.1 PERFORMANCE REQUIREMENTS

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by qualified testing agency, and marked for intended location and application.
- B. Comply with NEMA ICS 1.
- C. Comply with NFPA 110.
- D. Comply with UL 1008 unless requirements of these Specifications are stricter.
- E. Indicated Current Ratings: Apply as defined in UL 1008 for continuous loading and total system transfer, unless otherwise indicated.
- F. Tested Fault-Current Closing and Short-Circuit Ratings: Adequate for duty imposed by protective devices at installation locations in Project under fault conditions indicated, based on testing per UL 1008.

1. Short-time withstand capability for 3 cycles.
- G. Repetitive Accuracy of Solid-State Controls: Settings shall be plus or minus 2 percent or better over operating temperature range of minus 20 to plus 70 degrees C.
- H. Resistance to Damage by Voltage Transients: Components shall meet or exceed voltage-surge withstand capability requirements when tested per IEEE C62.62. Components shall meet or exceed voltage-impulse withstand test of NEMA ICS 1.
- I. Electrical Operation: Accomplish by non-fused, momentarily energized solenoid or electric-motor-operated mechanism. Switches for emergency or standby purposes shall be mechanically and electrically interlocked in both directions to prevent simultaneous connection to both power sources unless closed transition.
- J. Neutral Switching (208Y/120V): Provide neutral pole switched simultaneously with phase poles.
- K. Neutral Terminal (120/240V): Solid and fully rated unless otherwise indicated.
- L. Heater: Equip switches with internal heater. Provide thermostat within enclosure to control heater.
- M. Annunciation Interface Components: Devices at transfer switches for communicating with remote annunciators shall have communication capability matched with remote device.
- N. Factory Wiring: Train and bundle factory wiring and label, consistent with Shop Drawings, by color-code or by numbered or lettered wire and cable with printed markers at terminations. Color-coding and wire and cable markers are specified in Section 260553 "Identification."
  1. Designated Terminals: Pressure type, suitable for types and sizes of field wiring indicated.
  2. Power-Terminal Arrangement and Field-Wiring Space: Suitable for top, side, or bottom entrance of feeder conductors as indicated.
  3. Control Wiring: Equipped with lugs suitable for connection to terminal strips.
  4. Accessible via front access.
- O. Enclosures: General-purpose NEMA 250, Type 3R, complying with NEMA ICS 6 and UL 508, unless otherwise indicated.

## 2.2 CONTACTOR-TYPE AUTOMATIC TRANSFER SWITCHES

- A. Transfer switches shall be manufactured by ASCO Power Technologies or approved equal.
- B. Switch Characteristics: Designed for continuous-duty repetitive transfer of full-rated current between active power sources.
  1. Limitation: Switches using molded-case switches or circuit breakers or insulated-case circuit-breaker components are unacceptable.
  2. Switch Action: Double throw; mechanically held in both directions.

3. Contacts: Silver composition or silver alloy for load-current switching. Contactor-style automatic transfer-switch units, rated 600A and higher, shall have separate arcing contacts.
  4. Conductor Connectors: Suitable for use with conductor material and sizes.
  5. Material: Tin-plated aluminum.
  6. Main and Neutral Lugs: Compression type.
  7. Ground Lugs and Bus-Configured Terminators: Compression type.
  8. Ground bar.
  9. Connectors shall be marked for conductor size and type per UL 1008.
- C. Automatic Open-Transition Transfer Switches: Interlocked to prevent load from being closed on both sources at same time.
1. Sources shall be mechanically and electrically interlocked to prevent closing both sources on load at same time.
- D. Manual Switch Operation: Unloaded. Control circuit automatically disconnects from electrical operator during manual operation.
- E. Digital Communication Interface: Matched to capability of remote annunciator or annunciator and control panel.
- F. Automatic Transfer-Switch Controller Features:
1. Controller operates through period of loss of control power.
  2. Undervoltage Sensing for Each Phase of Normal and Alternate Source: Sense low phase-to-ground voltage on each phase. Pickup voltage shall be adjustable from 85 to 100 percent of nominal, and dropout voltage shall be adjustable from 75 to 98 percent of pickup value. Factory set for pickup at 90 percent and dropout at 85 percent.
  3. Voltage/Frequency Lockout Relay: Prevent premature transfer to generator. Pickup voltage shall be adjustable from 85 to 100 percent of nominal. Factory set for pickup at 90 percent. Pickup frequency shall be adjustable from 90 to 100 percent of nominal. Factory set for pickup at 95 percent.
  4. Time Delay for Retransfer to Normal Source: Adjustable from zero to 30 minutes, and factory set for 10 minutes. Override shall automatically defeat delay on loss of voltage or sustained undervoltage of emergency source, provided normal supply has been restored.
  5. Test Switch: Simulate normal-source failure.
  6. Switch-Position Pilot Lights: Indicate source to which load is connected.
  7. Source-Available Indicating Lights: Supervise sources via transfer-switch normal- and emergency-source sensing circuits.
    - a. Normal Power Supervision: Green light with nameplate engraved "Normal Source Available."
    - b. Emergency Power Supervision: Red light with nameplate engraved "Emergency Source Available."
  8. Unassigned Auxiliary Contacts: Two normally open, single-pole, double-throw contacts for each switch position, rated 10A at 240V ac.
  9. Transfer Override Switch: Overrides automatic retransfer control so transfer switch will remain connected to emergency power source regardless of condition of normal source. Pilot light indicates override status.

10. Engine Starting Contacts: One isolated and normally closed, and one isolated and normally open; rated 10A at 32V dc minimum.
11. Engine Shutdown Contacts: Time delay adjustable from zero to 5 minutes, and factory set for 5 minutes. Contacts shall initiate shutdown at remote engine-generator controls after retransfer of load to normal source.
12. Engine-Generator Exerciser: Solid-state, programmable-time switch starts engine generator and transfers load to it from normal source for preset time, then retransfers and shuts down engine after preset cool-down period. Initiates exercise cycle at preset intervals adjustable from 7 to 30 days. Running periods shall be adjustable from 10 to 30 minutes. Factory settings shall be for 7-day exercise cycle, 20-minute running period, and 5-minute cool-down period. Exerciser features include following:
  - a. Exerciser Transfer Selector Switch: Permits selection of exercise with and without load transfer.
  - b. Push-button programming control with digital display of settings.
  - c. Integral battery operation of time switch when normal control power is unavailable.

### 2.3 TRANSFER SWITCH ACCESSORIES

- A. Remote Annunciator System:
  1. Source Limitations: Same manufacturer as transfer switch in which installed.
  2. Functional Description: Remote annunciator panel shall annunciate conditions for transfer switches.
  3. Annunciation panel display shall include following indicators:
    - a. Sources available, as defined by actual pickup and dropout settings of transfer-switch controls.
    - b. Switch position.
    - c. Switch in test mode.
    - d. Failure of communication link.
  4. Annunciator Panel: LED-lamp type with audible signal and silencing switch.
    - a. Indicating Lights: Grouped for each transfer switch monitored.
    - b. Label each group, indicating transfer switch it monitors, location of switch, and identity of load it serves.
    - c. Mounting: Flush, modular, steel cabinet unless otherwise indicated.
    - d. Lamp Test: Push-to-test or lamp-test switch on front panel.

### 2.4 SOURCE QUALITY CONTROL

- A. Prepare test and inspection reports.
  1. For each of tests required by UL 1008, performed on representative devices. Include results of test for following conditions:
    - a. Overvoltage.
    - b. Undervoltage.
    - c. Loss of supply voltage.
    - d. Reduction of supply voltage.
    - e. Alternative supply voltage or frequency is at minimum acceptable values.
    - f. Temperature rise.

- g. Dielectric voltage-withstand; before and after short-circuit test.
- h. Overload.
- i. Contact opening.
- j. Endurance.
- k. Short circuit.
- l. Short-time current capability.
- m. Receptacle withstand capability.
- n. Insulating base and supports damage.

### **PART 3 - EXECUTION**

#### **3.1 INSTALLATION**

- A. Pad-Mounting Switch: Anchor to pad by bolting.
  - 1. Install transfer switches on cast-in-place concrete equipment bases.
  - 2. Coordinate size and location of concrete bases. Cast anchor-bolt inserts into bases.
  - 3. Provide workspace and clearances required by NFPA 70.
- B. Annunciator and Control Panel Mounting: Flush in wall unless otherwise indicated.
- C. Identify components per Section 260553 "Identification."
- D. Set field-adjustable intervals and delays, relays, and engine exerciser clock.
- E. Comply with NECA 1.

#### **3.2 CONNECTIONS**

- A. Wiring to Remote Components: Match type and number of cables and conductors to generator sets, control, and communication requirements of transfer switches as recommended by manufacturer. Increase raceway sizes at no additional cost to Owner if necessary to accommodate required wiring.
- B. Wiring Method: Install cables in raceways and cable trays except within electrical enclosures. Conceal raceway and cables except in unfinished spaces.
  - 1. Comply with requirements for raceways and boxes specified in Section 260533 "Raceways and Boxes."
- C. Wiring within Enclosures: Bundle, lace, and train conductors to terminal points with no excess and without exceeding manufacturer's limitations on bending radii.
- D. Ground equipment per Section 260526 "Grounding and Bonding."
- E. Connect wiring per Section 260519 "Low-Voltage Power Conductors and Cables."

- F. Route and brace conductors per manufacturer's written instructions and Section 260529 "Hangers and Supports." Do not obscure manufacturer's markings and labels.
- G. Final connections to equipment shall be made with liquid-tight, flexible metallic conduit no more than 18 inches in length.

### 3.3 FIELD QUALITY CONTROL

- A. Manufacturer's Field Service: Engage factory-authorized service representative to test and inspect components, assemblies, and equipment installations, including connections.
- B. Perform following tests and inspections with assistance of factory-authorized service representative:
  - 1. After installing equipment, test for compliance with requirements per NETA ATS.
  - 2. Visual and Mechanical Inspection:
    - a. Compare equipment nameplate data with Drawings and Specifications.
    - b. Inspect physical and mechanical condition.
    - c. Inspect anchorage, alignment, grounding, and required clearances.
    - d. Verify that unit is clean.
    - e. Verify appropriate lubrication on moving current-carrying parts and on moving and sliding surfaces.
    - f. Verify that manual transfer warnings are attached and visible.
    - g. Verify tightness of control connections.
    - h. Inspect bolted electrical connections for high resistance using one of following methods, or both:
      - 1) Use of low-resistance ohmmeter.
      - 2) Verify tightness of accessible bolted electrical connections by calibrated torque-wrench method per manufacturer's published data.
    - i. Perform manual transfer operation.
    - j. Verify positive mechanical interlocking between normal and alternate sources.
    - k. Perform visual and mechanical inspection of surge arresters.
    - l. Inspect control power transformers.
      - 1) Inspect for physical damage, cracked insulation, broken leads, tightness of connections, defective wiring, and overall general condition.
      - 2) Verify that primary and secondary fuse or circuit-breaker ratings match Drawings.
      - 3) Verify correct functioning of draw-out disconnecting contacts, grounding contacts, and interlocks.
  - 3. Electrical Tests:
    - a. Perform insulation-resistance tests on control wiring with respect to ground.
    - b. Perform contact/pole-resistance test. Compare measured values with manufacturer's acceptable values.
    - c. Verify settings and operation of control devices.
    - d. Calibrate and set relays and timers.
    - e. Verify phase rotation, phasing, and synchronized operation.
    - f. Perform automatic transfer tests.
    - g. Verify correct operation and timing of following functions:

- 1) Normal source voltage-sensing and frequency-sensing relays.
  - 2) Engine start sequence.
  - 3) Time delay on transfer.
  - 4) Alternative source voltage-sensing and frequency-sensing relays.
  - 5) Automatic transfer operation.
  - 6) Interlocks and limit switch function.
  - 7) Time delay and retransfer on normal power restoration.
  - 8) Engine cool-down and shutdown feature.
4. Measure insulation resistance phase-to-phase and phase-to-ground with insulation-resistance tester. Include external annunciation and control circuits. Use test voltages and procedure recommended by manufacturer. Comply with manufacturer's specified minimum resistance.
    - a. Check for electrical continuity of circuits and for short circuits.
    - b. Inspect for physical damage, proper installation and connection, and integrity of barriers, covers, and safety features.
    - c. Verify that manual transfer warnings are properly placed.
    - d. Perform manual transfer operation.
  5. After energizing circuits, perform each electrical test for transfer switches stated in NETA ATS and demonstrate interlocking sequence and operational function for each switch at least 3 times.
    - a. Simulate power failures of normal source to automatic transfer switches and retransfer from emergency source with normal source available.
    - b. Simulate loss of phase-to-ground voltage for each phase of normal source.
    - c. Verify time-delay settings.
    - d. Verify pickup and dropout voltages by data readout or inspection of control settings.
    - e. Verify proper sequence and correct timing of automatic engine starting, transfer time delay, retransfer time delay on restoration of normal power, and engine cool-down and shutdown.
- C. Coordinate tests with tests of generator and run them concurrently.
  - D. Report results of tests and inspections in writing. Record adjustable relay settings and measured insulation and contact resistances and time delays. Attach label or tag to each tested component indicating satisfactory completion of tests.
  - E. Transfer switches will be considered defective if they do not pass tests and inspections.
  - F. Remove and replace malfunctioning units and retest as specified above.
  - G. Prepare test and inspection reports.
  - H. Infrared Scanning: After Substantial Completion, but not more than 60 days after Final Acceptance, perform infrared scan of each switch. Remove access panels so joints and connections are accessible to portable scanner.
    1. Instrument: Use infrared scanning device designed to measure temperature or to detect significant deviations from normal values. Provide calibration record for device.

2. Record of Infrared Scanning: Prepare certified report that identifies switches checked and that describes scanning results. Include notation of deficiencies detected, remedial action taken, and observations after remedial action.
3. Follow-up Infrared Scanning: Perform additional follow-up infrared scan of each switch 11 months after date of Substantial Completion.

#### 3.4 DEMONSTRATION

- A. Engage factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain transfer switches and related equipment.
- B. Training shall include testing ground-fault protective devices and instructions to determine when ground-fault system shall be retested. Include instructions on where ground-fault sensors are located and how to avoid negating ground-fault protection scheme during testing and circuit modifications.
- C. Coordinate this training with that for generator equipment.

**END OF SECTION 263600**



# COUNTY OF DALLAS MEDLOCK YOUTH TREATMENT CENTER GENERATOR REPLACEMENT

E Langdon Rd, Dallas, TX 75241



1 SITE LOCATION  
NTS

Prepared for:  
County of Dallas Facilities Management  
133 North Riverfront Boulevard Suite 9A-500  
Dallas, TX 75207  
(214) 653-6776

Prepared by:  
MEPCE  
6341 Campus Circle Drive East  
Irving, Texas 75063  
(972) 870-9060  
www.mepce.com

Recommended for Approval:

Senior Project Manager, (Title)

Date

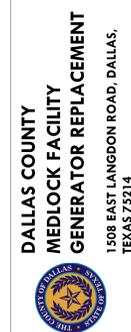
Project Manager, (Title)

Date



10/23/2025  
AM  
MF

DATE  
DRAWN BY  
CHECKED BY  
PROJECT NUMBER



NO.	REVISION	DATE
0	100% CD	11/19/2025



PHASING NOTES	
<p>THE CONTRACTOR MUST PROVIDE A COMPLETE PHASING PLAN FOR ALL WORK OUTLINED IN THESE DRAWINGS FOR ENGINEER AND OWNER REVIEW AND APPROVAL PRIOR TO BEGINNING ANY WORK. THE OUTLINE BELOW INDICATES THE GENERAL ORDER OF THE PERFORMANCE OF THE WORK, BUT IS TO BE USED SOLELY AS A GENERIC OUTLINE FOR CONTRACTOR GUIDANCE. ANY WORK THAT WILL INTERRUPT EXISTING ELECTRICAL FEEDERS OR SERVICES MUST BE KEPT TO A MINIMUM, AND ANY OUTAGES MUST BE COORDINATED AND APPROVED BY OWNER AND ENGINEER A MINIMUM OF 14 DAYS IN ADVANCE OF ANY INTERRUPTION.</p>	
<p>PHASE 1: PROCURE AND INSTALL ALL NEW EQUIPMENT, INCLUDING BUT NOT LIMITED TO: DISTRIBUTION PANELS, DISCONNECTS, GENERATOR, DOCKING STATION, AND TRANSFER SWITCH. PROVIDE ALL REQUIRED MOUNTING HARDWARE AND EQUIPMENT PADS AS REQUIRED FOR NEW EQUIPMENT.</p>	
<p>PHASE 2: INSTALL ALL NEW FEEDER CONDUITS / CONDUCTORS FOR NEW AND RE-FEEDS AS INDICATED ON THESE DOCUMENTS. PREPARE ALL NEW FEEDER INFRASTRUCTURE FOR BACKFEED / RE-FEED OF EXISTING EQUIPMENT AS OUTLINED.</p>	
<p>PHASE 3: PERFORM TESTING AND STARTUP OF ALL NEW EQUIPMENT TO ENSURE READINESS FOR CONNECTION TO EXISTING BUILDING SYSTEMS AND EQUIPMENT.</p>	
<p>PHASE 4: SWITCH OVER AND MAKE ALL REQUIRED FEEDER MODIFICATIONS TO NEW AND EXISTING EQUIPMENT AS INDICATED IN THESE PLANS. MINIMIZE AND COORDINATE ANY DOWNTIME FOR EXISTING SYSTEMS.</p>	
<p>PHASE 5: COMMISSION NEW SYSTEMS, EQUIPMENT, AND FEEDERS TO ENSURE CORRECT FUNCTIONALITY.</p>	
<p>PHASE 6: REMOVE ANY ABANDONED SYSTEMS, INCLUDING EXISTING OLD GENERATOR AND ANY ABANDONED CONDUITS / CONDUCTORS.</p>	

WIRING DEVICE MOUNTING		
MOUNTING HEIGHTS - UNLESS NOTED OTHERWISE ON PLANS		
SWITCHES	48" AFF TO TOP OF SWITCH	
RECEPTACLES	FINISHED AREAS:	18" AFF TO BOTTOM OF RECEPTACLE
	UNFINISHED AREAS:	48" AFF TO TOP OF RECEPTACLE
	WATER COOLERS:	DIRECTLY BEHIND COOLER
DATA/TELEPHONE	FINISHED AREAS:	18" AFF TO BOTTOM OF OUTLET
	UNFINISHED AREAS:	48" AFF TO TOP OF OUTLET
	ABOVE COUNTER:	6" ABOVE COUNTER OR BACKSPASH
	WALL MOUNTED:	48" AFF TO TOP OF OUTLET

FIXTURE MODIFIERS				
X	⊕	⊖	⊗	⊘
32	MOUNT -32" AFF			
36	MOUNT -36" AFF			
48	MOUNT -48" AFF			
60	MOUNT -60" AFF			
72	MOUNT -72" AFF			
A	MOUNT -6" ABOVE COUNTER TOP			
B	MOUNT 6" BELOW COUNTER TOP			
C	MOUNT ON CEILING			
DF	DRINKING FOUNTAIN RECEPTACLE - MOUNT INSIDE CHASE			
DP	TEACHING DISPLAY RECEPTACLE - PROVIDE ISOLATED GROUND NEMA 5-20 RECEPTACLE 42" AFF			
DS	DISPOSAL - MOUNT INSIDE CABINET IN SPACE BENEATH SINK. PROVIDE SWITCH TO CONTROL DISPOSAL ON WALL OF UNDER-SINK CABINET. REFER TO ARCHITECTURAL DRAWINGS FOR EXACT ELEVATION.			
DW	DISHWASHER - MOUNT INSIDE CABINET IN SPACE BENEATH SINK. PROVIDE 2" DIAMETER HOLE IN WALL BETWEEN UNDER-SINK SPACE AND DISHWASHER SPACE TO FEET DISHWASHER CORD.			
E	EXISTING TO REMAIN			
EWC	ELECTRIC WATER COOLER - PROVIDE DEDICATED GFCI RATED NEMA 5-20 RECEPTACLE ON INSIDE PLUMBING CHASE BEHIND FOUNTAIN. PROVIDE REMOTE TEST BUTTON.			
IG	ISOLATED GROUND			
IM	ICE MAKER - REFER TO ARCHITECTURAL DRAWINGS FOR EXACT ELEVATION			
IT	TECHNOLOGY RACK RECEPTACLE - PROVIDE DEDICATED NEMA 15-20R RECEPTACLE WITH ISOLATED GROUND, MOUNTED ON LADDER RACK ABOVE IT RACK.			
KN	KILN RECEPTACLE - PROVIDE NEMA 6-50R RECEPTACLE			
M	MICROWAVE - MOUNT -6" ABOVE COUNTER TOP			
NE2	NEMA 6-20 RECEPTACLE			
NE3	NEMA 6-30 RECEPTACLE			
N145	NEMA 14-50 RECEPTACLE			
N155	NEMA 15-50 RECEPTACLE			
PR	POWER REEL - MOUNT AT CEILING. PROVIDE AND INSTALL NEMA 5-20R RECEPTACLE AND OVERHEAD REEL. BASIS OF DESIGN - HBLIS123GF220.			
R	REFRIGERATOR - MOUNT -48" AFF. PROVIDE REMOTE TEST BUTTON.			
RE	RANGE - ELECTRIC - PROVIDE GFCI RATED NEMA 14-50R RECEPTACLE AND DEDICATED 50A GFCI RATED BREAKER			
RG	RANGE - GAS - PROVIDE GFCI RATED NEMA 5-15R RECEPTACLE AND DEDICATED 20A BREAKER			
RU	REFRIGERATOR - MOUNT UNDER COUNTER			
TD	TEACHER'S DESK RECEPTACLE - PROVIDE ISOLATED GROUND QUADPLEX RECEPTACLE -18" AFF			
TP	TAMPER PROOF			
TV	TV - MOUNT -72" AFF UNLESS NOTED OTHERWISE. PROVIDE RECESSED RECEPTACLE WITH ISOLATED GROUND EQUAL TO HUBBELL RR1514.			
WP	WEATHERPROOF - PROVIDE WEATHERPROOF PROTECTIVE BOX			
NOTES:	NOT ALL OF THE RECEPTACLE TYPES ON THIS LIST ARE USED IN THIS PROJECT.			

ABBREVIATIONS			
A	AMPERE(S)	LTFMC	LIQUID-TIGHT FLEXIBLE METAL CONDUIT
AC	ALTERNATING CURRENT	LTG	LIGHTING
ACT	ABOVE COUNTER TOP	LTG	LIGHTING
ADA	AMERICANS WITH DISABILITIES ACT	MAX	MAXIMUM
AFF	ABOVE FINISHED FLOOR	MCB	MAIN CIRCUIT BREAKER
AHU	AIR HANDLING UNIT	MCC	MOTOR CONTROL CENTER
AIC	AMPERE INTERRUPTING CAPACITY (SYMMETRICAL ROOT MEAN SQUARE)	MCP	MOTOR CIRCUIT PROTECTOR
ANSI	AMERICAN NATIONAL STANDARD INSTITUTE	MIN	MINIMUM
AWG	AMERICAN WIRE GAGE	MLO	MAIN LUGS ONLY
BDC	BELOW FINISHED CEILING	MTD	MOUNTED
BLDG	BUILDING	MTG	MOUNTING
C	CONDUIT	NC	NORMALLY CLOSED
CB	CIRCUIT BREAKER	NEC	NATIONAL ELECTRICAL CODE
CLG	CEILING	NEMA	NATIONAL ELECTRICAL MANUFACTURERS ASSOCIATION
DWG	DRAWING	NF	NON-FUSED OR NON-FUSIBLE
ECB	ENCLOSED CIRCUIT BREAKER	NFPA	NATIONAL FIRE PROTECTION ASSOCIATION
EF	EXHAUST FAN	NFSS	NON-FUSIBLE SAFETY SWITCH
EGS	ENGINE-GENERATOR SET	NIGHT	NIGHT LIGHT
EMERG	EMERGENCY	NO	NORMALLY OPEN
EMT	ELECTRICAL METALLIC TUBING	NTS	NOT TO SCALE
EQUIP	EQUIPMENT	P	POLE(S)
EWC	ELECTRIC WATER COOLER	PA	PUBLIC ADDRESS
EX	EXISTING	PH	PHASE
F	FUSE OR FUSIBLE	PNLBO	PANELBOARD
FAFP	FIRE ALARM ANNUNCIATOR PANEL	PVC	POLYVINYL CHLORIDE
FACP	FIRE ALARM PANEL	PWR	POWER
FLA	FULL LOAD CURRENT	REC	RECEPTACLE(S)
FMC	FLEXIBLE METAL CONDUIT	REQD	REQUIRED
FSS	FUSIBLE SAFETY SWITCH	RGS	RIGID GALVANIZED STEEL
FT	FOOT OR FEET	RTU	ROOF TOP UNIT
FVNR	FULL-VOLTAGE, NON-REVERSING	RVSS	REDUCED VOLTAGE, SOLID-STATE
FVR	FULL-VOLTAGE, REVERSING	SW	SWITCH
G, GND	GROUND	SWBD	SWITCHBOARD
GFI	GROUND FAULT INTERRUPTER	SWGGR	SWITCHGEAR
GFP	GROUND FAULT CIRCUIT PROTECTION	TA	TIP AMPERES
HDA	HAND-OFF-AUTOMATIC	TAS	TEXAS ACCESSIBILITY STANDARDS
HP	HORSEPOWER	TYP	TYPICAL
HVAC	HEATING, VENTILATING, AND AIR CONDITIONING	UG	UNDERGROUND
IG	ISOLATED GROUND	UH	UNIT HEATER
KCMIL	THOUSANDS OF CIRCULAR MILS	UL	UL SOLUTIONS
KV	KILOVOLTS	UNO	UNLESS NOTED OTHERWISE
KVA	KILOVOLT-AMPERE(S)	UPS	UNINTERRUPTIBLE POWER SUPPLY
KVAR	KILOVOLT-AMPERE(S) REACTIVE	V	VOLT(S) OR VOLTAGE
KW	KILOWATT(S)	VA	VOLT-AMPERE(S)
LSI	LONG-TIME, SHORT-TIME, INSTANTANEOUS	VFD	VARIABLE FREQUENCY DRIVE
LSIG	LONG-TIME, SHORT-TIME, INSTANTANEOUS, GROUND FAULT	W	WATT(S) OR WATTAGE
		W	WITH
		WO	WITHOUT
		WP	WEATHERPROOF
		XFMR	TRANSFORMER

ELECTRICAL GENERAL NOTES	
1.	ELECTRICAL WORK SHALL BE PERFORMED BY LICENSED ELECTRICAL CONTRACTOR. WIRING, EQUIPMENT, DEVICES, AND INSTALLATIONS SHALL CONFORM TO APPLICABLE LOCAL, STATE, AND FEDERAL CODES.
2.	PROVIDE WIRING, CONDUIT, LABOR, AND MATERIALS NECESSARY FOR COMPLETE AND PROPER OPERATION OF ELECTRICAL SYSTEMS, EVEN WHEN NOT SHOWN EXPLICITLY ON DOCUMENTS.
3.	PAY FEES AND PERMITS AS NECESSARY TO COMPLETE PROJECT. PROVIDE LABOR, MATERIALS, AND EQUIPMENT NECESSARY TO ENSURE COMPLETE WORKING SYSTEMS.
4.	ELECTRICAL WORK SHALL COMPLY WITH APPLICABLE REQUIREMENTS OF NFPA 70 (NATIONAL ELECTRICAL CODE), NFPA 70B, NFPA 70E, IECC, ASHRAE 90.1, OSHA, AND OTHER REFERENCES REQUIRED BY CONTRACT.
5.	INSTALLATION OF SWITCHES, OUTLETS AND CONTROL DEVICES SHALL COMPLY WITH LOCAL CODES, AMERICANS WITH DISABILITIES ACT, AND TEXAS ACCESSIBILITY STANDARDS.
6.	REFER TO MECHANICAL AND PLUMBING DRAWINGS FOR LOCATION OF MECHANICAL AND PLUMBING EQUIPMENT. PROVIDE LABOR AND MATERIALS REQUIRED TO CONNECT ELECTRICAL POWER TO MECHANICAL AND PLUMBING EQUIPMENT.
7.	ELECTRICAL EQUIPMENT, DEVICES, AND CIRCUITS SHALL CONTAIN EQUIPMENT GROUNDING CONDUCTOR. RACEWAY SYSTEM SHALL NOT BE USED AS SOLE GROUNDING PATH. GROUNDING SHALL BE IN COMPLIANCE WITH ARTICLE 250 OF NATIONAL ELECTRICAL CODE.
8.	PANELBOARDS, TRANSFORMERS, SAFETY SWITCHES AND OTHER ELECTRICAL DEVICES AND EQUIPMENT SHALL HAVE ENGRAVED NAMEPLATES INDICATING EQUIPMENT IDENTIFICATION TAG, VOLTAGE, AND WHERE ITEM IS FED FROM. SWITCHBOARDS AND PANELBOARDS SHALL HAVE TYPED DIRECTORIES INDICATING FEEDER AND BRANCH CIRCUIT FEEDERS. REFER TO SPECIFICATIONS FOR ADDITIONAL INFORMATION.
9.	PROVIDE CLEARANCES, DEDICATED ELECTRICAL SPACES, AND WORKING SPACES AROUND AND ABOVE ELECTRICAL EQUIPMENT AND DEVICES AS REQUIRED BY NATIONAL ELECTRICAL CODE.
10.	AMPERE INTERRUPTING CAPACITY OF ELECTRICAL ITEMS SHALL BE GREATER THAN MAXIMUM AVAILABLE SHORT CIRCUIT CURRENT. PROVIDE NAMEPLATE ON SERVICE EQUIPMENT INDICATING CALCULATED AVAILABLE FAULT CURRENT AND DATE OF CALCULATION PER NEC 110.24.
11.	FLEXIBLE CONDUIT SHALL BE USED ONLY FOR FINAL CONNECTION TO LIGHTING FIXTURES AND VIBRATING EQUIPMENT (MAXIMUM LENGTH 72 INCHES).
12.	ELECTRICAL WIRING SHALL BE INSTALLED IN RACEWAY, WIREWAY, OR OTHER PROTECTIVE COVER AS REQUIRED PER NATIONAL ELECTRICAL CODE.
13.	CONDUCTORS IN UNINSULATED CEILING SPACE AND OUTDOORS SHALL BE DERATED USING 122-DEGREE FAHRENHEIT TEMPERATURE. REVISE CONDUCTOR SIZES BASED ON CONDUIT RATING.
14.	OUTDOOR EQUIPMENT SHALL BE WEATHER PROTECTED, NEMA 3R, UNLESS OTHERWISE INDICATED.
15.	PROVIDE FIRE PROOFING FOR PIPES OR CONDUITS THAT PENETRATE THROUGH FIRE-SMOKE RATED FLOORS, WALLS, CEILING, ROOFS, OR RUNS INSIDE CHASES. FIRE PROOFING METHODS AND MATERIALS SHALL BE AS REQUIRED TO MAINTAIN FIRE/SMOKE RATING OF PARTITION.
16.	IF PROTECTIVE DEVICE RATING IS MARKED ON APPLIANCE OR EQUIPMENT, BRANCH-CIRCUIT OVERCURRENT DEVICE RATING SHALL NOT EXCEED THIS RATING.
17.	SWITCHES SHALL BE MINIMUM 3 INCHES FROM DOOR TRIM WHEN LOCATED AT ENTRANCE TO ROOMS. OCCUPANCY SENSORS SHALL BE PASSIVE INFRARED AND ULTRASONIC TECHNOLOGY.
18.	COORDINATE WITH OTHER DISCIPLINES' DRAWINGS AND SPECIFICATIONS.
19.	SYMBOLS FOR VARIOUS ELEMENTS AND SYSTEMS ARE SHOWN ON DRAWINGS. SHOULD THERE BE DOUBT REGARDING MEANING OR INTENT OF SYMBOLS USED, INTERPRETATION SHALL BE OBTAINED FROM ARCHITECT OR ENGINEER IN WRITING.
20.	WHERE CONFLICTS OCCUR BETWEEN DIFFERENT PARTS OF DOCUMENTS, GREATER QUANTITY, BETTER QUALITY, OR LARGER SIZE SHALL PREVAIL UNLESS OTHERWISE APPROVED IN WRITING BY ARCHITECT OR ENGINEER.
21.	EMPTY CONDUITS SHALL CONTAIN NYLON PULL STRING FOR FUTURE CONDUCTOR PULLS.
22.	FLOOR BOXES SHOWN ON PLANS ARE DIAGRAMMATIC. COORDINATE EXACT LOCATIONS WITH OWNER AND ARCHITECT BEFORE INSTALLATION. AVOID STRUCTURAL ELEMENTS AND OTHER SYSTEMS.
23.	PROVIDE CONDUIT EXPANSION FITTINGS WHERE CONDUIT RUNS CROSS BUILDING EXPANSION JOINTS. REFER TO ARCHITECTURAL AND STRUCTURAL DOCUMENTS FOR EXPANSION JOINT LOCATIONS.
24.	LIGHTING FIXTURES DESIGNATED WITH "NL" SHALL BE UNSWITCHED NIGHT LIGHTS.
25.	CIRCUIT BREAKER PANELBOARDS RATED 400A AND BELOW AND HAVING MORE THAN 10 PERCENT OF THEIR BREAKERS PROTECTING LIGHTING AND APPLIANCE BRANCH CIRCUITS SHALL BE FILLED WITH 1P20A SPARE BREAKERS, EVEN IF NOT INDICATED IN PANELBOARD SCHEDULES.
26.	UNLESS OTHERWISE NOTED, CONCEALED AND EXPOSED EXTERIOR RACEWAY SHALL BE RIGID METAL CONDUIT. UNDERGROUND RACEWAY SHALL BE SCHEDULE-40 RIGID POLYVINYL CHLORIDE CONDUIT, AND EXTERIOR CONNECTION TO VIBRATING EQUIPMENT SHALL BE LIQUID-TIGHT FLEXIBLE METALLIC CONDUIT.
27.	UNLESS OTHERWISE NOTED, CONCEALED AND EXPOSED INTERIOR RACEWAY SHALL BE ELECTRICAL METALLIC TUBING. EXPOSED INTERIOR RACEWAY IN LOADING DOCK AREAS AND IN AREAS USED FOR TRAFFIC OF MECHANIZED CARTS, FORKLIFTS, AND PALLET-HANDLING UNITS AND IN MECHANICAL ROOMS AND IN GYMNASIUMS SHALL BE RIGID METAL CONDUIT. INTERIOR RACEWAY CONNECTION TO VIBRATING EQUIPMENT SHALL BE FLEXIBLE METALLIC CONDUIT. INTERIOR RACEWAY IN DAMP OR WET LOCATIONS SHALL BE RIGID METAL CONDUIT, AND INTERIOR RACEWAY CONNECTION TO VIBRATING EQUIPMENT IN DAMP OR WET LOCATIONS SHALL BE LIQUID-TIGHT FLEXIBLE METALLIC CONDUIT.
28.	MINIMUM RACEWAY SIZE SHALL BE 3/4-INCH.
29.	RACEWAY RUNS SHALL BE CONSOLIDATED AND INSTALLED TIGHT TO STRUCTURE WHERE POSSIBLE.
30.	FOR UNDERGROUND ELECTRICAL RUNS OR CMU WALLS, CREATE SHOP DRAWINGS SHOWING CONDUIT PATHWAYS BEFORE CONSTRUCTION. NO SURFACE MOUNTED CONDUIT WILL BE PERMITTED ON CMU UNLESS APPROVED BY ARCHITECT OR ENGINEER.
31.	COORDINATE WITH LOW VOLTAGE CONTRACTOR FOR EXACT LOW VOLTAGE RACEWAY REQUIREMENTS.
32.	BID EQUIPMENT IN SCHEDULES AS BASIS OF DESIGN. ALTERNATE EQUIPMENT BY ACCEPTABLE MANUFACTURERS MEETING PERFORMANCE REQUIREMENTS MAY BE REVIEWED BY DESIGN TEAM AND OWNER.
33.	IN THESE DOCUMENTS, "FURNISH" SHALL MEAN TO SUPPLY AND DELIVER TO PROJECT SITE, READY FOR UNLOADING, UNPACKING, ASSEMBLY, INSTALLATION AND SIMILAR OPERATIONS. "INSTALL" SHALL MEAN TO UNLOAD, TEMPORARILY STORE, UNPACK, ASSEMBLE, ERECT, PLACE, ANCHOR, APPLY, WORK TO DIMENSION, FINISH, CURE, PROTECT, CLEAN, AND SIMILAR OPERATIONS AT THE PROJECT SITE. "PROVIDE" SHALL MEAN TO FURNISH AND INSTALL, COMPLETE AND READY FOR INTENDED USE.
34.	BRANCH CIRCUITS SHALL BE #12, 1#12G, 3#4" UNLESS NOTED OTHERWISE (U.N.O.).
35.	REFER TO SPECIFICATION SECTION 01 10 00 - SUMMARY FOR WORKING HOUR REQUIREMENTS AND FACILITY/ACCESS RESTRICTIONS.

ELECTRICAL LEGEND	
<b>LIGHT FIXTURES</b>	<b>POWER DEVICES</b>
ILLUMINATED EXIT SIGN	JUNCTION BOX
DISCONNECT SAFETY SWITCH	SURGE PROTECTIVE DEVICE
PANELBOARDS / TRANSFORMERS	PANELBOARD
TRANSFORMER	<b>RECEPTACLES</b>
<b>LIGHTING CONTROL DEVICES</b>	DUPLEX RECEPTACLE
SINGLE WAY SWITCH	QUADPLEX RECEPTACLE
THREE WAY SWITCH	SPECIAL RATED RECEPTACLE
DIMMER SWITCH	G.F.I. RECEPTACLE
OCCUPANCY SENSING SWITCH	CONTROL RECEPTACLE
CEILING OCCUPANCY SENSOR	<b>ELECTRICAL WIRING</b>
WALL OCCUPANCY SENSOR	BRANCH CIRCUIT WIRING
PHOTOCCELL	CIRCUIT HOME RUN

VOLTAGE DROP ADJUSTMENTS	
<b>FOR 120V/20A BRANCH CIRCUITS</b>	
CIRCUIT LENGTH LESS THAN OR EQUAL TO 60 FEET: 2#12, 1#12G, 3#4"	
CIRCUIT LENGTH GREATER THAN 60 FEET AND LESS THAN OR EQUAL TO 105 FEET: 2#10, 1#10G, 3#4"	
CIRCUIT LENGTH GREATER THAN 105 FEET AND LESS THAN OR EQUAL TO 160 FEET: 2#8, 1#8G, 3#4"	
CIRCUIT LENGTH GREATER THAN 160 FEET AND LESS THAN OR EQUAL TO 245 FEET: 2#6, 1#6G, 3#4"	
<b>FOR 277V/20A BRANCH CIRCUITS</b>	
CIRCUIT LENGTH LESS THAN OR EQUAL TO 145 FEET: 2#12, 1#12G, 3#4"	
CIRCUIT LENGTH GREATER THAN 145 FEET AND LESS THAN OR EQUAL TO 245 FEET: 2#10, 1#10G, 3#4"	
CIRCUIT LENGTH GREATER THAN 245 FEET AND LESS THAN OR EQUAL TO 370 FEET: 2#8, 1#8G, 3#4"	
CIRCUIT LENGTH GREATER THAN 370 FEET AND LESS THAN OR EQUAL TO 570 FEET: 2#6, 1#6G, 3#4"	
NOTE: PROVIDE ADAPTOR AT CONNECTION POINT TO CONVERT WIRE SIZE AS REQUIRED TO MAKE TERMINATION AT DEVICE OR EQUIPMENT.	

APPLICABLE CODES	
2023 NEC WITH LOCAL AMENDMENTS	
2021 IRC WITH LOCAL AMENDMENTS	
2019 NFPA 110 WITH LOCAL AMENDMENTS	

ELECTRICAL SHEET INDEX	
SHEET #	DESCRIPTION
E-001	ELECTRICAL GENERAL NOTES AND LEGEND
ED-001	DEMOLITION SITE PLAN
ED-101	SITE DEMOLITION PLAN - EQUIPMENT YARD
ED-102	SITE DEMOLITION PLAN - KITCHEN/CAFETERIA
EP-001	OVERALL SITE PLAN
EP-101	ENLARGED SITE PLAN - EQUIPMENT YARD - NEW WORK
EP-102	ENLARGED SITE PLAN - PORTABLE BUILDING - NEW WORK
EP-103	ENLARGED SITE PLAN - SCHOOL BUILDING - NEW WORK
EZ-501	ELECTRICAL DETAILS
EZ-701	ONE-LINE DIAGRAMS



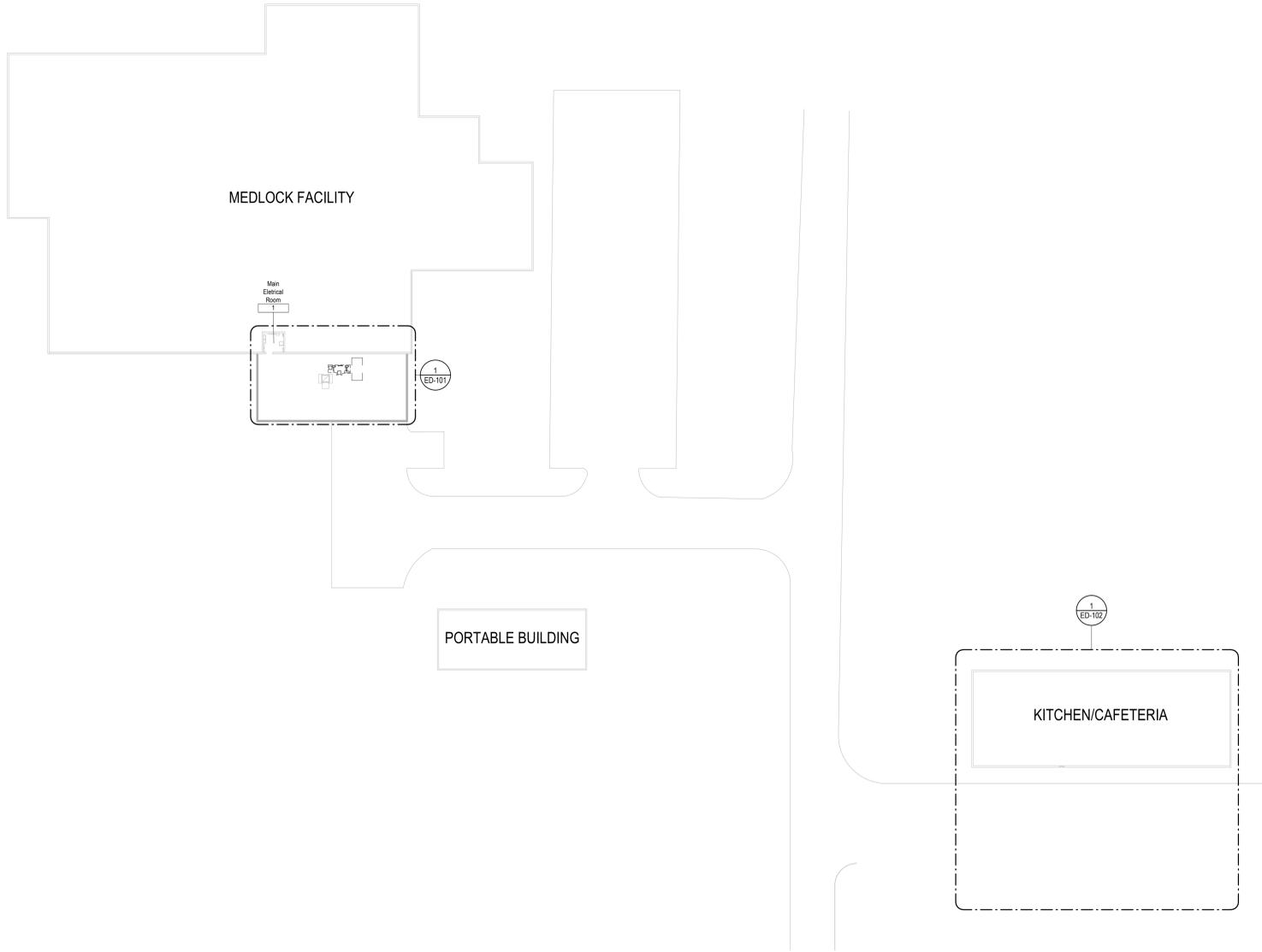
DATE: 10/23/2025  
 DRAWN BY: CB  
 CHECKED BY: MF  
 PROJECT NUMBER: 31-00639

DALLAS COUNTY  
 MEDLOCK FACILITY  
 GENERATOR REPLACEMENT  
 1508 EAST LANGDON ROAD, DALLAS,  
 TEXAS 75214

NO.	REVISION	DATE
0	100% CD	11/19/2025

**PLAN NOTES**

1. EXISTING INFORMATION SHOWN IS BASED ON FIELD OBSERVATIONS. FIELD VERIFY EXISTING CONDITIONS PRIOR TO WORK.
2. VERIFY UNDERGROUND UTILITIES AND NOTIFY UTILITY PROVIDERS A MINIMUM OF TWO DAYS PRIOR TO DIGGING.
3. THE CONDITIONS SHOWN ARE INTENDED TO SHOW THE LOCATIONS OF EXISTING EQUIPMENT, WHERE SHOWN ON THE PLAN DRAWINGS, AND IN NO WAY RELIEVES THE CONTRACTOR FROM PROVIDING ANY AND ALL COORDINATION NECESSARY TO COMPLETE THE NEW WORK. FIELD CONDITIONS SHALL GOVERN.
4. ALL AREAS OUTSIDE THE SCOPE OF CONSTRUCTION ARE TO REMAIN ENERGIZED. COORDINATE PHASING WITH CONSTRUCTION MANAGER AND OWNER PRIOR TO DEMOLITION WHICH MAY RESULT IN INTERRUPTION OF POWER.
5. REMOVE ALL ABANDONED WIRING AND CONDUIT THAT IS WITHIN THE PROJECT AREA PRIOR TO THE END OF CONSTRUCTION.
6. UPDATE PANEL DIRECTORIES WHICH ARE MODIFIED BY THIS PROJECT.
7. REPAIR DISTURBED AREAS TO MATCH EXISTING CONDITIONS.
8. CONTRACTOR SHALL BE RESPONSIBLE FOR ALL TESTING AND ABATEMENT OF ASBESTOS-CONTAINING AND LEAD-BASED PAINT PRIOR TO DEMOLITION WORK OR INSTALLATION OF NEW CONDUITS.

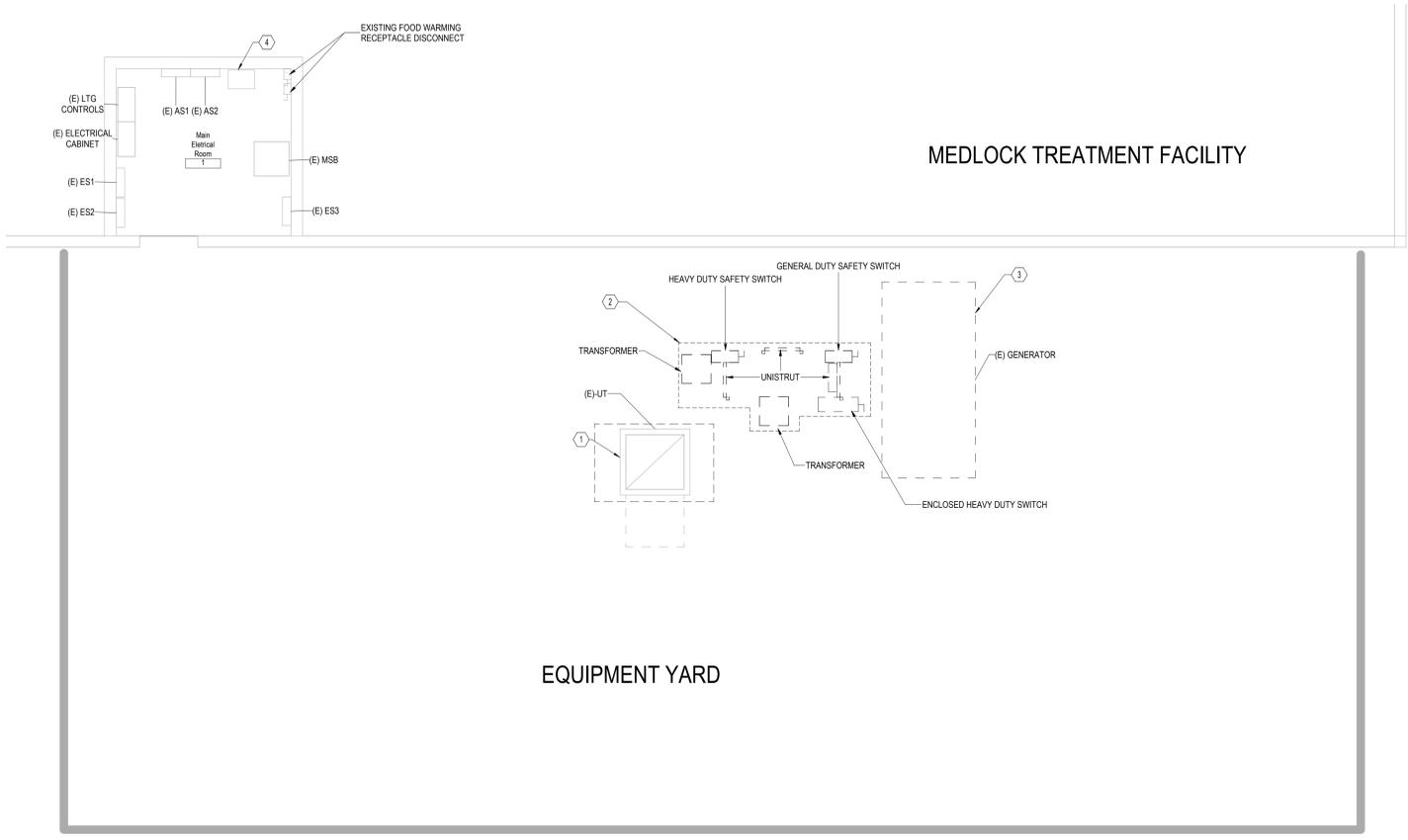


**1 DEMOLITION SITE PLAN**  
1" = 30'-0"

DATE: 10/23/2025  
 DRAWN BY: CB  
 CHECKED BY: MF  
 PROJECT NUMBER: 31.00.539

**DALLAS COUNTY  
 MEDLOCK FACILITY  
 GENERATOR REPLACEMENT**  
 1508 EAST LANGDON ROAD, DALLAS,  
 TEXAS 75214

NO.	REVISION	DATE
0	100% CD	11/19/2025



**1** ENLARGED DEMOLITION PLAN - EQUIPMENT YARD  
1/4" = 1'-0"

**PLAN NOTES**

- EXISTING INFORMATION SHOWN IS BASED ON FIELD OBSERVATIONS. FIELD VERIFY EXISTING CONDITIONS PRIOR TO WORK.
- VERIFY UNDERGROUND UTILITIES AND NOTIFY UTILITY PROVIDERS A MINIMUM OF TWO DAYS PRIOR TO DIGGING.
- THE CONDITIONS SHOWN ARE INTENDED TO SHOW THE LOCATIONS OF EXISTING EQUIPMENT, WHERE SHOWN ON THE PLAN DRAWINGS, AND IN NO WAY RELIEVES THE CONTRACTOR FROM PROVIDING ANY AND ALL COORDINATION NECESSARY TO COMPLETE THE NEW WORK. FIELD CONDITIONS SHALL GOVERN.
- ALL AREAS OUTSIDE THE SCOPE OF CONSTRUCTION ARE TO REMAIN ENERGIZED. COORDINATE PHASING WITH CONSTRUCTION MANAGER AND OWNER PRIOR TO DEMOLITION WHICH MAY RESULT IN INTERRUPTION OF POWER.
- REMOVE ALL ABANDONED WIRING AND CONDUIT THAT IS WITHIN THE PROJECT AREA PRIOR TO THE END OF CONSTRUCTION.
- UPDATE PANEL DIRECTORIES WHICH ARE MODIFIED BY THIS PROJECT.
- REPAIR DISTURBED AREAS TO MATCH EXISTING CONDITIONS.
- CONTRACTOR SHALL BE RESPONSIBLE FOR ALL TESTING AND ABATEMENT OF ASBESTOS-CONTAINING AND LEAD-BASED PAINT PRIOR TO DEMOLITION WORK OR INSTALLATION OF NEW CONDUITS.



10/23/2025  
DATE  
CB  
MF  
31.00.639

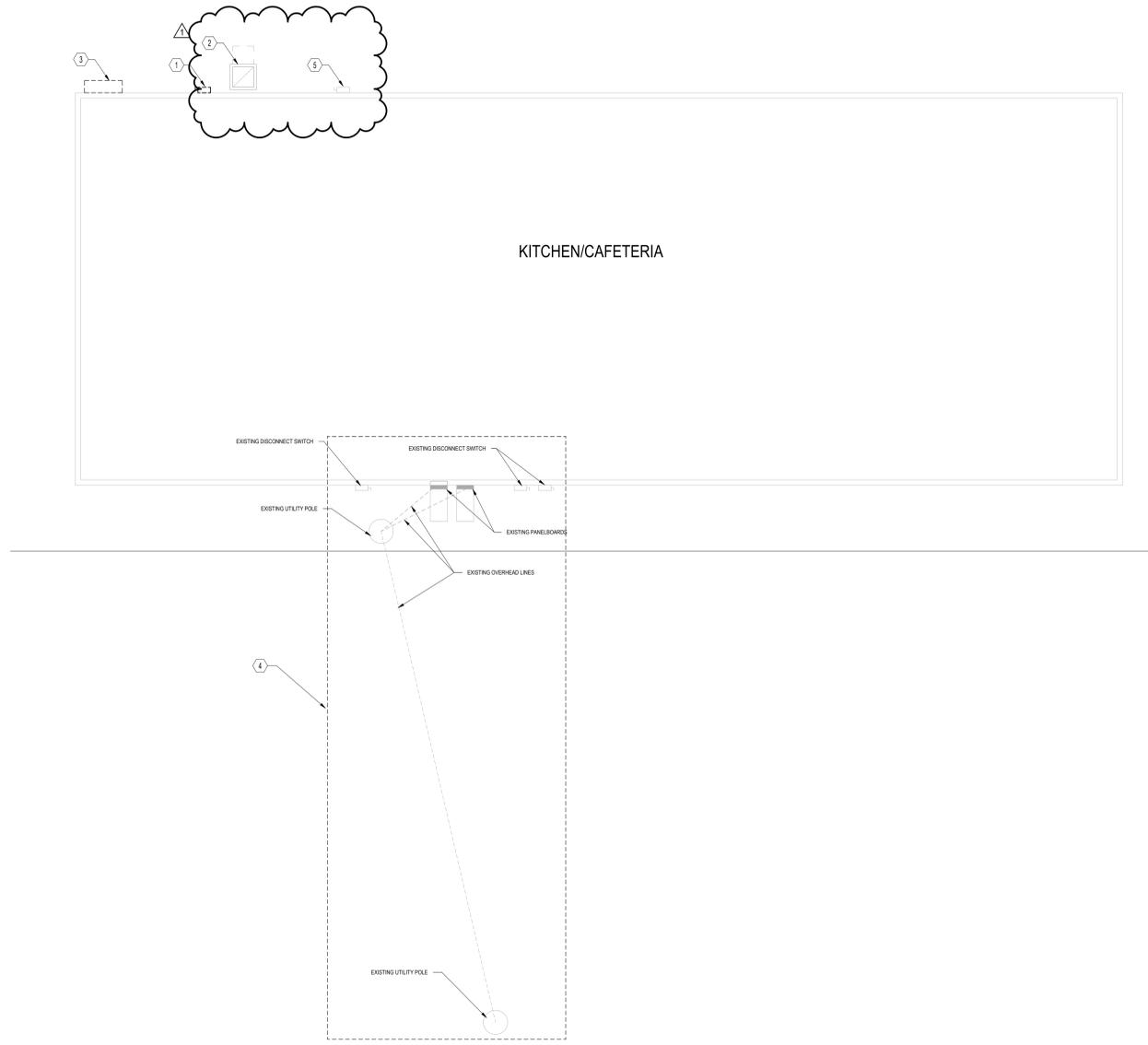
DRAWN BY  
CHECKED BY  
PROJECT NUMBER

**NOTES BY SYMBOL**

- EXISTING PAD-MOUNTED UTILITY TRANSFORMER TO REMAIN.
- REMOVE EXISTING ELECTRICAL EQUIPMENT IN DASHED BOUNDARY. REMOVE ASSOCIATED WIRING. REMOVE ASSOCIATED RACEWAY BACK TO POINT OF CONCEALMENT.
- REMOVE EXISTING GENERATOR AND FUEL TANK. REMOVE ASSOCIATED WIRING. REMOVE ASSOCIATED RACEWAY BACK TO CONCEALMENT. DRAIN AND PROPERLY DISPOSE OF ALL FUEL IN ACCORDANCE WITH EPA REGULATIONS.
- EXISTING ATS TO REMAIN. DEENERGIZE AND DISCONNECT CONDUCTORS ON EMERGENCY INPUT.

**DALLAS COUNTY  
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**1** ENLARGED DEMOLITION PLAN - KITCHEN/CAFETERIA  
1/8" = 1'-0"

**PLAN NOTES**

1. EXISTING INFORMATION SHOWN IS BASED ON FIELD OBSERVATIONS. FIELD VERIFY EXISTING CONDITIONS PRIOR TO WORK.
2. VERIFY UNDERGROUND UTILITIES AND NOTIFY UTILITY PROVIDERS A MINIMUM OF TWO DAYS PRIOR TO DIGGING.
3. THE CONDITIONS SHOWN ARE INTENDED TO SHOW THE LOCATIONS OF EXISTING EQUIPMENT, WHERE SHOWN ON THE PLAN DRAWINGS, AND IN NO WAY RELIEVES THE CONTRACTOR FROM PROVIDING ANY AND ALL COORDINATION NECESSARY TO COMPLETE THE NEW WORK. FIELD CONDITIONS SHALL GOVERN.
4. ALL AREAS OUTSIDE THE SCOPE OF CONSTRUCTION ARE TO REMAIN ENERGIZED. COORDINATE PHASING WITH CONSTRUCTION MANAGER AND OWNER PRIOR TO DEMOLITION WHICH MAY RESULT IN INTERRUPTION OF POWER.
5. REMOVE ALL ABANDONED WIRING AND CONDUIT THAT IS WITHIN THE PROJECT AREA PRIOR TO THE END OF CONSTRUCTION.
6. UPDATE PANEL DIRECTORIES WHICH ARE MODIFIED BY THIS PROJECT.
7. REPAIR DISTURBED AREAS TO MATCH EXISTING CONDITIONS.
8. CONTRACTOR SHALL BE RESPONSIBLE FOR ALL TESTING AND ABATEMENT OF ASBESTOS CONTAINING AND LEAD-BASED PAINT PRIOR TO DEMOLITION WORK OR INSTALLATION OF NEW CONDUITS.



**NOTES BY SYMBOL**

1. DEENERGIZE, DISCONNECT, AND REMOVE EXISTING DISCONNECT SWITCH BACK TO SOURCE. REFER TO ONE-LINE DIAGRAM FOR MORE INFORMATION.
2. EXISTING TRANSFORMER TO REMAIN. REFER TO EXISTING ONE-LINE DIAGRAM ON SHEET E2-701 FOR MORE INFORMATION.
3. REMOVE EXISTING TAPE BODY.
4. ELECTRICAL EQUIPMENT LOCATED IN DASHED BOUNDARY IS FOR REFERENCE ONLY AND IS NOT INCLUDED IN THE SCOPE OF WORK FOR THIS PROJECT.
5. EXISTING DISCONNECT TO REMAIN. REFER TO EXISTING ONE-LINE DIAGRAM ON SHEET E2-701 FOR MORE INFORMATION.

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**DALLAS COUNTY  
 MEDLOCK FACILITY  
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NO.	REVISION	DATE
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1	Revision 1	12/02/2025

**DRAWING NOTES**

1. REFER TO ONE-LINE DIAGRAM ON SHEET E-006 FOR MORE INFORMATION.
2. UNDERGROUND ROUTING LOCATIONS SHOWN THIS PLAN ARE PROPOSED. COORDINATE UNDERGROUND ROUTING WITH EXISTING CONDITIONS PRIOR TO WORK.
3. ALL CONCRETE AND PAVING DISTURBED DURING CONSTRUCTION SHALL BE PATCHED/REPAIRED TO MATCH EXISTING CONDITIONS.
4. THERE ARE EXISTING UNDERGROUND CONDUITS AND OTHER UTILITY LINES THROUGHOUT THIS ENTIRE WORK AREA. TO BE VERIFIED BY CONTRACTOR PRIOR TO DIGGING. SEE GENERAL NOTES ON E-001.



**FWN&A**  
Structural Engineering

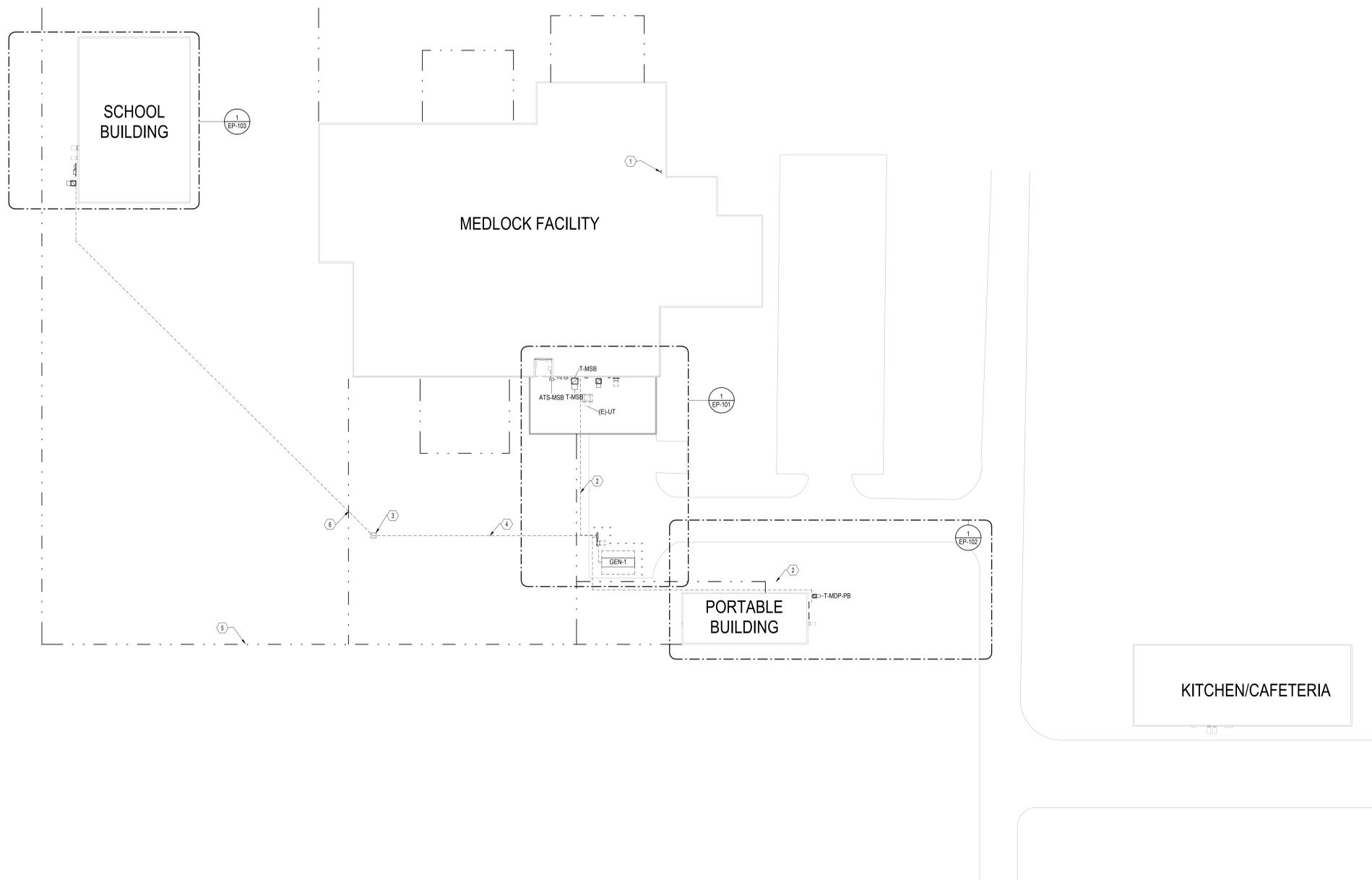
PROFESSIONAL SEAL:



11/19/2025

**NOTES BY SYMBOL**

1. PROVIDE GENERATOR ALARM PANEL IN CONTROL CENTER. COORDINATE LOCATION WITH OWNER. PROVIDE POWER FOR ALARM PANEL FROM NEW 120V CIRCUIT ON PANEL 'A'. CONTRACTOR SHALL VERIFY AVAILABLE LOAD AND CAPACITY PRIOR TO WORK. COORDINATE POWER REQUIREMENTS WITH GENERATOR MANUFACTURER.
2. APPROXIMATE PATH OF UNDERGROUND CONDUIT. FIELD VERIFY EXACT ROUTING PRIOR TO TRENCHING.
3. PROVIDE PULLBOX FOR UNDERGROUND CONDUIT. FIELD VERIFY EXACT LOCATION PRIOR TO INSTALLATION.
4. APPROXIMATE PATH OF UNDERGROUND CONDUIT FROM PANEL EDP TO SCHOOL BUILDING ATS. FIELD VERIFY EXACT ROUTING PRIOR TO TRENCHING.
5. EXISTING BARBED WIRE FENCE.
6. COORDINATE UNDERGROUND FEEDER ROUTING WITH OWNER PRIOR TO WORK.



10/23/2025  
DATE  
DRAWN BY  
CHECKED BY  
PROJECT NUMBER

CB  
MF  
31.00.039

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MEDLOCK FACILITY  
GENERATOR REPLACEMENT**  
1508 EAST LANGDON ROAD, DALLAS,  
TEXAS 75214



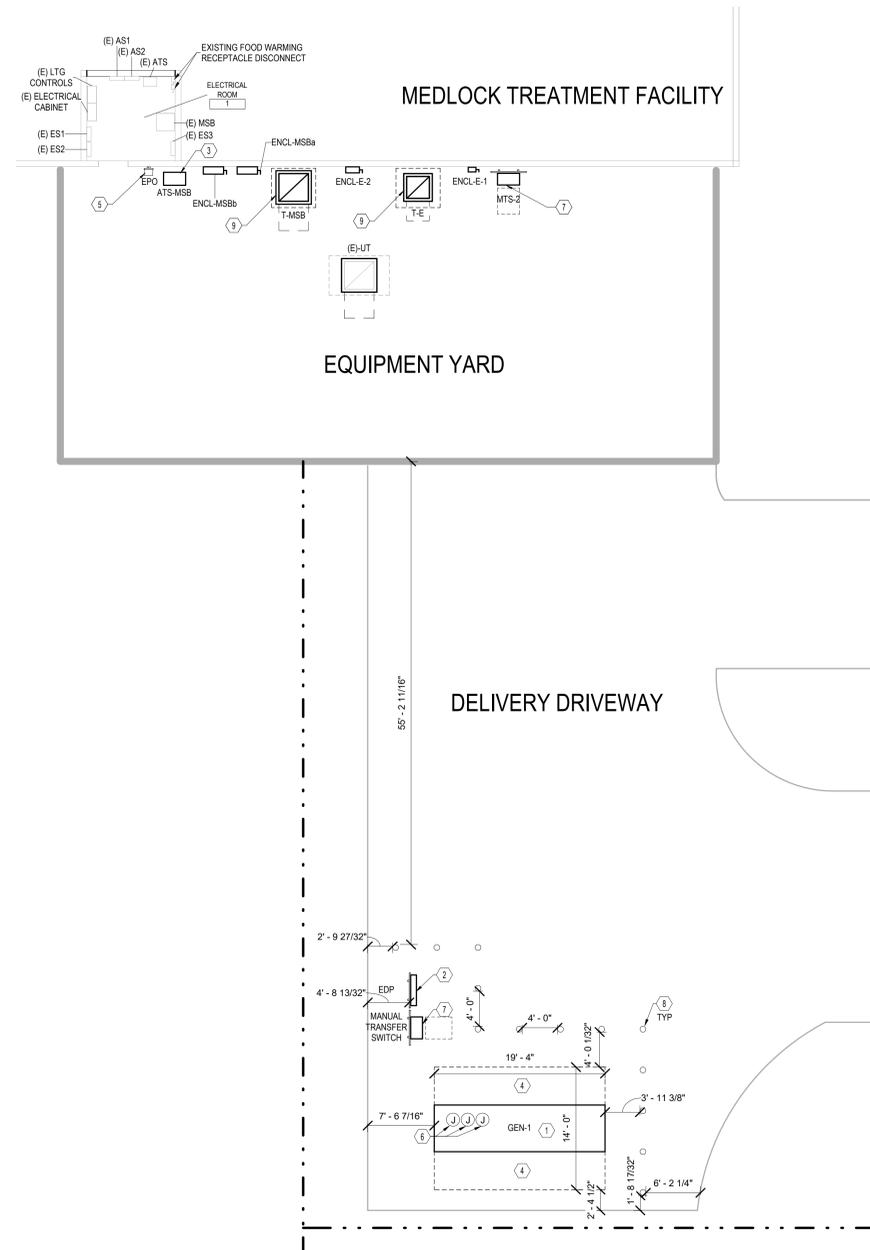
NO.	REVISION	DATE
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**EP-001**  
OVERALL SITE PLAN

**1 ELECTRICAL SITE PLAN**  
1" = 30'-0"

DRAWING NOTES

1. REFER TO ONE-LINE DIAGRAM ON SHEET E-006 FOR MORE INFORMATION.



1 ENLARGED SITE PLAN - EQUIPMENT YARD/ELECTRICAL ROOM/DELIVERY DRIVEWAY  
1/8" = 1'-0"

NOTES BY SYMBOL #

1. PROVIDE NEW GENERATOR. REFER TO SHEET E2-701 FOR MORE INFORMATION. REFER TO STRUCTURAL FOR GENERATOR FOUNDATION REQUIREMENTS.
2. PROVIDE NEW 1-LINE GENERATOR DISTRIBUTION PANEL MOUNTED ON STAINLESS STEEL UNISTRUT RACK. COORDINATE LOCATION WITH OWNER PRIOR TO INSTALLATION.
3. PROVIDE NEW PAD MOUNTED ATS. COORDINATE LOCATION WITH OWNER PRIOR TO INSTALLATION.
4. NEW GENERATOR MAINTENANCE CATWALK PROVIDED BY GENERATOR MANUFACTURER. CATWALK SHALL BE JUST ABOVE FUEL TANK, 52 INCHES WIDE, AND PROVIDE ACCESS TO INTERIOR OF GENERATOR ENCLOSURE.
5. PROVIDE EMERGENCY GENERATOR SHUTOFF BUTTON. SHUTOFF BUTTON SHALL BE LABELED 'EMERGENCY GENERATOR SHUTOFF'.
6. PROVIDE POWER FOR GENERATOR AUXILIARY CIRCUITS. REFER TO DETAIL 212Z-501 FOR MORE INFORMATION. FEED FROM EXISTING SPARE OR NEW CIRCUIT BREAKER IN EXISTING PANELBOARD 'A'. CONTRACTOR SHALL VERIFY AVAILABLE AMPERAGE AND CAPACITY PRIOR TO INSTALLATION.
7. PROVIDE NEW DOCKING STATION WITH MANUAL TRANSFER SWITCH MOUNTED TO STAINLESS STEEL UNISTRUT RACK. REFER TO ONE-LINE FOR MORE INFORMATION.
8. REFER TO SHEET E2-501 FOR BOLLARD INFORMATION.
9. PROVIDE NEW PAD MOUNTED STEP-DOWN TRANSFORMER. FIELD VERIFY EXACT LOCATION PRIOR TO INSTALLATION.
10. PROVIDE NEW WALL MOUNTED DOCKING STATION WITH MANUAL TRANSFER SWITCH. REFER TO ONE-LINE FOR MORE INFORMATION.

DATE: 10/23/2025  
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CHECKED BY: MF  
PROJECT NUMBER: 31.00.639

DALLAS COUNTY  
MEDLOCK FACILITY  
GENERATOR REPLACEMENT  
1508 EAST LANGDON ROAD, DALLAS,  
TEXAS 75214

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**DRAWING NOTES**

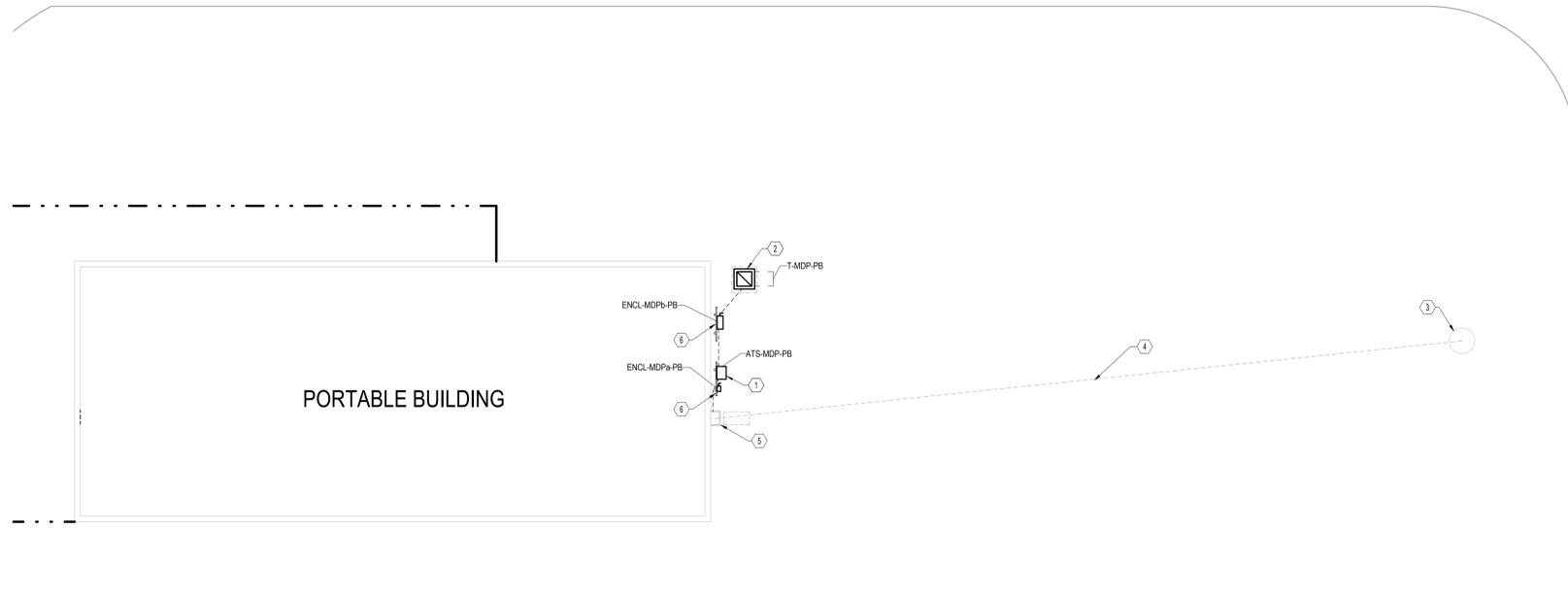
- REFER TO ONE-LINE ON SHEET E-007 FOR MORE INFORMATION.



PROFESSIONAL SEAL:



DELIVERY DRIVEWAY



**1** ENLARGED SITE PLAN - PORTABLE BUILDING  
1/8" = 1'-0"

**NOTES BY SYMBOL**

- PROVIDE NEW AUTOMATIC TRANSFER SWITCH. COORDINATE LOCATION PRIOR TO INSTALLATION.
- PROVIDE NEW PAD MOUNTED TRANSFORMER. COORDINATE LOCATION PRIOR TO INSTALLATION.
- EXISTING POLE-MOUNTED UTILITY TRANSFORMER.
- EXISTING OVERHEAD ELECTRICAL UTILITY SERVICE.
- EXISTING ELECTRICAL SERVICE METER.
- PROVIDE STAINLESS STEEL UNISTRUT RACK FOR MOUNTING ELECTRICAL EQUIPMENT. FIELD VERIFY EXACT LOCATION PRIOR TO INSTALLATION.

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PROJECT NUMBER: 31.00.039

**DALLAS COUNTY  
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**EP-102**

ENLARGED SITE PLAN -  
PORTABLE BUILDING -  
NEW WORK

**DRAWING NOTES**

1. REFER TO ONE-LINE ON SHEET E-007 FOR MORE INFORMATION.



**FWN&A**  
Structural Engineering

PROFESSIONAL SEAL:



10/23/2025 CB MF 31.00.539

DATE DRAWN BY  
CHECKED BY PROJECT NUMBER

**NOTES BY SYMBOL**

1. EXISTING POLE MOUNTED UTILITY TRANSFORMER.
2. EXISTING OVERHEAD ELECTRICAL SERVICE.
3. EXISTING ELECTRICAL METER.
4. PROVIDE NEW AUTOMATIC TRANSFER SWITCH. COORDINATE LOCATION PRIOR TO INSTALLATION.
5. PROVIDE NEW PAD MOUNTED TRANSFORMER. COORDINATE LOCATION PRIOR TO INSTALLATION.
6. PROVIDE STAINLESS STEEL UNISTRUT RACK FOR MOUNTING ELECTRICAL EQUIPMENT. FIELD VERIFY EXACT LOCATION PRIOR TO INSTALLATION.

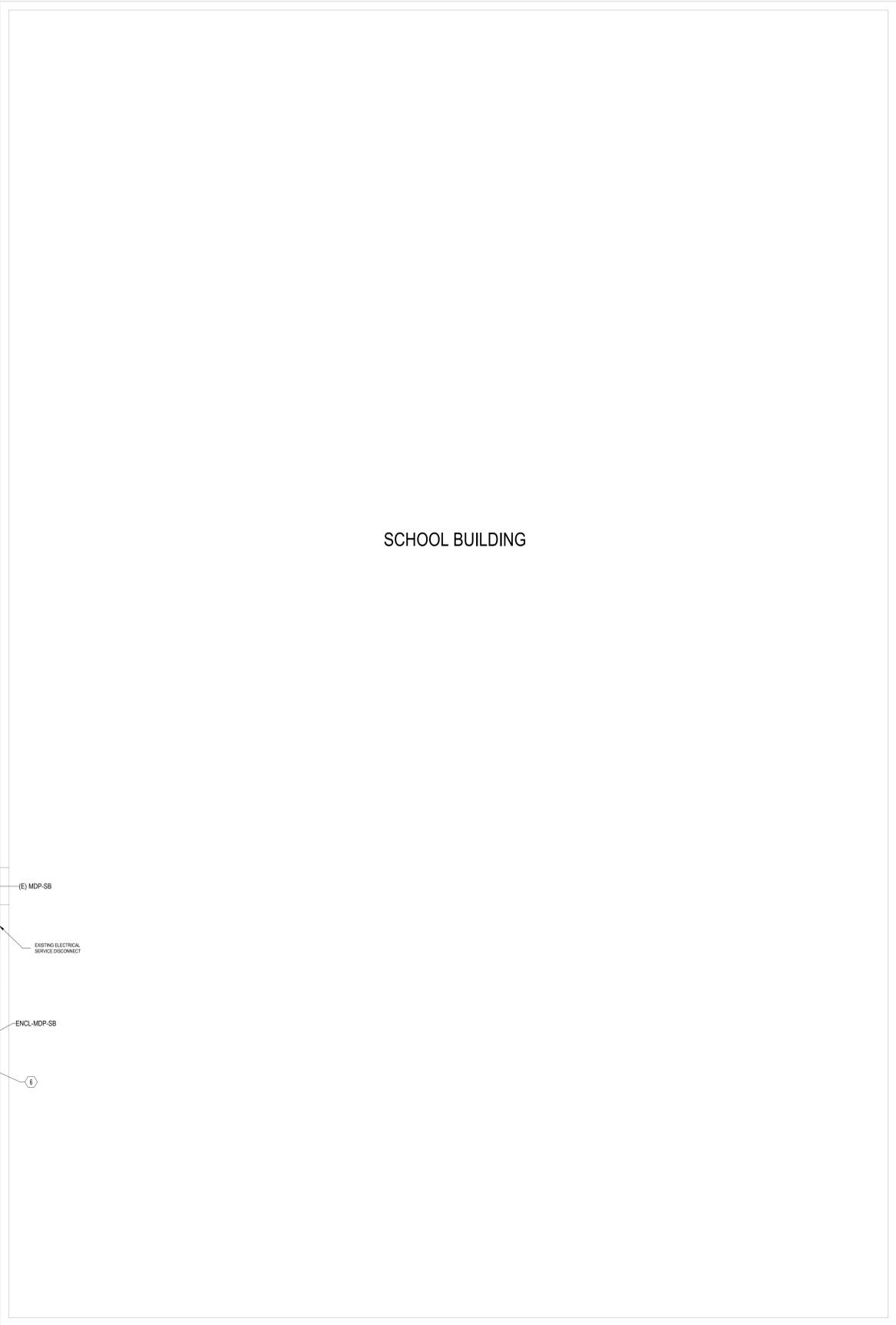
**DALLAS COUNTY  
MEDLOCK FACILITY  
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1508 EAST LANGDON ROAD, DALLAS,  
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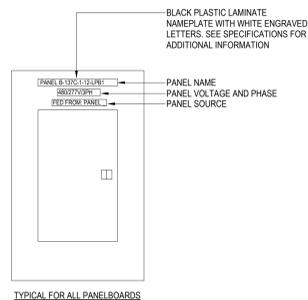
**EP-103**

ENLARGED SITE PLAN -  
SCHOOL BUILDING -  
NEW WORK



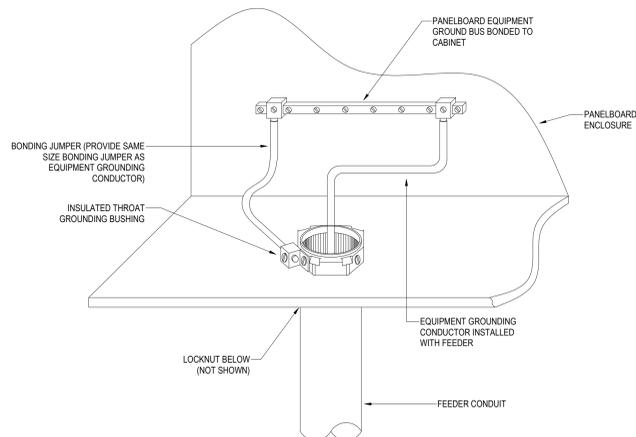
SCHOOL BUILDING

**1 ENLARGED SITE PLAN - SCHOOL BUILDING**  
1/4" = 1'-0"

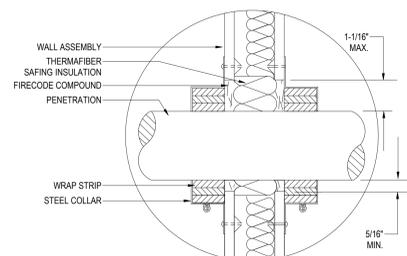


TYPICAL FOR ALL PANELBOARDS

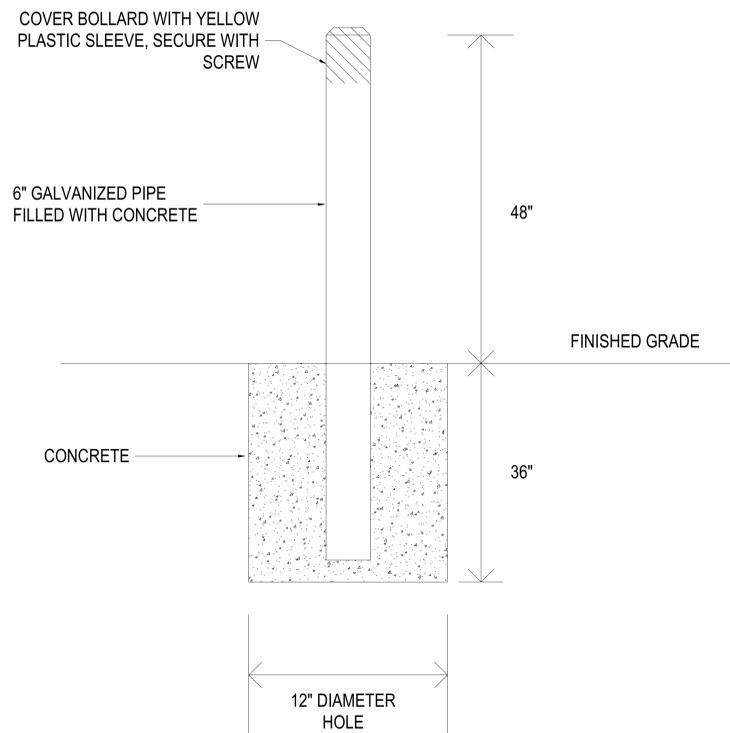
**4 PANELBOARD IDENTIFICATION**  
NTS



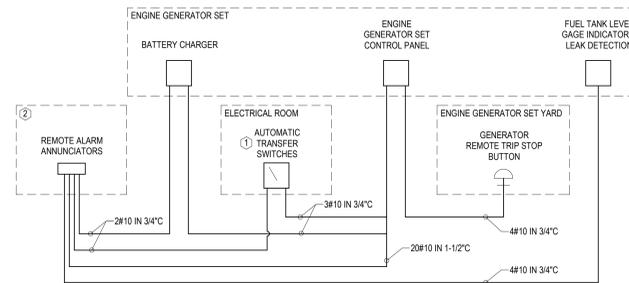
**5 BONDING**  
NTS



**6 FIRESTOP WALL PENETRATION**  
NTS

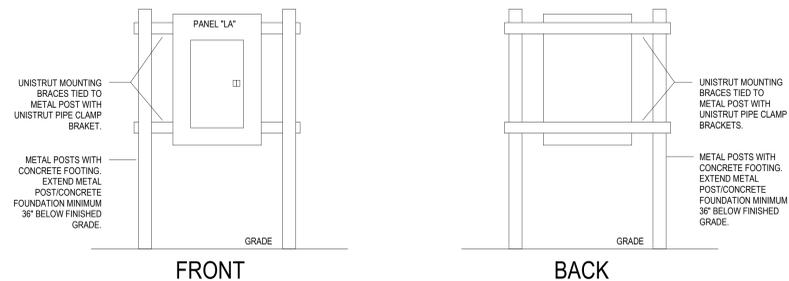


**1 BOLLARD INSTALLATION**  
NTS



KEY NOTES:  
1. REFER TO PLANS FOR QUANTITY.  
2. MULTIPLE LOCATIONS AS REQUIRED. REFER TO PLANS FOR LOCATIONS AND QUANTITY.

**2 GENERATOR CONTROL WIRING DIAGRAM**  
NTS



**3 E\_PANELBOARD - FREE STANDING MOUNT**  
NTS



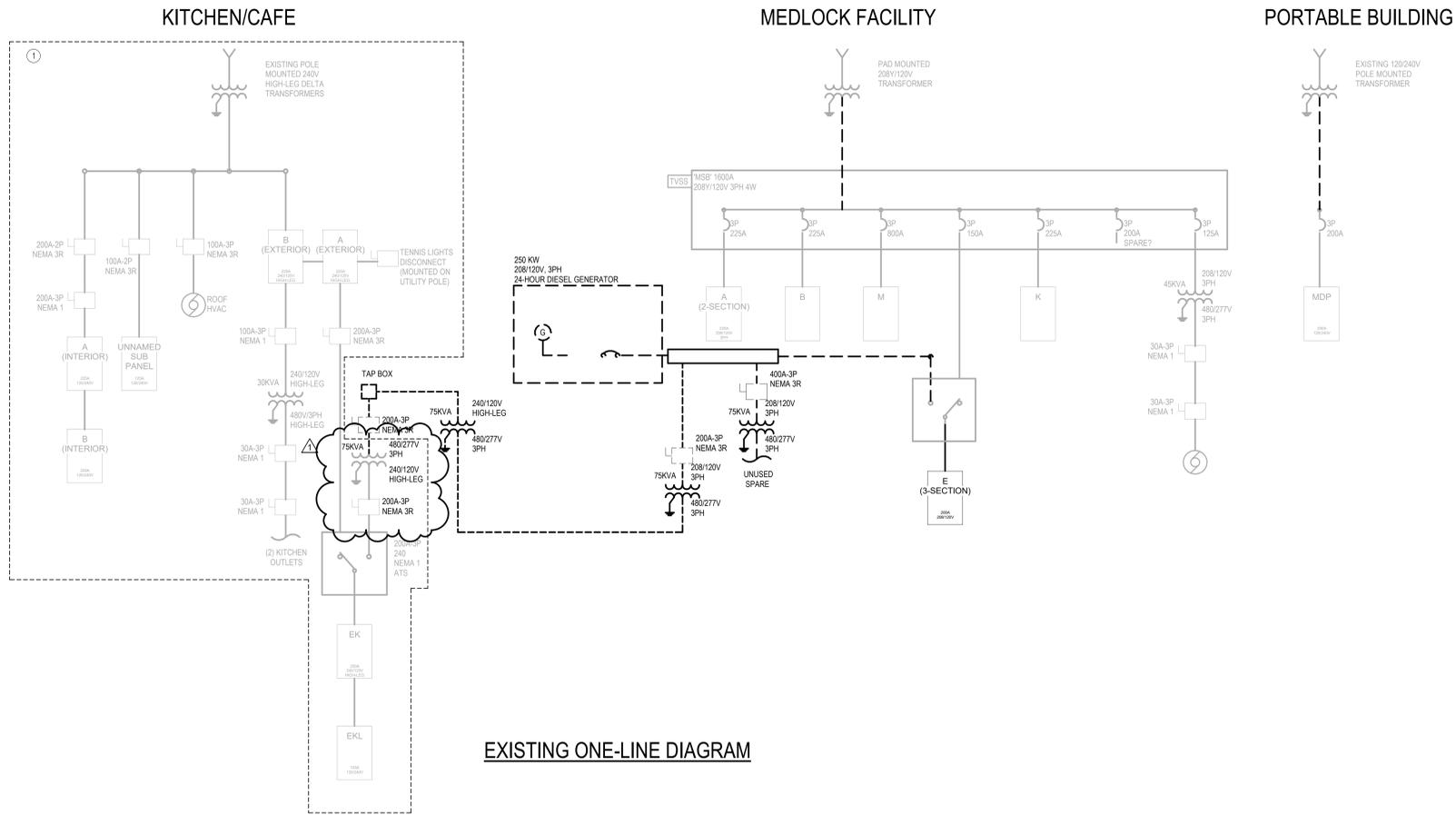
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DALLAS COUNTY  
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1508 EAST LANGDON ROAD, DALLAS,  
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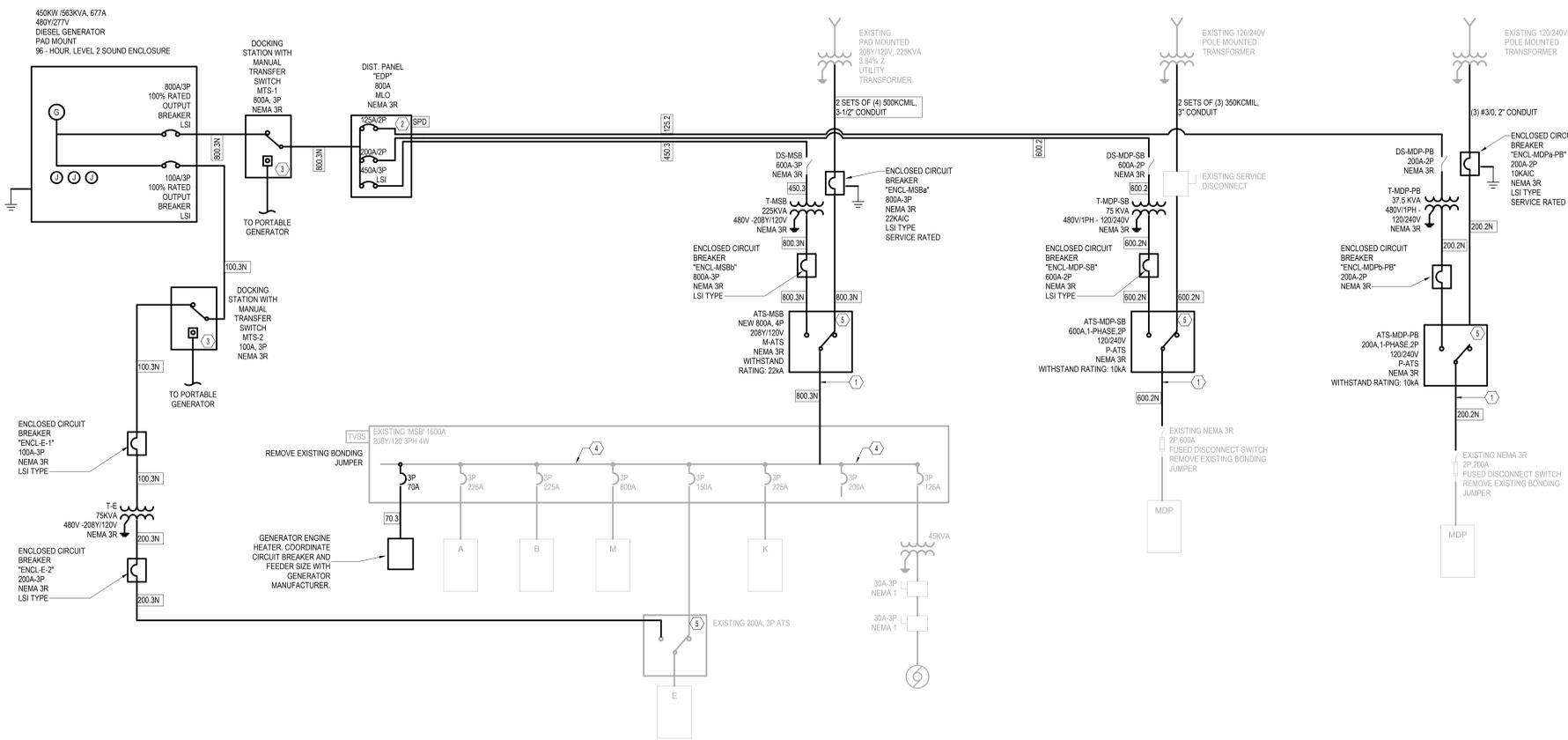
**EZ-501**

ELECTRICAL DETAILS



EXISTING ONE-LINE DIAGRAM

BRANCH & FEEDER CIRCUITS - COPPER									
CIRCUIT TAG	PHASE CONDUCTOR(S)	NEUTRAL CONDUCTOR(S)	GROUNDING CONDUCTOR(S)	RAWEAY	CIRCUIT TAG	PHASE CONDUCTOR(S)	NEUTRAL CONDUCTOR(S)	GROUNDING CONDUCTOR(S)	RAWEAY
15.1	1#12	1#12	1#12	3/4"	150.2	2#10	1#10	1#6	1-1/4"
15.2	2#12	1#12	1#12	3/4"	150.2N	2#10	1#10	1#6	1-1/2"
15.2N	2#12	1#12	1#12	3/4"	150.3	3#10	1#10	1#6	1-1/2"
15.3	3#12	1#12	1#12	3/4"	150.3N	3#10	1#10	1#6	2"
15.3N	3#12	1#12	1#12	3/4"	175.2	2#10	1#10	1#6	1-1/2"
20.1	1#12	1#12	1#12	3/4"	175.2N	2#10	1#10	1#6	2"
20.2	2#12	1#12	1#12	3/4"	175.3	3#10	1#10	1#6	2"
20.2N	2#12	1#12	1#12	3/4"	175.3N	3#10	1#10	1#6	2"
20.3	3#12	1#12	1#12	3/4"	200.2	2#10	1#10	1#6	1-1/2"
20.3N	3#12	1#12	1#12	3/4"	200.2N	2#10	1#10	1#6	2"
25.1	1#10	1#10	1#10	3/4"	200.3	3#10	1#10	1#6	2"
25.2	2#10	1#10	1#10	3/4"	200.3N	3#10	1#10	1#6	2"
25.2N	2#10	1#10	1#10	3/4"	225.2	2#10	1#10	1#6	2"
25.3	3#10	1#10	1#10	3/4"	225.2N	2#10	1#10	1#6	2"
25.3N	3#10	1#10	1#10	3/4"	225.3	3#10	1#10	1#6	2"
30.1	1#10	1#10	1#10	3/4"	225.3N	3#10	1#10	1#6	2-1/2"
30.2	2#10	1#10	1#10	3/4"	250.2	2-250	1#10	1#4	2"
30.2N	2#10	1#10	1#10	3/4"	250.2N	2-250	1-250	1#4	2"
30.3	3#10	1#10	1#10	3/4"	250.3	3-250	1-250	1#4	2-1/2"
30.3N	3#10	1#10	1#10	3/4"	250.3N	3-250	1-250	1#4	3"
35.1	1#8	1#8	1#10	3/4"	300.2	2-350	1-350	1#4	2-1/2"
35.2	2#8	1#8	1#10	3/4"	300.2N	2-350	1-350	1#4	3"
35.2N	2#8	1#8	1#10	3/4"	300.3	3-350	1-350	1#4	3"
35.3	3#8	1#8	1#10	3/4"	300.3N	3-350	1-350	1#4	3"
35.3N	3#8	1#8	1#10	1"	400.2	2-500	1-500	1#3	2-1/2"
40.1	1#8	1#8	1#10	3/4"	400.2N	2-500	1-500	1#3	2-1/2"
40.2	2#8	1#8	1#10	3/4"	400.2N	2 Sets 2#300	2 Sets 1#300	2 Sets 1#300	2 Sets 1-1/2"
40.2N	2#8	1#8	1#10	3/4"	400.2N	2 Sets 2#300	2 Sets 1#300	2 Sets 1#300	2 Sets 2"
40.3	3#8	1#8	1#10	3/4"	400.3	3-500	1-500	1#3	3"
40.3N	3#8	1#8	1#10	1"	400.3	3-500	1-500	1#3	3-1/2"
45.1	1#6	1#6	1#10	3/4"	400.3N	3-500	1-500	1#3	2 Sets 2-1/2"
45.2	2#6	1#6	1#10	3/4"	450.2	2 Sets 2#300	2 Sets 1#300	2 Sets 1#300	2 Sets 1-1/2"
45.2N	2#6	1#6	1#10	1"	450.2N	2 Sets 2#300	2 Sets 1#300	2 Sets 1#300	2 Sets 2"
45.3	3#6	1#6	1#10	1"	450.3	3-500	1-500	1#3	2 Sets 2"
45.3N	3#6	1#6	1#10	1"	450.3N	3-500	1-500	1#3	2 Sets 2-1/2"
50.1	1#6	1#6	1#10	3/4"	450.3N	3-500	1-500	1#3	2 Sets 2-1/2"
50.2	2#6	1#6	1#10	3/4"	450.2	2 Sets 2#400	2 Sets 1#400	2 Sets 1#400	2 Sets 2"
50.2N	2#6	1#6	1#10	1"	450.2N	2 Sets 2#400	2 Sets 1#400	2 Sets 1#400	2 Sets 2"
50.3	3#6	1#6	1#10	1"	450.3	3-500	1-500	1#3	2 Sets 2"
50.3N	3#6	1#6	1#10	1"	450.3N	3-500	1-500	1#3	2 Sets 2-1/2"
60.1	1#6	1#6	1#10	3/4"	500.2	2 Sets 2-250	2 Sets 1-250	2 Sets 1#250	2 Sets 2"
60.2	2#6	1#6	1#10	3/4"	500.2N	2 Sets 2-250	2 Sets 1-250	2 Sets 1#250	2 Sets 2-1/2"
60.2N	2#6	1#6	1#10	1"	500.3	3-250	1-250	1#3	2 Sets 2-1/2"
60.3	3#6	1#6	1#10	1"	500.3N	3-250	1-250	1#3	2 Sets 2-1/2"
60.3N	3#6	1#6	1#10	1"	600.2	2 Sets 2-350	2 Sets 1-350	2 Sets 1#350	2 Sets 2-1/2"
70.1	1#4	1#4	1#8	1"	600.2N	2 Sets 2-350	2 Sets 1-350	2 Sets 1#350	2 Sets 3"
70.2	2#4	1#4	1#8	1-1/4"	600.3	3-350	1-350	1#3	2 Sets 3"
70.2N	2#4	1#4	1#8	1-1/4"	600.3N	3-350	1-350	1#3	2 Sets 3"
70.3	3#4	1#4	1#8	1-1/4"	700.2	2 Sets 2-400	2 Sets 1-400	2 Sets 1#400	2 Sets 2-1/2"
70.3N	3#4	1#4	1#8	1-1/4"	700.2N	2 Sets 2-400	2 Sets 1-400	2 Sets 1#400	2 Sets 3"
80.1	1#3	1#3	1#8	1"	700.2N	2 Sets 2-400	2 Sets 1-400	2 Sets 1#400	2 Sets 3"
80.2	2#3	1#3	1#8	1-1/4"	700.3	3-400	1-400	1#3	2 Sets 3"
80.2N	2#3	1#3	1#8	1-1/4"	700.3N	3-400	1-400	1#3	2 Sets 3"
80.3	3#3	1#3	1#8	1-1/4"	800.2	2 Sets 2-500	2 Sets 1-500	2 Sets 1#500	2 Sets 2-1/2"
80.3N	3#3	1#3	1#8	1-1/4"	800.2N	2 Sets 2-500	2 Sets 1-500	2 Sets 1#500	2 Sets 3"
90.1	1#3	1#3	1#8	1"	800.3	3-500	1-500	1#3	2 Sets 3-1/2"
90.2	2#3	1#3	1#8	1"	800.3N	3-500	1-500	1#3	3 Sets 3"
90.2N	2#3	1#3	1#8	1-1/4"	1000.3	3 Sets 3-400	3 Sets 1-400	3 Sets 1#400	3 Sets 3"
90.3	3#3	1#3	1#8	1-1/4"	1000.3N	3 Sets 3-400	3 Sets 1-400	3 Sets 1#400	3 Sets 3"
90.3N	3#3	1#3	1#8	1-1/4"	1200.3	4 Sets 3-350	4 Sets 1-350	4 Sets 1#350	4 Sets 3"
100.1	1#2	1#2	1#6	1"	1200.3N	4 Sets 3-350	4 Sets 1-350	4 Sets 1#350	4 Sets 3"
100.2	2#2	1#2	1#6	1"	1600.3	5 Sets 3-400	5 Sets 1-400	5 Sets 1#400	5 Sets 3"
100.2N	2#2	1#2	1#6	1-1/4"	1600.3N	5 Sets 3-400	5 Sets 1-400	5 Sets 1#400	5 Sets 3-1/2"
100.3	3#2	1#2	1#6	1-1/4"	2000.3	6 Sets 3-400	6 Sets 1-400	6 Sets 1-400	6 Sets 3-1/2"
100.3N	3#2	1#2	1#6	1-1/4"	2000.3N	6 Sets 3-400	6 Sets 1-400	6 Sets 1-400	6 Sets 3-1/2"
110.2	2#1	1#1	1#6	1-1/4"	2500.3	7 Sets 3-500	7 Sets 1-500	7 Sets 1-500	7 Sets 3-1/2"
110.2N	2#1	1#1	1#6	1-1/2"	2500.3N	7 Sets 3-500	7 Sets 1-500	7 Sets 1-500	7 Sets 3-1/2"
110.3	3#1	1#1	1#6	1-1/2"	3000.3	8 Sets 3-500	8 Sets 1-500	8 Sets 1-500	8 Sets 3-1/2"
110.3N	3#1	1#1	1#6	1-1/2"	3000.3N	8 Sets 3-500	8 Sets 1-500	8 Sets 1-500	8 Sets 3-1/2"
125.2	2#1/0	1#1/0	1#6	1-1/4"	4000.3	11 Sets 3-500	11 Sets 1-500	11 Sets 1-500	11 Sets 3-1/2"
125.2N	2#1/0	1#1/0	1#6	1-1/2"	4000.3N	11 Sets 3-500	11 Sets 1-500	11 Sets 1-500	11 Sets 3-1/2"
125.3	3#1/0	1#1/0	1#6	1-1/2"					
125.3N	3#1/0	1#1/0	1#6	2"					



NEW ONE-LINE DIAGRAM

**ELECTRICAL ONE-LINE DIAGRAM KEYED NOTES**

① EXISTING AND DEMO WORK

- EXISTING ELECTRICAL EQUIPMENT LOCATED IN DASHED BOUNDARY ARE NOT INCLUDED IN THE SCOPE OF WORK OF THIS PROJECT.

② NEW WORK

- REROUTE AS NEEDED TO RECONNECT EXISTING FEEDER TO NEW EQUIPMENT.
- ALL CIRCUIT BREAKERS THIS PANEL SHALL BE LSI TYPE.
- PROVIDE GENERATOR DOCKING STATION WITH ATS, SIMILAR TO TRYSSTAR.
- MODIFY LUGS AS NEEDED TO ACCEPT NEW FEEDERS.
- ROUTE ATS START SIGNAL WIRING TO GENERATOR CONTROL UNIT.



FWN&A Structural Engineering

PROFESSIONAL SEAL: COOPER P. BLODGETT 156986 12/02/2025

DATE: 10/23/2025  
 DRAWN BY: CB  
 CHECKED BY: MF  
 PROJECT NUMBER: 31.00.039

DALLAS COUNTY MEDLOCK FACILITY GENERATOR REPLACEMENT  
 1508 EAST LANGDON ROAD, DALLAS, TEXAS 75214

NO.	REVISION	DATE
0	100% CD	11/19/2025
1	Revision 1	12/02/2025



# GENERAL NOTES

## I. GENERAL CONDITIONS & DESIGN LOADS

1. Building Code: 2021 International Building Code
2. Risk Category I
3. Generator Load 50,000 LBS
4. Wind Design Data
  - Ultimate design wind speed,  $V_{ult}$  105 mph
  - Nominal design wind speed,  $V_{asd}$  81.3 mph
  - Wind Importance Factor,  $I_w$  1.0
  - Wind exposure B
5. Earthquake Design Data
  - Seismic importance factor,  $I_e$  1.0
  - Mapped spectral response acceleration (short period),  $S_S$  0.096 g
  - Mapped spectral response acceleration (1 sec. period),  $S_1$  0.053 g
  - Site class D
  - Design spectral response acceleration (short period),  $S_{DS}$  0.099 g
  - Design spectral response acceleration (1 sec. period),  $S_{D1}$  0.085 g
  - Seismic design category B

6. General
  - a. All existing conditions shall be field verified.
  - b. Contractor shall verify all dimensions prior to start of construction.
  - c. General Contractor shall be responsible for coordination of other trades (mech'l, elec'l, etc.) prior to fabrication and installation of materials.
  - d. The details designated as "Typical Details" (TYP) apply generally to the drawings in all areas where conditions are similar.

## II. FOUNDATION & EARTHWORK

1. Design based on Geotechnical Report No. DF250116 by Building and Earth Sciences, Inc., dated 10-09-2025.
2. Foundation construction shall be monitored by a representative of the Geotechnical Engineer to observe excavation, identify bearing strata, and provide recommendations if seepage is encountered.
3. Depths or elevations of bottoms (footings) shown on Structural Drawings are for estimating purposes only. Final bearing elevations shall be determined in the field by a representative of the Geotechnical Engineer to satisfy assumed design bearing values.
4. Footing design loadbearing value: 2,000 psf  
 Bearing stratum Lean Clay
5. Slab on grade
  - a. The foundation and structure is designed based on 1" or less potential vertical movement. The Contractor in coordination with the Geotechnical Engineer is responsible for field execution of the geotechnical report information to achieve this design potential vertical movement criteria.

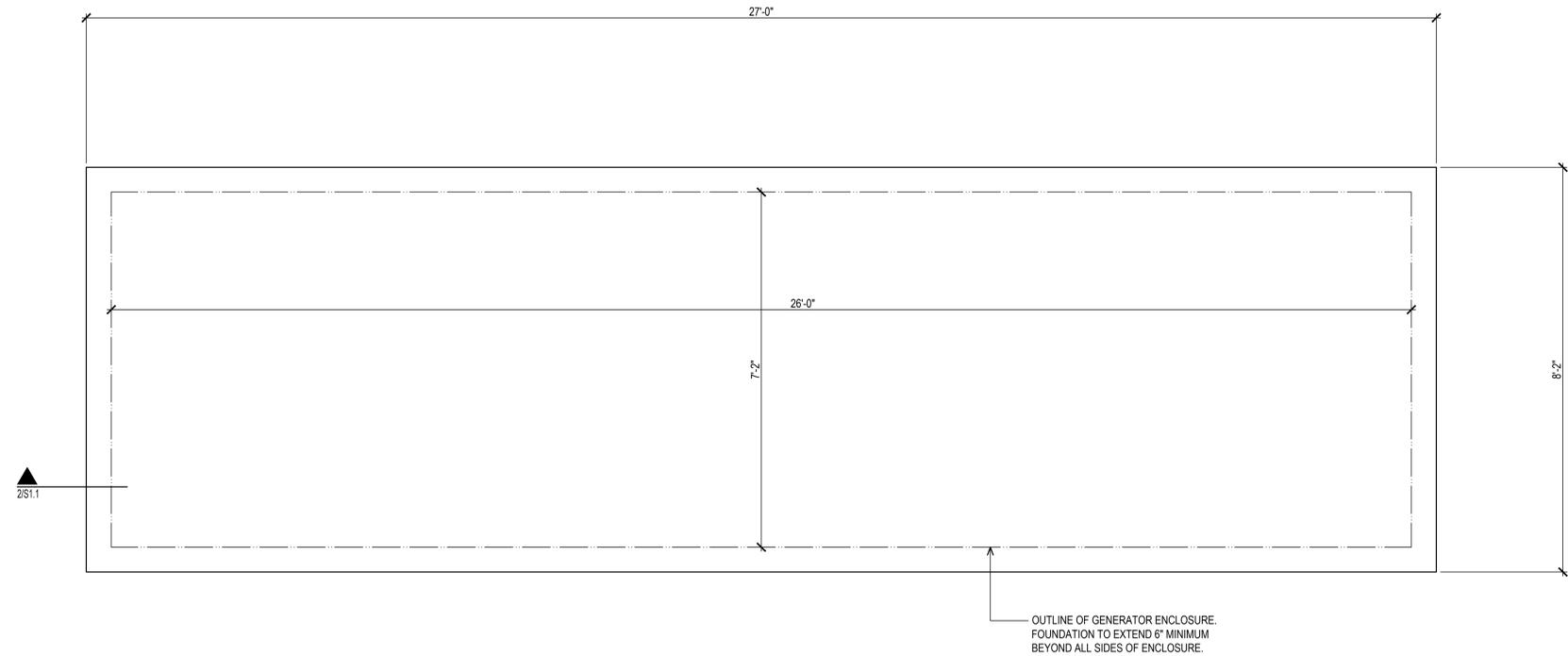
## III. STRUCTURAL CONCRETE

1. Concrete shall have the following properties:

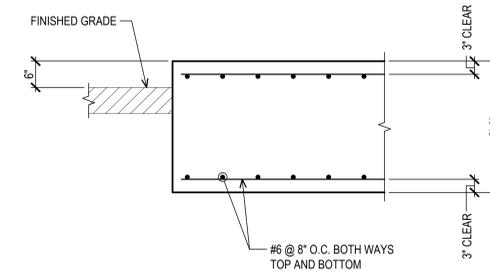
Description of Use	Unit Weight (pcf)	Min. 28 Day Strength (psi)	Max w/c Ratio	Max Aggregate Size (in)	Air Content
Spread Footings	145 (NW)	4,500	-	3/4"	5-6%

2. Reinforcing steel shall be ASTM A615 Grade 60 unless noted otherwise.
3. Lap reinforcing splices #6 and smaller bars - 57 bar diameters with 24" minimum unless noted otherwise. Lap reinforcing splices #7 and larger - 71 bar diameters with 24" minimum unless noted otherwise.
4. Provide concrete coverage for reinforcing steel as follows unless noted otherwise:

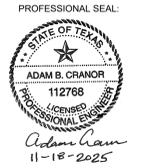
Concrete Exposure	Member	Reinforcement	Specified Cover (in)
Concrete cast against and permanently in contact with ground	All	All	3



**1 | GENERATOR PAD**  
3/4" = 1'-0"



**2 | SECTION**  
3/4" = 1'-0" | GENERATOR PAD REINFORCEMENT



NOVEMBER 19, 2025  
 DATE  
 DRAWN BY  
 CHECKED BY  
 PROJECT NUMBER  
 RV  
 AC  
 22408204

**DALLAS COUNTY  
 MEDLOCK FACILITY  
 GENERATOR REPLACEMENT**  
 1508 EAST LANGDON ROAD, DALLAS,  
 TEXAS 75214

NO.	REVISION	DATE
0	100% CD	11/19/2025

DALLAS COUNTY - RENOVATION PROJECTS			
BID COST SHEET			
Project Name:			
Solicitation No:			
Vendor Name:			
Date:			
ITEM	COST CATEGORY DESCRIPTION	PERCENTAGE (%) OF TOTAL PROJECT COST	TOTAL AMOUNT (\$)
1	General Conditions:		
2	Cost of Work *** :		
3	Contractor Contingency:		
4	Total Construction Costs: (Line Items 1 thru 3)		\$ -
5	Payment & Performance Bonds:		
6	Insurance:		
7	Permit Fee:		
8	Contractor Fee/Profit:		
9	Total Markups (Line Items 5 thru 8)		\$ -
10	Owner Contingency: (5% of Line Item 4)		
11	TOTAL SUBMITTED COSTS: (Line Items 4+9+10)		\$ -
12	Alternates:		
13	GRAND TOTAL - PROJECT COSTS: (Line Items 11+12)		\$ -

- a. \*\*\* Cost of Work needs to be broken down by Unifomat Level II Classification - **See Unifomat Level II Classification Form.**
- b. General Conditions should take into account all Personnel required to complete the project
- c. Cost of Work should include any Allowances if identified in the Bid Documents
- d. Owner approval required for use of ALL contingencies. Contractor shall be responsible for procurement and coordination
- e. Alternates should be all inclusive of General Conitions, General Requirements and relevant markups.
- f. Grand Total costs under Line 13 should be entered in BidSync
- g. All Cost Categories need to be separated and filled-in as listed in the Cost Sheet

<b>DALLAS COUNTY - RENOVATION PROJECTS</b>		
<b>UNIFORMAT LEVEL II CLASSIFICATION FORM</b>		
Project Name:		
Solicitation No:		
Vendor Name:		
Date:		
<b>Division</b>	<b>Uniformat Level II Description</b>	<b>Estimated Cost (\$)</b>
Division 01	General Requirements	\$ -
Division 02	Existing Conditions	\$ -
Division 03	Concrete	\$ -
Division 04	Masonry	\$ -
Division 05	Metals	\$ -
Division 06	Wood, Plastics, and Composites	\$ -
Division 07	Thermal and Moisture Protection	\$ -
Division 08	Openings	\$ -
Division 09	Finishes	\$ -
Division 10	Specialties	\$ -
Division 11	Equipment	\$ -
Division 12	Furnishings	\$ -
Division 13	Special Construction	\$ -
Division 14	Conveying Equipment	\$ -
Division 21	Fire Suppression	\$ -
Division 22	Plumbing	\$ -
Division 23	HVAC	\$ -
Division 25	Integrated Automated Systems	\$ -
Division 26	Electrical	\$ -
Division 27	Communications	\$ -
Division 28	Electronic Safety and Security	\$ -
Division 31	Earthwork	\$ -
Division 32	Exterior Improvements	\$ -
Division 33	Utilities	\$ -
Division 34	Transportation	\$ -
Division 35	Waterway and Marine Construction	\$ -
Division 40	Process Integration Manufacturers	\$ -
Division 41	Material Processing and Handling Equipment	\$ -
Division 42	Process Heating, Cooling and Drying Equipment	\$ -
Division 43	Process Gas and Liquid Handling, Purification, and Storage Equipment Manufacturers	\$ -
Division 44	Pollution Control Equipment	\$ -
Division 45	Industry-Specific Manufacturing Equipment	\$ -
Division 46	Water and Wastewater Equipment	\$ -
Division 48	Electrical Power Generation	\$ -
	<b>TOTAL (Cost of Work)***</b>	<b>\$ -</b>

\*\*\* Enter under line item 2 on *Bid Cost Sheet*