

**PROJECT MANUAL**

**for**

**FARNUM STREET EAST**  
**SWITCHBOARD AND SERVICE UPGRADE**

**for the**

**LANCASTER CITY HOUSING AUTHORITY**

325 Church Street  
Lancaster, PA 17602-4201

**Architect**

**HAMMEL ASSOCIATES ARCHITECTS, LLC**

25 East Grant Street, Suite 102  
Lancaster, PA 17602

**Electrical Engineer**

**Moore Engineering Company**

3637 Columbia Avenue  
Lancaster, PA 17603

---

**August 2024**  
**Architect's Project Number 2433**

PROJECT MANUAL

**LANCASTER CITY HOUSING AUTHORITY**  
 FARNUM STREET EAST SWITCHBOARD AND SERVICE UPGRADE

TABLE OF CONTENTS

<b>NON-TECHNICAL SPECIFICATIONS</b>	<b>Pages</b>
Signature Page .....	1
*Invitation to Bid.....	2
Instructions to Bidders, HUD-5369 .....	5
<b>FORMS REQUIRED TO BE SUBMITTED WITH BID</b>	
* <b>Bid Form</b> .....	<b>2</b>
<b>Bid Bond (10% Required)</b> .....	<b>2</b>
<b>Representations, Certifications, and Other Statement of Bidders, HUD-5369-A</b> .....	<b>4</b>
<b>Non-Collusion Affidavit of Prime Bidder</b> .....	<b>1</b>
<b>Section 3 Overview</b> .....	<b>4</b>
<b>Hourly Rate Schedule</b> .....	<b>1</b>
*General Conditions of the Contract for Construction, HUD-5370.....	19
*Owner/Contractor Agreement.....	2
*Performance and Maintenance Bond .....	2
*Labor and Material Payment Bond .....	2
Release of Lien .....	2
Special Conditions.....	2
Additional Provisions for Pennsylvania Authorities.....	1
Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion.....	2
*Federal Wage Rate Determination PA20240092 07/19/20243 (Building) .....	10
Change Order Procedures .....	1
 <b>DIVISION 1 - GENERAL REQUIREMENTS</b>	
011000 SUMMARY .....	011000-01 – 011000-04
012300 ALTERNATES .....	012300-01 – 012300-01
012500 SUBSTITUTION PROCEDURES .....	012500-01 – 012500-04
SUBSTITUTION SUBMITTAL REQUEST FORM .....	2 PAGES
012600 CONTRACT MODIFICATION PROCEDURES .....	012600-01 – 012600-03
012900 PAYMENT PROCEDURES.....	012900-01 – 012900-04
013100 PROJECT MANAGEMENT AND COORDINATION .....	013100-01 – 013100-08
013200 CONSTRUCTION SCHEDULES.....	013200-01 – 013200-07
013300 SUBMITTAL PROCEDURES .....	013300-01 – 013300-07
014000 QUALITY REQUIREMENTS .....	014000-01 – 014000-08
014200 REFERENCES.....	014200-01 – 014200-08

015000	TEMPORARY FACILITIES AND CONTROLS .....	015000-01 – 015000-04
016000	PRODUCT REQUIREMENTS .....	016000-01 – 016000-05
017300	EXECUTION.....	017300-01 – 017300-09
017700	CLOSEOUT PROCEDURES .....	017700-01 – 017700-05
017823	OPERATION AND MAINTENANCE DATA .....	017823-01 – 017823-06
017839	PROJECT RECORD DOCUMENTS.....	017839-01 – 017839-03

**DIVISION 2 – EXISTING CONDITIONS**

024119	– SELECTIVE DEMOLITION .....	024119-01 – 024119-04
--------	------------------------------	-----------------------

**DIVISION 7 – THERMAL AND MOISTURE**

079200	– JOINT SEALANTS.....	079200-01 – 079200-04
--------	-----------------------	-----------------------

**DIVISION 8 – OPENINGS**

081113	– HOLLOW METAL DOORS AND FRAMES .....	081113-01 – 081113-05
087100	– DOOR HARDWARE.....	087100-01 – 087100-11

**DIVISIONS 26 - ELECTRICAL**

260010	ELECTRICAL GENERAL REQUIREMENTS .....	260010-01 – 260010-16
260060	ELECTRICAL DEMOLITION .....	260060-01 – 260060-05
260519	ELECTRICAL POWER CONDUCTORS & CABLES .....	260519-01 – 260519-05
260526	GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS.....	260526-01 – 260526-05
260529	HANGERS AND SUPPORTS.....	260529-01 – 260529-03
260533	RACEWAYS AND BOXES.....	260533-01 – 260533-11
260553	IDENTIFICATION.....	206553-01 – 260553-05
260573	OVERCURRENT PROTECTIVE DEVICE DIST EQUIP.....	260573-01 – 260573-07
260620	SCHEDULES FOR ELECTRICAL DIST EQUIP .....	260620-01 – 260620-06
260650	LUMINAIRE SCHEDULE.....	260650-01 – 260650-03
262412	EXISTING SWITCHBOARDS .....	262412-01 – 262412-08
262413	SWITCHBOARDS .....	262413-01 – 262413-13
262415	EXISTING PANELBOARDS .....	262415-01 – 262415-07
262416	PANELBOARDS.....	262416-01 – 262416-16
262726	WIRING DEVICES .....	262726-01 – 262726-04
262816	ENCLOSED SWITCHES AND CIRCUIT BREAKERS.....	262816-01 – 262816-05
264313	DISTRIBUTION SURGE PROTECTIVE DEVICES.....	262313-01 – 262313-05

**END OF TABLE OF CONTENTS**

## **SIGNATURE PAGE**

### **GENERAL CONTRACTOR**

---

**Company Name**

---

**Authorized Signature**

---

**Title**

---

**Date**

### **HOUSING AUTHORITY OF THE CITY OF LANCASTER**

---

**Barbara J. Wilson**  
**Executive Director**

---

**Date**

## INVITATION TO BID

The Housing Authority of the City of Lancaster (LCHA) will receive bids for Electrical Switchboard and Service Upgrades at LCHA's Farnum Street East Towers, Lancaster, PA until **2:00 pm** prevailing time on **October 3, 2024**, online via the PennBid System - <https://pennbid.bonfirehub.com/>. There will be no public bid opening, but bids will be promptly released on PennBid.

Bids are invited on a lump sum basis for a single prime contract.

All Bid Documents and solicitation details are available at no cost at PennBid at <https://pennbid.bonfirehub.com/>. Please note that the awarded bidder is responsible for a fee to PennBid.

A responsive bid must include the (1) bid form, (2) a bid bond, and (3) a HUD-5369A *Representations, Certifications, and Other Statements of Bidders*.

The work shall be in strict accordance with the drawings and specifications prepared by: Hammel Associates Architects and Moore Engineering Company.

A prebid meeting will be held at the project site on **Thursday September 5th, 2024 at 10:00 AM**. Please register to attend the bid event through the Bid Events area located in the "Description" tab in PennBid. Site visits to view the work area must be scheduled in advance by contacting LCHA Facilities and Maintenance Manager Jay Ortiz at [jortiz@lchapa.com](mailto:jortiz@lchapa.com) or 717-475-3144.

During the bidding period, please submit all questions and substitution requests via the "Clarifications" tab on PennBid. Do not call or email the architect or owner. Substitution requests will only be accepted during the bidding period, subject to the requirements outlined in the contract documents. Optional material substitution requests will not be considered after the date and time stated below or during the construction phase. Questions and substitution requests will not be accepted after **12:00 Noon on Monday, September 23, 2024**.

A certified check or bank draft payable to the Housing Authority of the City of Lancaster, U.S. Government Bonds, or a satisfactory Bid Bond executed by the bidder and acceptable sureties in an amount equal to ten percent (10%) of base bid shall be submitted with each bid.

Attention is called to the fact that not less than the minimum salaries and wages set forth in the contract documents must be paid on this project and that the contractor must ensure that employees and applicants for employment are not discriminated against because of race, color, age, religion, sex, national origin, familial status or disability.

Contracts under this project are subject to the requirements of Section 3 of the Housing and Urban Development Act of 1968, as amended, 12 U.S.C. 1701u. The purpose of Section 3 is to ensure that employment and other economic opportunities generated by HUD assistance or HUD-assisted projects covered by Section 3, shall to the greatest extent feasible, be directed to low- and very low-income persons, particularly persons who are recipients of HUD assistance for housing.

The LCHA is an equal opportunity agency which does not discriminate against any person because of race, color, age, religion, sex, national origin, handicap or familial status. The LCHA solicits and encourages Minority Business Enterprise (MBE) and Women Business Enterprise (WBE) participation in all of its contracts.

The successful bidder will be required to furnish and pay for satisfactory performance and payment bonds.

The LCHA reserves the right to reject any or all bids or to waive any informalities in the bidding. No bid shall be withdrawn for a period of sixty (60) days subsequent to the opening of the bids without written consent of the LCHA.

## **HOUSING AUTHORITY OF THE CITY OF LANCASTER**

**U.S. Department of Housing and  
Urban Development**  
Office of Public and Indian Housing

**Instructions to Bidders for Contracts  
Public and Indian Housing Programs**

# Instructions to Bidders for Contracts

## Public and Indian Housing Programs

### Table of Contents

Clause	Page
1. Bid Preparation and Submission	1
2. Explanations and Interpretations to Prospective Bidders	1
3. Amendments to Invitations for Bids	1
4. Responsibility of Prospective Contractor	1
5. Late Submissions, Modifications, and Withdrawal of Bids	1
6. Bid Opening	2
7. Service of Protest	2
8. Contract Award	2
9. Bid Guarantee	3
10. Assurance of Completion	3
11. Preconstruction Conference	3
12. Indian Preference Requirements	3

### 1. Bid Preparation and Submission

(a) Bidders are expected to examine the specifications, drawings, all instructions, and, if applicable, the construction site (see also the contract clause entitled **Site Investigation and Conditions Affecting the Work** of the *General Conditions of the Contract for Construction*). Failure to do so will be at the bidders' risk.

(b) All bids must be submitted on the forms provided by the Public Housing Agency/Indian Housing Authority (PHA/IHA). Bidders shall furnish all the information required by the solicitation. Bids must be signed and the bidder's name typed or printed on the bid sheet and each continuation sheet which requires the entry of information by the bidder. Erasures or other changes must be initialed by the person signing the bid. Bids signed by an agent shall be accompanied by evidence of that agent's authority. (Bidders should retain a copy of their bid for their records.)

(c) Bidders must submit as part of their bid a completed form HUD-5369-A, "Representations, Certifications, and Other Statements of Bidders."

(d) All bid documents shall be sealed in an envelope which shall be clearly marked with the words "Bid Documents," the Invitation for Bids (IFB) number, any project or other identifying number, the bidder's name, and the date and time for receipt of bids.

(e) If this solicitation requires bidding on all items, failure to do so will disqualify the bid. If bidding on all items is not required, bidders should insert the words "No Bid" in the space provided for any item on which no price is submitted.

(f) Unless expressly authorized elsewhere in this solicitation, alternate bids will not be considered.

(g) Unless expressly authorized elsewhere in this solicitation, bids submitted by telegraph or facsimile (fax) machines will not be considered.

(h) If the proposed contract is for a Mutual Help project (as described in 24 CFR Part 905, Subpart E) that involves Mutual Help contributions of work, material, or equipment, supplemental information regarding the bid advertisement is provided as an attachment to this solicitation.

### 2. Explanations and Interpretations to Prospective Bidders

(a) Any prospective bidder desiring an explanation or interpretation of the solicitation, specifications, drawings, etc., must request it at least 7 days before the scheduled time for bid opening. Requests may be oral or written. Oral requests must be confirmed in writing. The only oral clarifications that will be provided will be those clearly related to solicitation procedures, i.e., not substantive technical information. No other oral explanation or interpretation will be provided. Any information given a prospective bidder concerning this solicitation will be furnished promptly to all other prospective bidders as a written amendment to the solicitation, if that information is necessary in submitting bids, or if the lack of it would be prejudicial to other prospective bidders.

(b) Any information obtained by, or provided to, a bidder other than by formal amendment to the solicitation shall not constitute a change to the solicitation.

### 3. Amendments to Invitations for Bids

(a) If this solicitation is amended, then all terms and conditions which are not modified remain unchanged.

(b) Bidders shall acknowledge receipt of any amendment to this solicitation (1) by signing and returning the amendment, (2) by identifying the amendment number and date on the bid form, or (3) by letter, telegram, or facsimile, if those methods are authorized in the solicitation. The PHA/IHA must receive acknowledgement by the time and at the place specified for receipt of bids. Bids which fail to acknowledge the bidder's receipt of any amendment will result in the rejection of the bid if the amendment(s) contained information which substantively changed the PHA's/IHA's requirements.

(c) Amendments will be on file in the offices of the PHA/IHA and the Architect at least 7 days before bid opening.

### 4. Responsibility of Prospective Contractor

(a) The PHA/IHA will award contracts only to responsible prospective contractors who have the ability to perform successfully under the terms and conditions of the proposed contract. In determining the responsibility of a bidder, the PHA/IHA will consider such matters as the bidder's:

- (1) Integrity;
- (2) Compliance with public policy;
- (3) Record of past performance; and
- (4) Financial and technical resources (including construction and technical equipment).

(b) Before a bid is considered for award, the bidder may be requested by the PHA/IHA to submit a statement or other documentation regarding any of the items in paragraph (a) above. Failure by the bidder to provide such additional information shall render the bidder nonresponsible and ineligible for award.



## 5. Late Submissions, Modifications, and Withdrawal of Bids

(a) Any bid received at the place designated in the solicitation after the exact time specified for receipt will not be considered unless it is received before award is made and it:

(1) Was sent by registered or certified mail not later than the fifth calendar day before the date specified for receipt of offers (e.g., an offer submitted in response to a solicitation requiring receipt of offers by the 20th of the month must have been mailed by the 15th);

(2) Was sent by mail, or if authorized by the solicitation, was sent by telegram or via facsimile, and it is determined by the PHA/IHA that the late receipt was due solely to mishandling by the PHA/IHA after receipt at the PHA/IHA; or

(3) Was sent by U.S. Postal Service Express Mail Next Day Service - Post Office to Addressee, not later than 5:00 p.m. at the place of mailing two working days prior to the date specified for receipt of proposals. The term "working days" excludes weekends and observed holidays.

(b) Any modification or withdrawal of a bid is subject to the same conditions as in paragraph (a) of this provision.

(c) The only acceptable evidence to establish the date of mailing of a late bid, modification, or withdrawal sent either by registered or certified mail is the U.S. or Canadian Postal Service postmark both on the envelope or wrapper and on the original receipt from the U.S. or Canadian Postal Service. Both postmarks must show a legible date or the bid, modification, or withdrawal shall be processed as if mailed late. "Postmark" means a printed, stamped, or otherwise placed impression (exclusive of a postage meter machine impression) that is readily identifiable without further action as having been supplied and affixed by employees of the U.S. or Canadian Postal Service on the date of mailing. Therefore, bidders should request the postal clerk to place a hand cancellation bull's-eye postmark on both the receipt and the envelope or wrapper.

(d) The only acceptable evidence to establish the time of receipt at the PHA/IHA is the time/date stamp of PHA/IHA on the proposal wrapper or other documentary evidence of receipt maintained by the PHA/IHA.

(e) The only acceptable evidence to establish the date of mailing of a late bid, modification, or withdrawal sent by Express Mail Next Day Service-Post Office to Addressee is the date entered by the post office receiving clerk on the "Express Mail Next Day Service-Post Office to Addressee" label and the postmark on both the envelope or wrapper and on the original receipt from the U.S. Postal Service. "Postmark" has the same meaning as defined in paragraph (c) of this provision, excluding postmarks of the Canadian Postal Service. Therefore, bidders should request the postal clerk to place a legible hand cancellation bull's eye postmark on both the receipt and Failure by a bidder to acknowledge receipt of the envelope or wrapper.

(f) Notwithstanding paragraph (a) of this provision, a late modification of an otherwise successful bid that makes its terms more favorable to the PHA/IHA will be considered at any time it is received and may be accepted.

(g) Bids may be withdrawn by written notice, or if authorized by this solicitation, by telegram (including mailgram) or facsimile machine transmission received at any time before the exact time set for opening of bids; provided that written confirmation of telegraphic or facsimile withdrawals over the signature of the bidder is mailed and postmarked prior to the specified bid opening time. A bid may be withdrawn in person by a bidder or its authorized representative if, before the exact time set for opening of bids, the identity of the person requesting withdrawal is established and the person signs a receipt for the bid.

## 6. Bid Opening

All bids received by the date and time of receipt specified in the solicitation will be publicly opened and read. The time and place of opening will be as specified in the solicitation. Bidders and other interested persons may be present.

## 7. Service of Protest

(a) Definitions. As used in this provision:

"Interested party" means an actual or prospective bidder whose direct economic interest would be affected by the award of the contract.

"Protest" means a written objection by an interested party to this solicitation or to a proposed or actual award of a contract pursuant to this solicitation.

(b) Protests shall be served on the Contracting Officer by obtaining written and dated acknowledgement from —

[Contracting Officer designate the official or location where a protest may be served on the Contracting Officer]

(c) All protests shall be resolved in accordance with the PHA's/IHA's protest policy and procedures, copies of which are maintained at the PHA/IHA.

## 8. Contract Award

(a) The PHA/IHA will evaluate bids in response to this solicitation without discussions and will award a contract to the responsible bidder whose bid, conforming to the solicitation, will be most advantageous to the PHA/IHA considering only price and any price-related factors specified in the solicitation.

(b) If the apparent low bid received in response to this solicitation exceeds the PHA's/IHA's available funding for the proposed contract work, the PHA/IHA may either accept separately priced items (see 8(e) below) or use the following procedure to determine contract award. The PHA/IHA shall apply in turn to each bid (proceeding in order from the apparent low bid to the high bid) each of the separately priced bid deductible items, if any, in their priority order set forth in this solicitation. If upon the application of the first deductible item to all initial bids, a new low bid is within the PHA's/IHA's available funding, then award shall be made to that bidder. If no bid is within the available funding amount, then the PHA/IHA shall apply the second deductible item. The PHA/IHA shall continue this process until an evaluated low bid, if any, is within the PHA's/IHA's available funding. If upon the application of all deductibles, no bid is within the PHA's/IHA's available funding, or if the solicitation does not request separately priced deductibles, the PHA/IHA shall follow its written policy and procedures in making any award under this solicitation.

(c) In the case of tie low bids, award shall be made in accordance with the PHA's/IHA's written policy and procedures.

(d) The PHA/IHA may reject any and all bids, accept other than the lowest bid (e.g., the apparent low bid is unreasonably low), and waive informalities or minor irregularities in bids received, in accordance with the PHA's/IHA's written policy and procedures.

(e) Unless precluded elsewhere in the solicitation, the PHA/IHA may accept any item or combination of items bid.

(f) The PHA/IHA may reject any bid as nonresponsive if it is materially unbalanced as to the prices for the various items of work to be performed. A bid is materially unbalanced when it is based on prices significantly less than cost for some work and prices which are significantly overstated for other work.

(g) A written award shall be furnished to the successful bidder within the period for acceptance specified in the bid and shall result in a binding contract without further action by either party.

## 9. Bid Guarantee

All bids must be accompanied by a negotiable bid guarantee which shall not be less than ten percent (10%) of the amount of the bid. The bid guarantee may be a certified check, bank draft, U.S. Government Bonds at par value, or a bid bond secured by a surety company acceptable to the U.S. Government and authorized to do business in the state where the work is to be performed. In the case where the work under the contract will be performed on an Indian reservation area, the bid guarantee may also be an irrevocable Letter of Credit (see provision 10, Assurance of Completion, below). Certified checks and bank drafts must be made payable to the order of the PHA/IHA. The bid guarantee shall insure the execution of the contract and the furnishing of a method of assurance of completion by the successful bidder as required by the solicitation. Failure to submit a bid guarantee with the bid shall result in the rejection of the bid. Bid guarantees submitted by unsuccessful bidders will be returned as soon as practicable after bid opening.

## 10. Assurance of Completion

(a) Unless otherwise provided in State law, the successful bidder shall furnish an assurance of completion prior to the execution of any contract under this solicitation. This assurance may be [Contracting Officer check applicable items] —

[ ] (1) a performance and payment bond in a penal sum of 100 percent of the contract price; or, as may be required or permitted by State law;

[ ] (2) separate performance and payment bonds, each for 50 percent or more of the contract price;

[ ] (3) a 20 percent cash escrow;

[ ] (4) a 25 percent irrevocable letter of credit; or,

[ ] (5) an irrevocable letter of credit for 10 percent of the total contract price with a monitoring and disbursements agreement with the IHA (applicable only to contracts awarded by an IHA under the Indian Housing Program).

(b) Bonds must be obtained from guarantee or surety companies acceptable to the U.S. Government and authorized to do business in the state where the work is to be performed. Individual sureties will not be considered. U.S. Treasury Circular Number 570, published annually in the Federal Register, lists companies approved to act as sureties on bonds securing Government contracts, the maximum underwriting limits on each contract bonded, and the States in which the company is licensed to do business. Use of companies listed in this circular is mandatory. Copies of the circular may be downloaded on the U.S. Department of Treasury website <http://www.fms.treas.gov/c570/index.html>, or ordered for a minimum fee by contacting the Government Printing Office at (202) 512-2168.

(c) Each bond shall clearly state the rate of premium and the total amount of premium charged. The current power of attorney for the person who signs for the surety company must be attached to the bond. The effective date of the power of attorney shall not precede the date of the bond. The effective date of the bond shall be on or after the execution date of the contract.

(d) Failure by the successful bidder to obtain the required assurance of completion within the time specified, or within such extended period as the PHA/IHA may grant based upon reasons determined adequate by the PHA/IHA, shall render the bidder ineligible for award. The PHA/IHA may then either award the contract to the next lowest responsible bidder or solicit new bids. The PHA/IHA may retain the ineligible bidder's bid guarantee.

## 11. Preconstruction Conference (applicable to construction contracts)

After award of a contract under this solicitation and prior to the start of work, the successful bidder will be required to attend a preconstruction conference with representatives of the PHA/IHA and its architect/engineer, and other interested parties convened by the PHA/IHA. The conference will serve to acquaint the participants with the general plan of the construction operation and all other requirements of the contract (e.g., Equal Employment Opportunity, Labor Standards). The PHA/IHA will provide the successful bidder with the date, time, and place of the conference.

## 12. Indian Preference Requirements (applicable only if this solicitation is for a contract to be performed on a project for an Indian Housing Authority)

(a) HUD has determined that the contract awarded under this solicitation is subject to the requirements of section 7(b) of the Indian Self-Determination and Education Assistance Act (25 U.S.C. 450e(b)). Section 7(b) requires that any contract or subcontract entered into for the benefit of Indians shall require that, to the greatest extent feasible

(1) Preferences and opportunities for training and employment (other than core crew positions; see paragraph (h) below) in connection with the administration of such contracts or subcontracts be given to qualified "Indians." The Act defines "Indians" to mean persons who are members of an Indian tribe and defines "Indian tribe" to mean any Indian tribe, band, nation, or other organized group or community, including any Alaska Native village or regional or village corporation as defined in or established pursuant to the Alaska Native Claims Settlement Act, which is recognized as eligible for the special programs and services provided by the United States to Indians because of their status as Indians; and,

(2) Preference in the award of contracts or subcontracts in connection with the administration of contracts be given to Indian organizations and to Indian-owned economic enterprises, as defined in section 3 of the Indian Financing Act of 1974 (25 U.S.C. 1452). That Act defines "economic enterprise" to mean any Indian-owned commercial, industrial, or business activity established or organized for the purpose of profit, except that the Indian ownership must constitute not less than 51 percent of the enterprise; "Indian organization" to mean the governing body of any Indian tribe or entity established or recognized by such governing body; "Indian" to mean any person who is a member of any tribe, band, group, pueblo, or community which is recognized by the Federal Government as eligible for services from the Bureau of Indian Affairs and any "Native" as defined in the Alaska Native Claims Settlement Act; and Indian "tribe" to mean any Indian tribe, band, group, pueblo, or community including Native villages and Native groups (including

corporations organized by Kenai, Juneau, Sitka, and Kodiak) as defined in the Alaska Native Claims Settlement Act, which is recognized by the Federal Government as eligible for services from the Bureau of Indian Affairs.

(b) (1) The successful Contractor under this solicitation shall comply with the requirements of this provision in awarding all subcontracts under the contract and in providing training and employment opportunities.

(2) A finding by the IHA that the contractor, either (i) awarded a subcontract without using the procedure required by the IHA, (ii) falsely represented that subcontracts would be awarded to Indian enterprises or organizations; or, (iii) failed to comply with the contractor's employment and training preference bid statement shall be grounds for termination of the contract or for the assessment of penalties or other remedies.

(c) If specified elsewhere in this solicitation, the IHA may restrict the solicitation to qualified Indian-owned enterprises and Indian organizations. If two or more (or a greater number as specified elsewhere in the solicitation) qualified Indian-owned enterprises or organizations submit responsive bids, award shall be made to the qualified enterprise or organization with the lowest responsive bid. If fewer than the minimum required number of qualified Indian-owned enterprises or organizations submit responsive bids, the IHA shall reject all bids and readvertise the solicitation in accordance with paragraph (d) below.

(d) If the IHA prefers not to restrict the solicitation as described in paragraph (c) above, or if after having restricted a solicitation an insufficient number of qualified Indian enterprises or organizations submit bids, the IHA may advertise for bids from non-Indian as well as Indian-owned enterprises and Indian organizations. Award shall be made to the qualified Indian enterprise or organization with the lowest responsive bid if that bid is -

(1) Within the maximum HUD-approved budget amount established for the specific project or activity for which bids are being solicited; and

(2) No more than the percentage specified in 24 CFR 905.175(c) higher than the total bid price of the lowest responsive bid from any qualified bidder. If no responsive bid by a qualified Indian-owned economic enterprise or organization is within the stated range of the total bid price of the lowest responsive bid from any qualified enterprise, award shall be made to the bidder with the lowest bid.

(e) Bidders seeking to qualify for preference in contracting or subcontracting shall submit proof of Indian ownership with their bids. Proof of Indian ownership shall include but not be limited to:

(1) Certification by a tribe or other evidence that the bidder is an Indian. The IHA shall accept the certification of a tribe that an individual is a member.

(2) Evidence such as stock ownership, structure, management, control, financing and salary or profit sharing arrangements of the enterprise.

(f) (1) All bidders must submit with their bids a statement describing how they will provide Indian preference in the award of subcontracts. The specific requirements of that statement and the factors to be used by the IHA in determining the statement's adequacy are included as an attachment to this solicitation. Any bid that fails to include the required statement shall be rejected as nonresponsive. The IHA may require that comparable statements be provided by subcontractors to the successful Contractor, and may require the Contractor to reject any bid or proposal by a subcontractor that fails to include the statement.

(2) Bidders and prospective subcontractors shall submit a certification (supported by credible evidence) to the IHA in any instance where the bidder or subcontractor believes it is infeasible to provide Indian preference in subcontracting. The acceptance or rejection by the IHA of the certification shall be final. Rejection shall disqualify the bid from further consideration.

(g) All bidders must submit with their bids a statement detailing their employment and training opportunities and their plans to provide preference to Indians in implementing the contract; and the number or percentage of Indians anticipated to be employed and trained. Comparable statements from all proposed subcontractors must be submitted. The criteria to be used by the IHA in determining the statement(s)'s adequacy are included as an attachment to this solicitation. Any bid that fails to include the required statement(s), or that includes a statement that does not meet minimum standards required by the IHA shall be rejected as nonresponsive.

(h) Core crew employees. A core crew employee is an individual who is a bona fide employee of the contractor at the time the bid is submitted; or an individual who was not employed by the bidder at the time the bid was submitted, but who is regularly employed by the bidder in a supervisory or other key skilled position when work is available. Bidders shall submit with their bids a list of all core crew employees.

(i) Preference in contracting, subcontracting, employment, and training shall apply not only on-site, on the reservation, or within the IHA's jurisdiction, but also to contracts with firms that operate outside these areas (e.g., employment in modular or manufactured housing construction facilities).

(j) Bidders should contact the IHA to determine if any additional local preference requirements are applicable to this solicitation.

(k) The IHA [ ] does [ ] does not [Contracting Officer check applicable box] maintain lists of Indian-owned economic enterprises and Indian organizations by specialty (e.g., plumbing, electrical, foundations), which are available to bidders to assist them in meeting their responsibility to provide preference in connection with the administration of contracts and subcontracts.

# BID FORM

**NOTE:** Bidders shall copy form given below on their letterheads and use same in submitting their bids in **DUPLICATE**.

Place your bid in a sealed envelope and clearly mark it, "**SEALED BID**"

---

**TO:** Barbara J. Wilson, Executive Director  
Lancaster City Housing Authority  
325 Church Street  
Lancaster, PA 17602-4201

Gentlemen:

1. The undersigned, having familiarized ourselves with the local conditions affecting the cost of the work, drawings and with the Project Manual (including all documents contained therein) and Addenda, if any thereto, as prepared by Hammel Associates Architects and Moore Engineering Company and on file in the office of the Housing Authority of the City of Lancaster, hereby proposes to furnish all labor, materials, equipment and services required to construct and complete:

<b>Electrical Construction Contract</b>	<b>X</b>
---	----------

all in accordance with the contract documents within the time set forth therein and at the prices set forth below.

2. Base Proposal: We agree to furnish all labor, materials, equipment and services required to provide the services as described and required by the herein above stated documents, in accordance therewith for the sum of \_\_\_\_\_ (\$\_\_\_\_\_).

ADD Alternate #EC-1:

ADD \_\_\_\_\_ (\$\_\_\_\_\_)

DEDUCT Alternate #EC-2:

DEDUCT \_\_\_\_\_ (\$\_\_\_\_\_)

- a. This proposal is based upon the receipt of the following addenda issued by the Authority during the bidding period: \_\_\_\_\_  
(Insert the addenda number(s), or the word "none" as the case may be).

- b. Should our firm be awarded the contract, we will complete the contract to substantial completion within 460 days of the issuance of the Notice to Proceed.

3. In submitting this bid, it is understood that the right is reserved by the Housing Authority of the City of Lancaster to reject any and all bids, consistent with language set forth in paragraph No. 8 of HUD5369.
4. If written notice of the acceptance of this bid is mailed, telegraphed or delivered to the undersigned within sixty (60) days after the opening thereof, or at any time thereafter before this bid is withdrawn, the undersigned agrees to execute and deliver a contract in the prescribed form and furnish the required bonds within ten (10) days after the contract is presented to him for signature.
5. Security in the sum of \_\_\_\_\_ Dollars (\$ \_\_\_\_\_), in the form of \_\_\_\_\_ is submitted herewith in accordance with the Specifications.

The contract amount stated above includes all sales taxes, excise taxes, and any other taxes for all materials and appliances subject to and upon which taxes are levied.

**NOTE:** The penalty for making false statements in offers is prescribed in 18 U.W.C. 1001.

Date \_\_\_\_\_, 2024

\_\_\_\_\_  
(Signature)

By: \_\_\_\_\_

(Print or type name of person signing above)

Official address

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

\_\_\_\_\_  
TYPE OF BUSINESS:    - INDIVIDUAL  
                                  - PARTNERSHIP  
                                  - CORPORATION

\* \_\_\_\_\_ is a corporation organized and existing under the laws of the State/Commonwealth of \_\_\_\_\_.

## BID BOND

**KNOW ALL MEN BY THESE PRESENTS**, That we the undersigned,

\_\_\_\_\_ as PRINCIPAL,

and \_\_\_\_\_ as SURETY

are held and firmly bound unto the **HOUSING AUTHORITY OF THE CITY OF LANCASTER** hereinafter called the "Housing Authority", in the penal sum of \_\_\_\_\_ Dollars, (\$\_\_\_\_\_) lawful money of the United States, for the payment of which sum will and truly to be made, we bind ourselves, our heirs, executors, administrators, successors, and assigns, jointly and severally, firmly by these presents.

**THE CONDITION OF THIS OBLIGATION IS SUCH**, that whereas the Principal has submitted the accompanying bid, dated \_\_\_\_\_, 2024, for:

<b>Electrical Construction Contract</b>	<b>X</b>
---	----------

**NOW, THEREFORE**, if the Principal shall not withdraw said bid within the period specified therein after the opening of the same, or, if no period be specified, within sixty (60) days after the said opening, and shall within the period specified therefore, or, if no period be specified within ten (10) days after the prescribed forms are presented to him for signature, enter into a written contract with the Housing Authority in accordance with the bid as accepted, and give bond with good and sufficient surety or sureties, as may be required, for the faithful performance and proper fulfillment of such contract; or in the event of the withdrawal of said bid within the period specified, or the failure to enter into such contract and give such bond within the time specified, if the Principal shall pay the Housing Authority the difference between the amount specified in said bid and the amount for which the Housing Authority may procure the required work or supplies or both, if the latter amount be in excess of the former, then the above obligation shall be void and of no effect, otherwise to remain in full force and virtue.

**IN WITNESS WHEREOF**, the above-bound parties have executed this instrument under their several seals this \_\_\_\_\_ day of \_\_\_\_\_, 2024, the name and corporate seal of each corporate party being hereto affixed and these presents duly signed by its undersigned representatives, pursuant to authority of its governing body.

**Bid Bond -- Page 2**

**(If Principal is an Individual)**

\_\_\_\_\_  
(Witness) \_\_\_\_\_ (Signature of Individual) \_\_\_\_\_ (SEAL)

**(If Principal is a Partnership) (Each Partner Must Sign)**

\_\_\_\_\_  
(Witness) \_\_\_\_\_ (Signature of Partner) \_\_\_\_\_ (SEAL)

\_\_\_\_\_  
(Witness) \_\_\_\_\_ (Signature of Partner) \_\_\_\_\_ (SEAL)

\_\_\_\_\_  
(Witness) \_\_\_\_\_ (Signature of Partner) \_\_\_\_\_ (SEAL)

**(If Principal is a Corporation)**

ATTEST:

\_\_\_\_\_  
(Name of Corporation)

\_\_\_\_\_  
(Secretary or Asst. Secretary) \_\_\_\_\_ (President or Vice President)

(Corporate Seal)

\_\_\_\_\_  
(Name of Surety)

(SEAL) \_\_\_\_\_  
(Attorney-in-Fact)

**IMPORTANT NOTE:** Surety Companies executing bonds must appear on the Treasury Department’s most current list (Circular 570) and be authorized to transact business in the State where the project is located.

**U.S. Department of Housing  
and Urban Development**  
Office of Public and Indian Housing

**Representations, Certifications,  
and Other Statements of Bidders**  
**Public and Indian Housing Programs**



# Representations, Certifications, and Other Statements of Bidders

## Public and Indian Housing Programs

### Table of Contents

Clause	Page
1. Certificate of Independent Price Determination	1
2. Contingent Fee Representation and Agreement	1
3. Certification and Disclosure Regarding Payments to Influence Certain Federal Transactions	1
4. Organizational Conflicts of Interest Certification	2
5. Bidder's Certification of Eligibility	2
6. Minimum Bid Acceptance Period	2
7. Small, Minority, Women-Owned Business Concern Representation	2
8. Indian-Owned Economic Enterprise and Indian Organization Representation	2
9. Certification of Eligibility Under the Davis-Bacon Act	3
10. Certification of Nonsegregated Facilities	3
11. Clean Air and Water Certification	3
12. Previous Participation Certificate	3
13. Bidder's Signature	3

### 1. Certificate of Independent Price Determination

(a) The bidder certifies that--

(1) The prices in this bid have been arrived at independently, without, for the purpose of restricting competition, any consultation, communication, or agreement with any other bidder or competitor relating to (i) those prices, (ii) the intention to submit a bid, or (iii) the methods or factors used to calculate the prices offered;

(2) The prices in this bid have not been and will not be knowingly disclosed by the bidder, directly or indirectly, to any other bidder or competitor before bid opening (in the case of a sealed bid solicitation) or contract award (in the case of a competitive proposal solicitation) unless otherwise required by law; and

(3) No attempt has been made or will be made by the bidder to induce any other concern to submit or not to submit a bid for the purpose of restricting competition.

(b) Each signature on the bid is considered to be a certification by the signatory that the signatory--

(1) Is the person in the bidder's organization responsible for determining the prices being offered in this bid or proposal, and that the signatory has not participated and will not participate in any action contrary to subparagraphs (a)(1) through (a)(3) above; or

(2) (i) Has been authorized, in writing, to act as agent for the following principals in certifying that those principals have not participated, and will not participate in any action contrary to subparagraphs (a)(1) through (a)(3) above.

\_\_\_\_\_ [insert full name of person(s) in the bidder's organization responsible for determining the prices offered in this bid or proposal, and the title of his or her position in the bidder's organization];

(ii) As an authorized agent, does certify that the principals named in subdivision (b)(2)(i) above have not participated, and will not participate, in any action contrary to subparagraphs (a)(1) through (a)(3) above; and

(iii) As an agent, has not personally participated, and will not participate in any action contrary to subparagraphs (a)(1) through (a)(3) above.

(c) If the bidder deletes or modifies subparagraph (a)2 above, the bidder must furnish with its bid a signed statement setting forth in detail the circumstances of the disclosure.

[Contracting Officer check if following paragraph is applicable]

(d) Non-collusive affidavit. (applicable to contracts for construction and equipment exceeding \$50,000)

(1) Each bidder shall execute, in the form provided by the PHA/IHA, an affidavit to the effect that he/she has not colluded with any other person, firm or corporation in regard to any bid submitted in response to this solicitation. If the successful bidder did not submit the affidavit with his/her bid, he/she must submit it within three (3) working days of bid opening. Failure to submit the affidavit by that date may render the bid nonresponsive. No contract award will be made without a properly executed affidavit.

(2) A fully executed "Non-collusive Affidavit"  is,  is not included with the bid.

### 2. Contingent Fee Representation and Agreement

(a) Definitions. As used in this provision:

"Bona fide employee" means a person, employed by a bidder and subject to the bidder's supervision and control as to time, place, and manner of performance, who neither exerts, nor proposes to exert improper influence to solicit or obtain contracts nor holds out as being able to obtain any contract(s) through improper influence.

"Improper influence" means any influence that induces or tends to induce a PHA/IHA employee or officer to give consideration or to act regarding a PHA/IHA contract on any basis other than the merits of the matter.

(b) The bidder represents and certifies as part of its bid that, except for full-time bona fide employees working solely for the bidder, the bidder:

(1)  has,  has not employed or retained any person or company to solicit or obtain this contract; and

(2)  has,  has not paid or agreed to pay to any person or company employed or retained to solicit or obtain this contract any commission, percentage, brokerage, or other fee contingent upon or resulting from the award of this contract.

(c) If the answer to either (a)(1) or (a)(2) above is affirmative, the bidder shall make an immediate and full written disclosure to the PHA/IHA Contracting Officer.

(d) Any misrepresentation by the bidder shall give the PHA/IHA the right to (1) terminate the contract; (2) at its discretion, deduct from contract payments the amount of any commission, percentage, brokerage, or other contingent fee; or (3) take other remedy pursuant to the contract.

### 3. Certification and Disclosure Regarding Payments to Influence Certain Federal Transactions (applicable to contracts exceeding \$100,000)

(a) The definitions and prohibitions contained in Section 1352 of title 31, United States Code, are hereby incorporated by reference in paragraph (b) of this certification.

(b) The bidder, by signing its bid, hereby certifies to the best of his or her knowledge and belief as of December 23, 1989 that:

(1) No Federal appropriated funds have been paid or will be paid to any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress on his or her behalf in connection with the awarding of a contract resulting from this solicitation;

(2) If any funds other than Federal appropriated funds (including profit or fee received under a covered Federal transaction) have been paid, or will be paid, to any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress on his or her behalf in connection with this solicitation, the bidder shall complete and submit, with its bid, OMB standard form LLL, "Disclosure of Lobbying Activities;" and

(3) He or she will include the language of this certification in all subcontracts at any tier and require that all recipients of subcontract awards in excess of \$100,000 shall certify and disclose accordingly.

(c) Submission of this certification and disclosure is a prerequisite for making or entering into this contract imposed by section 1352, title 31, United States Code. Any person who makes an expenditure prohibited under this provision or who fails to file or amend the disclosure form to be filed or amended by this provision, shall be subject to a civil penalty of not less than \$10,000, and not more than \$100,000, for each such failure.

(d) Indian tribes (except those chartered by States) and Indian organizations as defined in section 4 of the Indian Self-Determination and Education Assistance Act (25 U.S.C. 450B) are exempt from the requirements of this provision.

#### 4. Organizational Conflicts of Interest Certification

The bidder certifies that to the best of its knowledge and belief and except as otherwise disclosed, he or she does not have any organizational conflict of interest which is defined as a situation in which the nature of work to be performed under this proposed contract and the bidder's organizational, financial, contractual, or other interests may, without some restriction on future activities:

- (a) Result in an unfair competitive advantage to the bidder; or,
- (b) Impair the bidder's objectivity in performing the contract work.

[ ] In the absence of any actual or apparent conflict, I hereby certify that to the best of my knowledge and belief, no actual or apparent conflict of interest exists with regard to my possible performance of this procurement.

#### 5. Bidder's Certification of Eligibility

(a) By the submission of this bid, the bidder certifies that to the best of its knowledge and belief, neither it, nor any person or firm which has an interest in the bidder's firm, nor any of the bidder's subcontractors, is ineligible to:

(1) Be awarded contracts by any agency of the United States Government, HUD, or the State in which this contract is to be performed; or,

(2) Participate in HUD programs pursuant to 24 CFR Part 24.

(b) The certification in paragraph (a) above is a material representation of fact upon which reliance was placed when making award. If it is later determined that the bidder knowingly rendered an erroneous certification, the contract may be terminated for default, and the bidder may be debarred or suspended from participation in HUD programs and other Federal contract programs.

#### 6. Minimum Bid Acceptance Period

(a) "Acceptance period," as used in this provision, means the number of calendar days available to the PHA/IHA for awarding a contract from the date specified in this solicitation for receipt of bids.

(b) This provision supersedes any language pertaining to the acceptance period that may appear elsewhere in this solicitation.

(c) The PHA/IHA requires a minimum acceptance period of [Contracting Officer insert time period] calendar days.

(d) In the space provided immediately below, bidders may specify a longer acceptance period than the PHA's/IHA's minimum requirement. The bidder allows the following acceptance period: calendar days.

(e) A bid allowing less than the PHA's/IHA's minimum acceptance period will be rejected.

(f) The bidder agrees to execute all that it has undertaken to do, in compliance with its bid, if that bid is accepted in writing within (1) the acceptance period stated in paragraph (c) above or (2) any longer acceptance period stated in paragraph (d) above.

#### 7. Small, Minority, Women-Owned Business Concern Representation

The bidder represents and certifies as part of its bid/ offer that it --

(a) [ ] is, [ ] is not a small business concern. "Small business concern," as used in this provision, means a concern, including its affiliates, that is independently owned and operated, not dominant in the field of operation in which it is bidding, and qualified as a small business under the criteria and size standards in 13 CFR 121.

(b) [ ] is, [ ] is not a women-owned business enterprise. "Women-owned business enterprise," as used in this provision, means a business that is at least 51 percent owned by a woman or women who are U.S. citizens and who also control and operate the business.

(c) [ ] is, [ ] is not a minority business enterprise. "Minority business enterprise," as used in this provision, means a business which is at least 51 percent owned or controlled by one or more minority group members or, in the case of a publicly owned business, at least 51 percent of its voting stock is owned by one or more minority group members, and whose management and daily operations are controlled by one or more such individuals. For the purpose of this definition, minority group members are:

(Check the block applicable to you)

- [ ] Black Americans
- [ ] Asian Pacific Americans
- [ ] Hispanic Americans
- [ ] Asian Indian Americans
- [ ] Native Americans
- [ ] Hasidic Jewish Americans

#### 8. Indian-Owned Economic Enterprise and Indian Organization Representation (applicable only if this solicitation is for a contract to be performed on a project for an Indian Housing Authority)

The bidder represents and certifies that it:

(a) [ ] is, [ ] is not an Indian-owned economic enterprise. "Economic enterprise," as used in this provision, means any commercial, industrial, or business activity established or organized for the purpose of profit, which is at least 51 percent Indian owned. "Indian," as used in this provision, means any person who is a member of any tribe, band, group, pueblo, or community which is recognized by the Federal Government as eligible for services from the Bureau of Indian Affairs and any "Native" as defined in the Alaska Native Claims Settlement Act.

(b) [ ] is, [ ] is not an Indian organization. "Indian organization," as used in this provision, means the governing body of any Indian tribe or entity established or recognized by such governing body. Indian "tribe" means any Indian tribe, band, group, pueblo, or

community including Native villages and Native groups (including corporations organized by Kenai, Juneau, Sitka, and Kodiak) as defined in the Alaska Native Claims Settlement Act, which is recognized by the Federal Government as eligible for services from the Bureau of Indian Affairs.

**9. Certification of Eligibility Under the Davis-Bacon Act** (applicable to construction contracts exceeding \$2,000)

(a) By the submission of this bid, the bidder certifies that neither it nor any person or firm who has an interest in the bidder's firm is a person or firm ineligible to be awarded contracts by the United States Government by virtue of section 3(a) of the Davis-Bacon Act or 29 CFR 5.12(a)(1).

(b) No part of the contract resulting from this solicitation shall be subcontracted to any person or firm ineligible to be awarded contracts by the United States Government by virtue of section 3(a) of the Davis-Bacon Act or 29 CFR 5.12(a)(1).

(c) The penalty for making false statements is prescribed in the U. S. Criminal Code, 18 U.S.C. 1001.

**10. Certification of Nonsegregated Facilities** (applicable to contracts exceeding \$10,000)

(a) The bidder's attention is called to the clause entitled **Equal Employment Opportunity** of the General Conditions of the Contract for Construction.

(b) "Segregated facilities," as used in this provision, means any waiting rooms, work areas, rest rooms and wash rooms, restaurants and other eating areas, time clocks, locker rooms and other storage or dressing areas, parking lots, drinking fountains, recreation or entertainment areas, transportation, and housing facilities provided for employees, that are segregated by explicit directive or are in fact segregated on the basis of race, color, religion, or national origin because of habit, local custom, or otherwise.

(c) By the submission of this bid, the bidder certifies that it does not and will not maintain or provide for its employees any segregated facilities at any of its establishments, and that it does not and will not permit its employees to perform their services at any location under its control where segregated facilities are maintained. The bidder agrees that a breach of this certification is a violation of the Equal Employment Opportunity clause in the contract.

(d) The bidder further agrees that (except where it has obtained identical certifications from proposed subcontractors for specific time periods) prior to entering into subcontracts which exceed \$10,000 and are not exempt from the requirements of the Equal Employment Opportunity clause, it will:

- (1) Obtain identical certifications from the proposed subcontractors;
- (2) Retain the certifications in its files; and
- (3) Forward the following notice to the proposed subcontractors (except if the proposed subcontractors have submitted identical certifications for specific time periods):

**Notice to Prospective Subcontractors of Requirement for Certifications of Nonsegregated Facilities**

A Certification of Nonsegregated Facilities must be submitted before the award of a subcontract exceeding \$10,000 which is not exempt from the provisions of the Equal Employment Opportunity clause of the prime contract. The certification may be submitted either for each subcontract or for all subcontracts during a period (i.e., quarterly, semiannually, or annually).

**Note:** The penalty for making false statements in bids is prescribed in 18 U.S.C. 1001.

**11. Clean Air and Water Certification** (applicable to contracts exceeding \$100,000)

The bidder certifies that:

(a) Any facility to be used in the performance of this contract [ ] is, [ ] is not listed on the Environmental Protection Agency List of Violating Facilities:

(b) The bidder will immediately notify the PHA/IHA Contracting Officer, before award, of the receipt of any communication from the Administrator, or a designee, of the Environmental Protection Agency, indicating that any facility that the bidder proposes to use for the performance of the contract is under consideration to be listed on the EPA List of Violating Facilities; and,

(c) The bidder will include a certification substantially the same as this certification, including this paragraph (c), in every nonexempt subcontract.

**12. Previous Participation Certificate** (applicable to construction and equipment contracts exceeding \$50,000)

(a) The bidder shall complete and submit with his/her bid the Form HUD-2530, "Previous Participation Certificate." If the successful bidder does not submit the certificate with his/her bid, he/she must submit it within three (3) working days of bid opening. Failure to submit the certificate by that date may render the bid nonresponsive. No contract award will be made without a properly executed certificate. **THIS IS NOT REQUIRED - LCHA.**

(b) A fully executed "Previous Participation Certificate" [ ] is, [ ] is not included with the bid.

**13. Bidder's Signature**

The bidder hereby certifies that the information contained in these certifications and representations is accurate, complete, and current.

\_\_\_\_\_  
(Signature and Date)

\_\_\_\_\_  
(Typed or Printed Name)

\_\_\_\_\_  
(Title)

\_\_\_\_\_  
(Company Name)

\_\_\_\_\_  
(Company Address)

## NONCOLLUSION AFFIDAVIT OF PRIME BIDDER

State of .....)

ss.

County of .....)

\_\_\_\_\_, being first duly sworn, depose and says that:

1. S/He is \_\_\_\_\_ of \_\_\_\_\_, the Bidder that has submitted the attached Bid;
2. S/He is fully informed respecting the preparation and contents of the attached Bid and of all pertinent circumstances respecting such Bid;
3. Such Bid is genuine and is not a collusive or sham Bid;
4. Neither the said Bidder nor any of its officers, partners, owners, agents, representatives, employees or parties in interest, including this affiant, has in any way colluded, conspired, connived or agreed directly or indirectly with any other Bidder, firm or person to submit a collusive or sham Bid in connection with the contract for which the attached Bid has been submitted or to refrain from bidding in connection with such contract, or has in any manner, directly or indirectly, sought by agreement or collusion or communication or conference with any other Bidder, firm or person to fix the price or prices in the attached Bid or of any other Bidder, or to fix any overhead, profit or lose element of the Bid price or the Bid price of any other Bidder, or to secure through any collusion, conspiracy, connivance or unlawful agreement any advantage against the Housing Authority of the City of Lancaster (Local Public Agency) or any person interested in the proposed contract; and
5. The price or prices quoted in the attached Bid are fair and proper and are not tainted by any collusion, conspiracy, connivance or unlawful agreement on the part of the Bidder or any of its agents, representatives, owners, employees, or parties in interest, including this affiant.

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

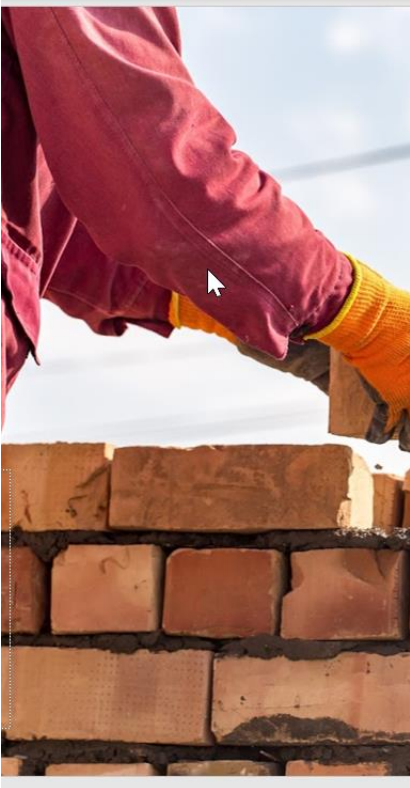
Subscribed and sworn to this \_\_\_\_\_ day of \_\_\_\_\_, 2024

Signed: \_\_\_\_\_

My Commission expires: \_\_\_\_\_

## Section 3 Business Concern Certification for Contracting

---



**Description:** Businesses seeking a preference in contracting on applicable Section 3 projects may qualify as a Section 3 business concern if they meet the following criteria: At least 51 percent of the business is owned and controlled by low- or very low-income persons, or at least 51 percent of the business is owned and controlled by current public housing residents or residents who currently live in Section 8-assisted housing, or over 75 percent of the labor hours performed for the business over the prior three-month period are performed by Section 3 workers.

## Section 3 Business Certification for Contracting

---

**Instructions:** Enter the following information and select the criteria that applies to certify your business' Section 3 Business Concern status.

### Business Information

Name of Business \_\_\_\_\_

Address of Business \_\_\_\_\_

Name of Business Owner \_\_\_\_\_

Phone Number of Business Owner \_\_\_\_\_

Email Address of Business Owner \_\_\_\_\_

### Preferred Contact Information

Same as above

Name of Preferred Contact \_\_\_\_\_

Phone Number of Preferred Contact \_\_\_\_\_

### Type of Business (select from the following options):

Corporation

Partnership

Sole Proprietorship

Joint Venture

### Select from **ONE** of the following three options below if any apply:

At least 51 percent of the business is owned and controlled by low- or very low-income persons (Refer to income guidelines on page 4).

At least 51 percent of the business is owned and controlled by current public housing residents or residents who currently live in Section 8-assisted housing.

Over 75 percent of the labor hours performed for the business over the prior three-month period are performed by Section 3 workers (Refer to definition on page 4).

---

**Business Concern Affirmation**

I affirm that these statements are true, complete, and correct to the best of my knowledge and belief. I understand that businesses who misrepresent themselves as Section 3 business concerns and report false information to Lancaster City Housing Authority may have their contracts terminated as default and be barred from ongoing and future considerations for contracting opportunities. I hereby certify, under penalty of law, that the following information is correct to the best of my knowledge.

Print Name: \_\_\_\_\_

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

\*Certification expires within six months of the date of signature

Information regarding Section 3 Business Concerns can be found at [24 CFR 75.5](#)

**FOR ADMINISTRATIVE USE ONLY**

Is the business a Section 3 business concern based upon their certification?

**YES**       **NO**

**EMPLOYERS MUST RETAIN THIS FORM IN THEIR SECTION 3 COMPLIANCE FILE FOR FIVE YEARS.**

## Lancaster City Housing Authority

### Section 3 Income Limits

#### Eligibility Guidelines

The worker's income must be at or below the amount provided below for an individual (household of 1) regardless of actual household size.

#### Individual Income Limits for City of Lancaster, PA

<b>Income Limits Category</b>	<b>FY 2024 Income Limits</b>
Extremely Low Income Limits (30%)	\$ 22,050
Very Low Income Limits (50%)	\$ 36,750
Low Income Limits (80%)	\$ 58,800

See <https://www.huduser.gov/portal/datasets/il.html> for most recent income limits.

#### Section 3 Worker Definition:

- A low or very low-income resident (the worker's income for the previous or annualized calendar year is below the income limit established by HUD); or
- Employed by a Section 3 business concern; or
- A YouthBuild participant.

#### Targeted Section 3 Worker Definition:

- Employed by a Section 3 business concern or
- Currently meets or when hired met at least one of the following categories as documented within the past five years:
  - A resident of public housing; or
  - A resident of other public housing projects or Section 8-assisted housing; or
  - A YouthBuild participant.

Note: YouthBuild is a community-based pre-apprenticeship program, administered by the Office of Workforce Investment's Division of Youth service, that provides job training and educational services for opportunity youth ages 16-24 who left school without a secondary diploma.



## **HOURLY RATE SCHEDULE**

1. Contractor is required to submit an Hourly Rate Schedule (inclusive of all rates and fringes) to be used to determine the rates used for calculation of all change order work.
2. Rate schedule is to be submitted on Contractor's letterhead, and is to correlate to worker classifications provided in the Federal Wage Rate Determination contained elsewhere in this Project Manual.
3. The contractor may simply state that the hourly rates will be billed in accordance with the Federal Wage Rate Determination, and no further information is needed.
4. If the contractor does not submit an Hourly Rate Schedule, the hourly rates may not exceed the Federal Wage Rate Determination.
5. The Hourly Rate Schedule will be considered as one means of evaluation of proposals and award of contract.

# General Conditions for Construction Contracts - Public Housing Programs

U.S. Department of Housing and Urban  
Development  
Office of Public and Indian Housing  
OMB Approval No. 2577-0157 (exp. 11/30/2023)

**Applicability. This form is applicable to any  
construction/development contract greater than \$250,000.**

Public reporting burden for this collection of information is estimated to average 1 hour. This includes the time for collecting, reviewing, and reporting the data. The information requested is required to obtain a benefit. This form includes those clauses required by OMB's common rule on grantee procurement, implemented at HUD in 2 CFR 200, and those requirements set forth in Section 3 of the Housing and Urban Development Act of 1968 and its amendment by the Housing and Community Development Act of 1992, implemented by HUD at 24 CFR Part 75. The form is required for construction contracts awarded by Public Housing Agencies (PHAs). The form is used by Housing Authorities in solicitations to provide necessary contract clauses. If the form were not used, PHAs would be unable to enforce their contracts. There are no assurances of confidentiality. HUD may not conduct or sponsor, and an applicant is not required to respond to a collection of information unless it displays a currently valid OMB control number.

Clause		Page	Clause		Page
1.	Definitions	2	<b>Administrative Requirements</b>		
2.	Contractor's Responsibility for Work	2	25.	Contract Period	9
3.	Architect's Duties, Responsibilities and Authority	2	26.	Order of Precedence	9
4.	Other Contracts	3	27.	Payments	9
<b>Construction Requirements</b>			28.	Contract Modifications	10
5.	Preconstruction Conference and Notice to Proceed	3	29.	Changes	10
6.	Construction Progress Schedule	3	30.	Suspension of Work	11
7.	Site Investigation and Conditions Affecting the Work	3	31.	Disputes	11
8.	Differing Site Conditions	4	32.	Default	11
9.	Specifications and Drawings for Construction	4	33.	Liquidated	12
10.	As-Built Drawings	5	34.	Termination of Convenience	12
11.	Material and Workmanship	5	35.	Assignment of Contract	12
12.	Permits and Codes	5	36.	Insurance	12
13.	Health, Safety, and Accident Prevention	6	37.	Subcontracts	13
14.	Temporary Buildings and Transportation Materials	6	38.	Subcontracting with Small and Minority Firms, Women's Business Enterprise, and Labor Surplus Area Firms	13
15.	Availability and Use of Utility Services	6	39.	Equal Employment Opportunity	13
16.	Protection of Existing Vegetation, Structures, Equipment, Utilities, and Improvements	6	40.	Employment, Training, and Contracting Opportunities for Low-Income Persons, Section 3 of the Housing and Urban Development Act of 1968	14
17.	Temporary Buildings and Transportation Materials	7	41.	Interest of Members of Congress	15
18.	Clean Air and Water	7	42.	Interest of Members, Officers, or Employees and Former Members, Officers, or Employees	15
19.	Energy Efficiency	7	43.	Limitations on Payments Made to Influence	15
20.	Inspection and Acceptance of Construction	7	44.	Royalties and Patents	15
21.	Use and Possession Prior to	8	45.	Examination and Retention of Contractor's Records	15
22.	Warranty of Title	8	46.	Labor Standards-Davis-Bacon and Related Acts	15
23.	Warranty of	8	47.	Non-Federal Prevailing Wage Rates	19
24.	Prohibition Against Liens	9	48.	Procurement of Recovered Materials	19

---

## 1. Definitions

- (a) "Architect" means the person or other entity engaged by the PHA to perform architectural, engineering, design, and other services related to the work as provided for in the contract. When a PHA uses an engineer to act in this capacity, the terms "architect" and "engineer" shall be synonymous. The Architect shall serve as a technical representative of the Contracting Officer. The Architect's authority is as set forth elsewhere in this contract.
- (b) "Contract" means the contract entered into between the PHA and the Contractor. It includes the forms of Bid, the Bid Bond, the Performance and Payment Bond or Bonds or other assurance of completion, the Certifications, Representations, and Other Statements of Bidders (form HUD-5370), these General Conditions of the Contract for Construction (form HUD-5370), the applicable wage rate determinations from the U.S. Department of Labor, any special conditions included elsewhere in the contract, the specifications, and drawings. It includes all formal changes to any of those documents by addendum, change order, or other modification.
- (c) "Contracting Officer" means the person delegated the authority by the PHA to enter into, administer, and/or terminate this contract and designated as such in writing to the Contractor. The term includes any successor Contracting Officer and any duly authorized representative of the Contracting Officer also designated in writing. The Contracting Officer shall be deemed the authorized agent of the PHA in all dealings with the Contractor.
- (d) "Contractor" means the person or other entity entering into the contract with the PHA to perform all of the work required under the contract.
- (e) "Drawings" means the drawings enumerated in the schedule of drawings contained in the Specifications and as described in the contract clause entitled Specifications and Drawings for Construction herein.
- (f) "HUD" means the United States of America acting through the Department of Housing and Urban Development including the Secretary, or any other person designated to act on its behalf. HUD has agreed, subject to the provisions of an Annual Contributions Terms and Conditions (ACC), to provide financial assistance to the PHA, which includes assistance in financing the work to be performed under this contract. As defined elsewhere in these General Conditions or the contract documents, the determination of HUD may be required to authorize changes in the work or for release of funds to the PHA for payment to the Contractor. Notwithstanding HUD's role, nothing in this contract shall be construed to create any contractual relationship between the Contractor and HUD.
- (g) "Project" means the entire project, whether construction or rehabilitation, the work for which is provided for in whole or in part under this contract.
- (h) "PHA" means the Public Housing Agency organized under applicable state laws which is a party to this contract.
- (j) "Specifications" means the written description of the technical requirements for construction and includes the criteria and tests for determining whether the requirements are met.
- (l) "Work" means materials, workmanship, and manufacture and fabrication of components.

## 2. Contractor's Responsibility for Work

- (a) The Contractor shall furnish all necessary labor, materials, tools, equipment, and transportation necessary for performance of the work. The Contractor shall also furnish all necessary water, heat, light, and power not made available to the Contractor by the PHA pursuant to the clause entitled Availability and Use of Utility Services herein.
- (b) The Contractor shall perform on the site, and with its own organization, work equivalent to at least [ ] (12 percent unless otherwise indicated) of the total amount of work to be performed under the order. This percentage may be reduced by a supplemental agreement to this order if, during performing the work, the Contractor requests a reduction and the Contracting Officer determines that the reduction would be to the advantage of the PHA.
- (c) At all times during performance of this contract and until the work is completed and accepted, the Contractor shall directly superintend the work or assign and have on the work site a competent superintendent who is satisfactory to the Contracting Officer and has authority to act for the Contractor.
- (d) The Contractor shall be responsible for all damages to persons or property that occur as a result of the Contractor's fault or negligence, and shall take proper safety and health precautions to protect the work, the workers, the public, and the property of others. The Contractor shall hold and save the PHA, its officers and agents, free and harmless from liability of any nature occasioned by the Contractor's performance. The Contractor shall also be responsible for all materials delivered and work performed until completion and acceptance of the entire work, except for any completed unit of work which may have been accepted under the contract.
- (e) The Contractor shall lay out the work from base lines and bench marks indicated on the drawings and be responsible for all lines, levels, and measurements of all work executed under the contract. The Contractor shall verify the figures before laying out the work and will be held responsible for any error resulting from its failure to do so.
- (f) The Contractor shall confine all operations (including storage of materials) on PHA premises to areas authorized or approved by the Contracting Officer.
- (g) The Contractor shall at all times keep the work area, including storage areas, free from accumulations of waste materials. After completing the work and before final inspection, the Contractor shall (1) remove from the premises all scaffolding, equipment, tools, and materials (including rejected materials) that are not the property of the PHA and all rubbish caused by its work; (2) leave the work area in a clean, neat, and orderly condition satisfactory to the Contracting Officer; (3) perform all specified tests; and, (4) deliver the installation in complete and operating condition.
- (h) The Contractor's responsibility will terminate when all work has been completed, the final inspection made, and the work accepted by the Contracting Officer. The Contractor will then be released from further obligation except as required by the warranties specified elsewhere in the contract.

## 3. Architect's Duties, Responsibilities, and Authority

- (a) The Architect for this contract, and any successor, shall be designated in writing by the Contracting Officer.

- (b) The Architect shall serve as the Contracting Officer's technical representative with respect to architectural, **Schedule** engineering, and design matters related to the work performed under the contract. The Architect may provide direction on contract performance. Such direction shall be within the scope of the contract and may not be of a nature which: (1) institutes additional work outside the scope of the contract; (2) constitutes a change as defined in the Changes clause herein; (3) causes an increase or decrease in the cost of the contract; (4) alters the Construction Progress Schedule; or (5) changes any of the other express terms or conditions of the contract.
- (c) The Architect's duties and responsibilities may include but shall not be limited to:
- (1) Making periodic visits to the work site, and on the basis of his/her on-site inspections, issuing written reports to the PHA which shall include all observed deficiencies. The Architect shall file a copy of the report with the Contractor's designated representative at the site;
  - (2) Making modifications in drawings and technical specifications and assisting the Contracting Officer in the preparation of change orders and other contract modifications for issuance by the Contracting Officer;
  - (3) Reviewing and making recommendations with respect to - (i) the Contractor's construction progress schedules; (ii) the Contractor's shop and detailed drawings; (iii) the machinery, mechanical and other equipment and materials or other articles proposed for use by the Contractor; and, (iv) the Contractor's price breakdown and progress payment estimates; and,
  - (4) Assisting in inspections, signing Certificates of Completion, and making recommendations with respect to acceptance of work completed under the contract.

#### 4. Other Contracts

The PHA may undertake or award other contracts for additional work at or near the site of the work under this contract. The Contractor shall fully cooperate with the other contractors and with PHA employees and shall carefully adapt scheduling and performing the work under this contract to accommodate the additional work, heeding any direction that may be provided by the Contracting Officer. The Contractor shall not commit or permit any act that will interfere with the performance of work by any other contractor or by PHA employees

### Construction Requirements

#### 5. Pre-construction Conference and Notice to Proceed

of the work, and that it has investigated and satisfied itself

- (a) Within ten calendar days of contract execution, and prior to the commencement of work, the Contractor shall attend a preconstruction conference with representatives of the PHA, its Architect, and other interested parties convened by the PHA. The conference will serve to acquaint the participants with the general plan of the construction operation and all other requirements of the contract. The PHA will provide the Contractor with the date, time, and place of the conference.
- (b) The contractor shall begin work upon receipt of a written Notice to Proceed from the Contracting Officer or designee. The Contractor shall not begin work prior to receiving such notice.

#### 6. Construction Progress

- (a) The Contractor shall, within five days after the work commences on the contract or another period of time determined by the Contracting Officer, prepare and submit to the Contracting Officer for approval three copies of a practicable schedule showing the order in which the Contractor proposes to perform the work, and the dates on which the Contractor contemplates starting and completing the several salient features of the work (including acquiring labor, materials, and equipment). The schedule shall be in the form of a progress chart of suitable scale to indicate appropriately the percentage of work scheduled for completion by any given date during the period. If the Contractor fails to submit a schedule within the time prescribed, the Contracting Officer may withhold approval of progress payments or take other remedies under the contract until the Contractor submits the required schedule.
- (b) The Contractor shall enter the actual progress on the chart as required by the Contracting Officer, and immediately deliver three copies of the annotated schedule to the Contracting Officer. If the Contracting Officer determines, upon the basis of inspection conducted pursuant to the clause entitled Inspection and Acceptance of Construction, herein that the Contractor is not meeting the approved schedule, the Contractor shall take steps necessary to improve its progress, including those that may be required by the Contracting Officer, without additional cost to the PHA. In this circumstance, the Contracting Officer may require the Contractor to increase the number of shifts, overtime operations, days of work, and/or the amount of construction plant, and to submit for approval any supplementary schedule or schedules in chart form as the Contracting Officer deems necessary to demonstrate how the approved rate of progress will be regained.
- (c) Failure of the Contractor to comply with the requirements of the Contracting Officer under this clause shall be grounds for a determination by the Contracting Officer that the Contractor is not prosecuting the work with sufficient diligence to ensure completion within the time specified in the Contract. Upon making this determination, the Contracting Officer may terminate the Contractor's right to proceed with the work, or any separable part of it, in accordance with the Default clause of this contract.

#### 7. Site Investigation and Conditions Affecting the Work

- (a) The Contractor acknowledges that it has taken steps reasonably necessary to ascertain the nature and location as to the general and local conditions which can affect the work or its cost, including but not limited to, (1) conditions bearing upon transportation, disposal, handling, and storage of materials; (2) the availability of labor, water, electric power, and roads; (3) uncertainties of weather, river stages, tides, or similar physical conditions at the site; (4) the conformation and conditions of the ground; and (5) the character of equipment and facilities needed preliminary to and during work performance. The Contractor also acknowledges that it has satisfied itself as to the character, quality, and quantity of surface and subsurface materials or obstacles to be encountered insofar as this information is

reasonably ascertainable from an inspection of the site, including all exploratory work done by the PHA, as well as from the drawings and specifications made a part of this contract. Any failure of the Contractor to take the actions described and acknowledged in this paragraph will not relieve the Contractor from responsibility for estimating properly the difficulty and cost of successfully performing the work, or for proceeding to successfully perform the work without additional expense to the PHA.

(b) The PHA assumes no responsibility for any conclusions or interpretations made by the Contractor based on the information made available by the PHA. Nor does the PHA assume responsibility for any understanding reached or representation made concerning conditions which can affect the work by any of its officers or agents before the execution of this contract, unless that understanding or representation is expressly stated in this contract.

## 8. Differing Site Conditions

- (a) The Contractor shall promptly, and before the conditions are disturbed, give a written notice to the Contracting Officer of (1) subsurface or latent physical conditions at the site which differ materially from those indicated in this contract, or (2) unknown physical conditions at the site(s), of an unusual nature, which differ materially from those ordinarily encountered and generally recognized as inhering in work of the character provided for in the contract.
- (b) The Contracting Officer shall investigate the site conditions promptly after receiving the notice. Work shall not proceed at the affected site, except at the Contractor's risk, until the Contracting Officer has provided written instructions to the Contractor. If the conditions do materially so differ and cause an increase or decrease in the Contractor's cost of, or the time required for, performing any part of the work under this contract, whether or not changed as a result of the conditions, the Contractor shall file a claim in writing to the PHA within ten days after receipt of such instructions and, in any event, before proceeding with the work. An equitable adjustment in the contract price, the delivery schedule, or both shall be made under this clause and the contract modified in writing accordingly.
- (c) No request by the Contractor for an equitable adjustment to the contract under this clause shall be allowed, unless the Contractor has given the written notice required; provided, that the time prescribed in (a) above for giving written notice may be extended by the Contracting Officer.
- (d) No request by the Contractor for an equitable adjustment to the contract for differing site conditions shall be allowed if made after final payment under this contract.

## 9. Specifications and Drawings for Construction

- (a) The Contractor shall keep on the work site a copy of the drawings and specifications and shall at all times give the Contracting Officer access thereto. Anything mentioned in the specifications and not shown on the drawings, or shown on the drawings and not mentioned in the specifications, shall be of like effect as if shown or mentioned in both. In case of difference between drawings and specifications, the specifications shall govern. In case of discrepancy in the figures, in the drawings, or in the specifications, the matter shall be

promptly submitted to the Contracting Officer, who shall promptly make a determination in writing. Any adjustment by the Contractor without such a determination shall be at its own risk and expense. The Contracting Officer shall furnish from time to time such detailed drawings and other information as considered necessary, unless otherwise provided.

- (b) Wherever in the specifications or upon the drawings the words "directed", "required", "ordered", "designated", "prescribed", or words of like import are used, it shall be understood that the "direction", "requirement", "order", "designation", or "prescription", of the Contracting Officer is intended and similarly the words "approved", "acceptable", "satisfactory", or words of like import shall mean "approved by", or "acceptable to", or "satisfactory to" the Contracting Officer, unless otherwise expressly stated.
- (c) Where "as shown" "as indicated", "as detailed", or words of similar import are used, it shall be understood that the reference is made to the drawings accompanying this contract unless stated otherwise. The word "provided" as used herein shall be understood to mean "provide complete in place" that is "furnished and installed".
- (d) "Shop drawings" means drawings, submitted to the PHA by the Contractor, subcontractor, or any lower tier subcontractor, showing in detail (1) the proposed fabrication and assembly of structural elements and (2) the installation (i.e., form, fit, and attachment details) of materials of equipment. It includes drawings, diagrams, layouts, schematics, descriptive literature, illustrations, schedules, performance and test data, and similar materials furnished by the Contractor to explain in detail specific portions of the work required by the contract. The PHA may duplicate, use, and disclose in any manner and for any purpose shop drawings delivered under this contract.
- (e) If this contract requires shop drawings, the Contractor shall coordinate all such drawings, and review them for accuracy, completeness, and compliance with other contract requirements and shall indicate its approval thereon as evidence of such coordination and review. Shop drawings submitted to the Contracting Officer without evidence of the Contractor's approval may be returned for resubmission. The Contracting Officer will indicate an approval or disapproval of the shop drawings and if not approved as submitted shall indicate the PHA's reasons therefore. Any work done before such approval shall be at the Contractor's risk. Approval by the Contracting Officer shall not relieve the Contractor from responsibility for any errors or omissions in such drawings, nor from responsibility for complying with the requirements of this contract, except with respect to variations described and approved in accordance with (f) below.
- (f) If shop drawings show variations from the contract requirements, the Contractor shall describe such variations in writing, separate from the drawings, at the time of submission. If the Architect approves any such variation and the Contracting Officer concurs, the Contracting Officer shall issue an appropriate modification to the contract, except that, if the variation is minor or does not involve a change in price or in time of performance, a modification need not be issued.
- (g) It shall be the responsibility of the Contractor to make timely requests of the PHA for such large scale and full size drawings, color schemes, and other additional information, not already in his possession, which shall be

required in the planning and production of the work. Such requests may be submitted as the need arises, but each such request shall be filed in ample time to permit appropriate action to be taken by all parties involved so as to avoid delay.

- (h) The Contractor shall submit to the Contracting Officer for approval four copies (unless otherwise indicated) of all shop drawings as called for under the various headings of these specifications. Three sets (unless otherwise indicated) of all shop drawings, will be retained by the PHA and one set will be returned to the Contractor. As required by the Contracting Officer, the Contractor, upon completing the work under this contract, shall furnish a complete set of all shop drawings as finally approved. These drawings shall show all changes and revisions made up to the time the work is completed and accepted.
- (i) This clause shall be included in all subcontracts at any tier. It shall be the responsibility of the Contractor to ensure that all shop drawings prepared by subcontractors are submitted to the Contracting Officer.

#### 10. As-Built Drawings

- (a) "As-built drawings," as used in this clause, means drawings submitted by the Contractor or subcontractor at any tier to show the construction of a particular structure or work as actually completed under the contract. "As-built drawings" shall be synonymous with "Record drawings."
- (b) As required by the Contracting Officer, the Contractor shall provide the Contracting Officer accurate information to be used in the preparation of permanent as-built drawings. For this purpose, the Contractor shall record on one set of contract drawings all changes from the installations originally indicated, and record final locations of underground lines by depth from finish grade and by accurate horizontal offset distances to permanent surface improvements such as buildings, curbs, or edges of walks.
- (c) This clause shall be included in all subcontracts at any tier. It shall be the responsibility of the Contractor to ensure that all as-built drawings prepared by subcontractors are submitted to the Contracting Officer.

#### 11. Material and Workmanship

- (a) All equipment, material, and articles furnished under this contract shall be new and of the most suitable grade for the purpose intended, unless otherwise specifically provided in this contract. References in the contract to equipment, material, articles, or patented processes by trade name, make, or catalog number, shall be regarded as establishing a standard of quality and shall not be construed as limiting competition. The Contractor may, at its option, use any equipment, material, article, or process that, in the judgment of, and as approved by the Contracting Officer, is equal to that named in the specifications, unless otherwise specifically provided in this contract.
- (b) Approval of equipment and materials.
- (1) The Contractor shall obtain the Contracting Officer's approval of the machinery and mechanical and other equipment to be incorporated into the work. When requesting approval, the Contractor shall furnish to the Contracting Officer the name of the manufacturer, the model number, and other information concerning the performance, capacity, nature, and rating of the

machinery and mechanical and other equipment. When required by this contract or by the Contracting Officer, the Contractor shall also obtain the Contracting Officer's approval of the material or articles which the Contractor contemplates incorporating into the work. When requesting approval, the Contractor shall provide full information concerning the material or articles. Machinery, equipment, material, and articles that do not have the required approval shall be installed or used at the risk of subsequent rejection.

- (2) When required by the specifications or the Contracting Officer, the Contractor shall submit appropriately marked samples (and certificates related to them) for approval at the Contractor's expense, with all shipping charges prepaid. The Contractor shall label, or otherwise properly mark on the container, the material or product represented, its place of origin, the name of the producer, the Contractor's name, and the identification of the construction project for which the material or product is intended to be used.
- (3) Certificates shall be submitted in triplicate, describing each sample submitted for approval and certifying that the material, equipment or accessory complies with contract requirements. The certificates shall include the name and brand of the product, name of manufacturer, and the location where produced.
- (4) Approval of a sample shall not constitute a waiver of the PHA right to demand full compliance with contract requirements. Materials, equipment and accessories may be rejected for cause even though samples have been approved.
- (5) Wherever materials are required to comply with recognized standards or specifications, such specifications shall be accepted as establishing the technical qualities and testing methods, but shall not govern the number of tests required to be made nor modify other contract requirements. The Contracting Officer may require laboratory test reports on items submitted for approval or may approve materials on the basis of data submitted in certificates with samples. Check tests will be made on materials delivered for use only as frequently as the Contracting Officer determines necessary to insure compliance of materials with the specifications. The Contractor will assume all costs of retesting materials which fail to meet contract requirements and/or testing materials offered in substitution for those found deficient.
- (6) After approval, samples will be kept in the Project office until completion of work. They may be built into the work after a substantial quantity of the materials they represent has been built in and accepted.
- (c) Requirements concerning lead-based paint. The Contractor shall comply with the requirements concerning lead-based paint contained in the Lead-Based Paint Poisoning Prevention Act (42 U.S.C. 4821-4846) as implemented by 24 CFR Part 35.

#### 12. Permits and Codes

- (a) The Contractor shall give all notices and comply with all applicable laws, ordinances, codes, rules and regulations. Notwithstanding the requirement of the Contractor to comply with the drawings and specifications in the contract, all work installed shall comply with all applicable codes and regulations as amended by any

waivers. Before installing the work, the Contractor shall examine the drawings and the specifications for compliance with applicable codes and regulations bearing on the work and shall immediately report any discrepancy it may discover to the Contracting Officer.

Where the requirements of the drawings and specifications fail to comply with the applicable code or regulation, the Contracting Officer shall modify the contract by change order pursuant to the clause entitled Changes herein to conform to the code or regulation.

- (b) The Contractor shall secure and pay for all permits, fees, and licenses necessary for the proper execution and completion of the work. Where the PHA can arrange for the issuance of all or part of these permits, fees and licenses, without cost to the Contractor, the contract amount shall be reduced accordingly.

### 13. Health, Safety, and Accident Prevention

(a) In performing this contract, the Contractor shall:

- (1) Ensure that no laborer or mechanic shall be required to work in surroundings or under working conditions which are unsanitary, hazardous, or dangerous to his/her health and/or safety as determined under construction safety and health standards promulgated by the Secretary of Labor by regulation;
- (2) Protect the lives, health, and safety of other persons;
- (3) Prevent damage to property, materials, supplies, and equipment; and,
- (4) Avoid work interruptions.

(b) For these purposes, the Contractor shall:

- (1) Comply with regulations and standards issued by the Secretary of Labor at 29 CFR Part 1926. Failure to comply may result in imposition of sanctions pursuant to the Contract Work Hours and Safety Standards Act (Public Law 91-54, 83 Stat. 96), 40 U.S.C. 3701 et seq.; and
- (2) Include the terms of this clause in every subcontract so that such terms will be binding on each subcontractor.

(c) The Contractor shall maintain an accurate record of exposure data on all accidents incident to work performed under this contract resulting in death, traumatic injury, occupational disease, or damage to property, materials, supplies, or equipment, and shall report this data in the manner prescribed by 29 CFR Part 1904.

(d) The Contracting Officer shall notify the Contractor of any noncompliance with these requirements and of the corrective action required. This notice, when delivered to the Contractor or the Contractor's representative at the site of the work, shall be deemed sufficient notice of the noncompliance and corrective action required. After receiving the notice, the Contractor shall immediately take corrective action. If the Contractor fails or refuses to take corrective action promptly, the Contracting Officer may issue an order stopping all or part of the work until satisfactory corrective action has been taken. The Contractor shall not base any claim or request for equitable adjustment for additional time or money on any stop order issued under these circumstances.

(e) The Contractor shall be responsible for its subcontractors' compliance with the provisions of this clause. The Contractor shall take such action with respect to any subcontract as the PHA, the Secretary of Housing and Urban Development, or the Secretary of Labor shall direct as a means of enforcing such provisions.

### 14. Temporary Heating

The Contractor shall provide and pay for temporary heating, covering, and enclosures necessary to properly protect all work and materials against damage by dampness and cold, to dry out the work, and to facilitate the completion of the work. Any permanent heating equipment used shall be turned over to the PHA in the condition and at the time required by the specifications.

### 15. Availability and Use of Utility Services

(a) The PHA shall make all reasonably required amounts of utilities available to the Contractor from existing outlets and supplies, as specified in the contract. Unless otherwise provided in the contract, the amount of each utility service consumed shall be charged to or paid for by the Contractor at prevailing rates charged to the PHA or, where the utility is produced by the PHA, at reasonable rates determined by the Contracting Officer. The Contractor shall carefully conserve any utilities furnished without charge.

(b) The Contractor, at its expense and in a manner satisfactory to the Contracting Officer, shall install and maintain all necessary temporary connections and distribution lines, and all meters required to measure the amount of each utility used for the purpose of determining charges. Before final acceptance of the work by the PHA, the Contractor shall remove all the temporary connections, distribution lines, meters, and associated paraphernalia.

### 16. Protection of Existing Vegetation, Structures, Equipment, Utilities, and Improvements

(a) The Contractor shall preserve and protect all structures, equipment, and vegetation (such as trees, shrubs, and grass) on or adjacent to the work site, which are not to be removed under this contract, and which do not unreasonably interfere with the work required under this contract.

(b) The Contractor shall only remove trees when specifically authorized to do so, and shall avoid damaging vegetation that will remain in place. If any limbs or branches of trees are broken during performance of this contract, or by the careless operation of equipment, or by workmen, the Contractor shall trim those limbs or branches with a clean cut and paint the cut with a tree-pruning compound as directed by the Contracting Officer.

(c) The Contractor shall protect from damage all existing improvements and utilities (1) at or near the work site and (2) on adjacent property of a third party, the locations of which are made known to or should be known by the Contractor. Prior to disturbing the ground at the construction site, the Contractor shall ensure that all underground utility lines are clearly marked.

(d) The Contractor shall shore up, brace, underpin, secure, and protect as necessary all foundations and other parts of existing structures adjacent to, adjoining, and in the vicinity of the site, which may be affected by the excavations or other operations connected with the construction of the project.

(e) Any equipment temporarily removed as a result of work under this contract shall be protected, cleaned, and replaced in the same condition as at the time of award of this contract.

- (f) New work which connects to existing work shall correspond in all respects with that to which it connects and/or be similar to existing work unless otherwise required by the specifications.
- (g) No structural members shall be altered or in any way weakened without the written authorization of the Contracting Officer, unless such work is clearly specified in the plans or specifications.
- (h) If the removal of the existing work exposes discolored or unfinished surfaces, or work out of alignment, such surfaces shall be refinished, or the material replaced as necessary to make the continuous work uniform and harmonious. This, however, shall not be construed to require the refinishing or reconstruction of dissimilar finishes previously exposed, or finished surfaces in good condition, but in different planes or on different levels **Construction** when brought together by the removal of intervening work, unless such refinishing or reconstruction is specified in the plans or specifications.
- (i) The Contractor shall give all required notices to any adjoining or adjacent property owner or other party before the commencement of any work.
- (j) The Contractor shall indemnify and save harmless the PHA from any damages on account of settlement or the loss of lateral support of adjoining property, any damages from changes in topography affecting drainage, and from all loss or expense and all damages for which the PHA may become liable in consequence of such injury or damage to adjoining and adjacent structures and their premises.
- (k) The Contractor shall repair any damage to vegetation, structures, equipment, utilities, or improvements, including those that are the property of a third party, resulting from failure to comply with the requirements of this contract or failure to exercise reasonable care in performing the work. If the Contractor fails or refuses to repair the damage promptly, the Contracting Officer may have the necessary work performed and charge the cost to the Contractor.

## 17. Temporary Buildings and Transportation of Materials

- (a) Temporary buildings (e.g., storage sheds, shops, offices, sanitary facilities) and utilities may be erected by the Contractor only with the approval of the Contracting Officer and shall be built with labor and materials furnished by the Contractor without expense to the PHA. The temporary buildings and utilities shall remain the property of the Contractor and shall be removed by the Contractor at its expense upon completion of the work. With the written consent of the Contracting Officer, the buildings and utilities may be abandoned and need not be removed.
- (b) The Contractor shall, as directed by the Contracting Officer, use only established roadways, or use temporary roadways constructed by the Contractor when and as authorized by the Contracting Officer. When materials are transported in prosecuting the work, vehicles shall not be loaded beyond the loading capacity recommended by the manufacturer of the vehicle or prescribed by any federal, state, or local law or regulation. When it is necessary to cross curbs or sidewalks, the Contractor shall protect them from damage. The Contractor shall repair or pay for the repair of any damaged curbs, sidewalks, or roads.

## 18. Clean Air and Water

The contractor shall comply with the Clean Air Act, as amended, 42 USC 7401 et seq., the Federal Water Pollution Control Water Act, as amended, 33 U.S.C. 1251 et seq., and standards issued pursuant thereto in the facilities in which this contract is to be performed.

## 19. Energy Efficiency

The Contractor shall comply with mandatory standards and policies relating to energy efficiency which are contained in the energy conservation plan issued in compliance with the Energy Policy and Conservation Act (Pub.L. 94-163) for the State in which the work under the contract is performed.

## 20. Inspection and Acceptance of

- (a) Definitions. As used in this clause -
- (1) "Acceptance" means the act of an authorized representative of the PHA by which the PHA approves and assumes ownership of the work performed under this contract. Acceptance may be partial or complete.
- (2) "Inspection" means examining and testing the work performed under the contract (including, when appropriate, raw materials, equipment, components, and intermediate assemblies) to determine whether it conforms to contract requirements.
- (3) "Testing" means that element of inspection that determines the properties or elements, including functional operation of materials, equipment, or their components, by the application of established scientific principles and procedures.
- (b) The Contractor shall maintain an adequate inspection system and perform such inspections as will ensure that the work performed under the contract conforms to contract requirements. All work is subject to PHA inspection and test at all places and at all reasonable times before acceptance to ensure strict compliance with the terms of the contract.
- (c) PHA inspections and tests are for the sole benefit of the PHA and do not: (1) relieve the Contractor of responsibility for providing adequate quality control measures; (2) relieve the Contractor of responsibility for loss or damage of the material before acceptance; (3) constitute or imply acceptance; or, (4) affect the continuing rights of the PHA after acceptance of the completed work under paragraph (j) below.
- (d) The presence or absence of the PHA inspector does not relieve the Contractor from any contract requirement, nor is the inspector authorized to change any term or condition of the specifications without the Contracting Officer's written authorization. All instructions and approvals with respect to the work shall be given to the Contractor by the Contracting Officer.
- (e) The Contractor shall promptly furnish, without additional charge, all facilities, labor, and material reasonably needed for performing such safe and convenient inspections and tests as may be required by the Contracting Officer. The PHA may charge to the Contractor any additional cost of inspection or test when work is not ready at the time specified by the Contractor for inspection or test, or when prior rejection makes reinspection or retest necessary. The PHA shall perform all inspections and tests in a manner that will not unnecessarily delay the work. Special, full size, and performance tests shall be performed as described in the contract.



- (f) The PHA may conduct routine inspections of the construction site on a daily basis.
- (g) The Contractor shall, without charge, replace or correct work found by the PHA not to conform to contract requirements, unless the PHA decides that it is in its interest to accept the work with an appropriate adjustment in contract price. The Contractor shall promptly segregate and remove rejected material from the premises.
- (h) If the Contractor does not promptly replace or correct rejected work, the PHA may (1) by contract or otherwise, replace or correct the work and charge the cost to the Contractor, or (2) terminate for default the Contractor's right to proceed.
- (i) If any work requiring inspection is covered up without approval of the PHA, it must, if requested by the Contracting Officer, be uncovered at the expense of the Contractor. If at any time before final acceptance of the entire work, the **Construction PHA** considers it necessary or advisable, to examine work already completed by removing or tearing it out, the Contractor, shall on request, promptly furnish all necessary facilities, labor, and material. If such work is found to be defective or nonconforming in any material respect due to the fault of the Contractor or its subcontractors, the Contractor shall defray all the expenses of the examination and of satisfactory reconstruction. If, however, such work is found to meet the requirements of the contract, the Contracting Officer shall make an equitable adjustment to cover the cost of the examination and reconstruction, including, if completion of the work was thereby delayed, an extension of time.
- (j) The Contractor shall notify the Contracting Officer, in writing, as to the date when in its opinion all or a designated portion of the work will be substantially completed and ready for inspection. If the Architect determines that the state of preparedness is as represented, the PHA will promptly arrange for the inspection. Unless otherwise specified in the contract, the PHA shall accept, as soon as practicable after completion and inspection, all work required by the contract or that portion of the work the Contracting Officer determines and designates can be accepted separately. Acceptance shall be final and conclusive except for latent defects, fraud, gross mistakes amounting to fraud, or the PHA's right under any warranty or guarantee.

## 21. Use and Possession Prior to Completion

- (a) The PHA shall have the right to take possession of or use any completed or partially completed part of the work. Before taking possession of or using any work, the Contracting Officer shall furnish the Contractor a list of items of work remaining to be performed or corrected on those portions of the work that the PHA intends to take possession of or use. However, failure of the Contracting Officer to list any item of work shall not relieve the Contractor of responsibility for complying with the terms of the contract. The PHA's possession or use shall not be deemed an acceptance of any work under the contract.
- (b) While the PHA has such possession or use, the Contractor shall be relieved of the responsibility for (1) the loss of or damage to the work resulting from the PHA's possession or use, notwithstanding the terms of the clause entitled Permits and Codes herein; (2) all maintenance costs on the areas occupied; and, (3) furnishing heat, light, power, and water used in the areas

occupied without proper remuneration therefore. If prior possession or use by the PHA delays the progress of the work or causes additional expense to the Contractor, an equitable adjustment shall be made in the contract price or the time of completion, and the contract shall be modified in writing accordingly.

## 22. Warranty of Title

The Contractor warrants good title to all materials, supplies, and equipment incorporated in the work and agrees to deliver the premises together with all improvements thereon free from any claims, liens or charges, and agrees further that neither it nor any other person, firm or corporation shall have any right to a lien upon the premises or anything appurtenant thereto.

## 23. Warranty of

- (a) In addition to any other warranties in this contract, the Contractor warrants, except as provided in paragraph (j) of this clause, that work performed under this contract conforms to the contract requirements and is free of any defect in equipment, material, or workmanship performed by the Contractor or any subcontractor or supplier at any tier. This warranty shall continue for a period of \_\_\_\_\_ (one year unless otherwise indicated) from the date of final acceptance of the work. If the PHA takes possession of any part of the work before final acceptance, this warranty shall continue for a period of (one year unless otherwise indicated) from the date that the PHA takes possession.
- (b) The Contractor shall remedy, at the Contractor's expense, any failure to conform, or any defect. In addition, the Contractor shall remedy, at the Contractor's expense, any damage to PHA-owned or controlled real or personal property when the damage is the result of—
  - (1) The Contractor's failure to conform to contract requirements; or
  - (2) Any defects of equipment, material, workmanship or design furnished by the Contractor.
- (c) The Contractor shall restore any work damaged in fulfilling the terms and conditions of this clause. The Contractor's warranty with respect to work repaired or replaced will run for (one year unless otherwise indicated) from the date of repair or replacement.
- (d) The Contracting Officer shall notify the Contractor, in writing, within a reasonable time after the discovery of any failure, defect or damage.
- (e) If the Contractor fails to remedy any failure, defect, or damage within a reasonable time after receipt of notice, the PHA shall have the right to replace, repair or otherwise remedy the failure, defect, or damage at the Contractor's expense.
- (f) With respect to all warranties, express or implied, from subcontractors, manufacturers, or suppliers for work performed and materials furnished under this contract, the Contractor shall:
  - (1) Obtain all warranties that would be given in normal commercial practice;
  - (2) Require all warranties to be executed in writing, for the benefit of the PHA; and,
  - (3) Enforce all warranties for the benefit of the PHA.
- (g) In the event the Contractor's warranty under paragraph (a) of this clause has expired, the PHA may bring suit at its own expense to enforce a subcontractor's, manufacturer's or supplier's warranty.

- (h) Unless a defect is caused by the negligence of the Contractor or subcontractor or supplier at any tier, the Contractor shall not be liable for the repair of any defect of material or design furnished by the PHA nor for the repair of any damage that results from any defect in PHA furnished material or design.
- (i) Notwithstanding any provisions herein to the contrary, the establishment of the time periods in paragraphs (a) and (c) above relate only to the specific obligation of the Contractor to correct the work, and have no relationship to the time within which its obligation to comply with the contract may be sought to be enforced, nor to the time within which proceedings may be commenced to establish the Contractor's liability with respect to its obligation other than specifically to correct the work.
- (j) This warranty shall not limit the PHA's rights under the Inspection and Acceptance of Construction clause of this contract with respect to latent defects, gross mistakes or fraud.

**24. Prohibition Against Liens**

The Contractor is prohibited from placing a lien on the PHA's property. This prohibition shall apply to all subcontractors at any tier and all materials suppliers.

**Administrative Requirements**

**25. Contract Period**

this contract within \_\_\_\_\_ calendar days of the effective date of the contract, or within the time schedule established in the notice to proceed issued by the Contracting Officer.

**26. Order of Provisions**

accordance with the terms and conditions of the

In the event of a conflict between these General Conditions and the Specifications, the General Conditions shall prevail. In the event of a conflict between the contract and any applicable state or local law or regulation, the state or local law or regulation shall prevail; provided that such state or local law or regulation does not conflict with, or is less restrictive than applicable federal law, regulation, or Executive Order. In the event of such a conflict, applicable federal law, regulation, and Executive Order shall prevail.

**27. Payments**

retain ten (10) percent of the amount of progress

- (a) The PHA shall pay the Contractor the price as provided in this contract.
- (b) The PHA shall make progress payments approximately every 30 days as the work proceeds, on estimates of work accomplished which meets the standards of quality established under the contract, as approved by the Contracting Officer. The PHA may, subject to written determination and approval of the Contracting Officer, make more frequent payments to contractors which are qualified small businesses.
- (c) Before the first progress payment under this contract, the Contractor shall furnish, in such detail as requested by the Contracting Officer, a breakdown of the total contract price showing the amount included therein for each principal category of the work, which shall substantiate the payment amount requested in order to provide a

basis for determining progress payments. The breakdown shall be approved by the Contracting Officer and must be acceptable to HUD. If the contract covers more than one project, the Contractor shall furnish a separate breakdown for each. The values and quantities employed in making up this breakdown are for determining the amount of progress payments and shall not be construed as a basis for additions to or deductions from the contract price. The Contractor shall prorate its overhead and profit over the construction period of the contract.

- (d) The Contractor shall submit, on forms provided by the PHA, periodic estimates showing the value of the work performed during each period based upon the approved submitted not later than \_\_\_\_\_ days in advance of the date set for payment and are subject to correction and revision as required. The estimates must be approved by the Contracting Officer with the concurrence of the Architect prior to payment. If the contract covers more than one project, the Contractor shall furnish a separate progress payment estimate for each.
- (e) Along with each request for progress payments and the required estimates, the Contractor shall furnish the following certification, or payment shall not be made: I hereby certify, to the best of my knowledge and belief, that:

- (1) The amounts requested are only for performance in accordance with the specifications, terms, and conditions of the contract;
- (2) Payments to subcontractors and suppliers have been made from previous payments received under the contract, and timely payments will be made from the proceeds of the payment covered by this certification, in accordance with subcontract agreements; and,
- (3) This request for progress payments does not include any amounts which the prime contractor intends to withhold or retain from a subcontractor or supplier in subcontract.

**Name:**

Title:

Date:

- (f) Except as otherwise provided in State law, the PHA shall payments until completion and acceptance of all work under the contract; except, that if upon completion of 50 percent of the work, the Contracting Officer, after consulting with the Architect, determines that the Contractor's performance and progress are satisfactory, the PHA may make the remaining payments in full for the work subsequently completed. If the Contracting Officer subsequently determines that the Contractor's performance and progress are unsatisfactory, the PHA shall reinstate the ten (10) percent (or other percentage as provided in State law) retainage until such time as the Contracting Officer determines that performance and progress are satisfactory.
- (g) The Contracting Officer may authorize material delivered on the site and preparatory work done to be taken into consideration when computing progress payments.

Material delivered to the Contractor at locations other than the site may also be taken into consideration if the Contractor furnishes satisfactory evidence that (1) it has acquired title to such material; (2) the material is properly stored in a bonded warehouse, storage yard, or similar suitable place as may be approved by the Contracting Officer; (3) the material is insured to cover its full value; and (4) the material will be used to perform this contract. Before any progress payment which includes delivered material is made, the Contractor shall furnish such documentation as the Contracting Officer may require to assure the protection of the PHA's interest in such materials. The Contractor shall remain responsible for such stored material notwithstanding the transfer of title to the PHA.

- (h) All material and work covered by progress payments made shall, at the time of payment become the sole property of the PHA, but this shall not be construed as (1) relieving the Contractor from the sole responsibility for all material and work upon which payments have been made or the restoration of any damaged work; or, (2) waiving the right of the PHA to require the fulfillment of all of the terms of the contract. In the event the work of the Contractor has been damaged by other contractors or persons other than employees of the PHA in the course of their employment, the Contractor shall restore such damaged work without cost to the PHA and to seek redress for its damage only from those who directly caused it.
- (i) The PHA shall make the final payment due the Contractor under this contract after (1) completion and final acceptance of all work; and (2) presentation of release of all claims against the PHA arising by virtue of this contract, other than claims, in stated amounts, that the Contractor has specifically excepted from the operation of the release. Each such exception shall embrace no more than one claim, the basis and scope of which shall be clearly defined. The amounts for such excepted claims shall not be included in the request for final payment. A release may also be required of the assignee if the Contractor's claim to amounts payable under this contract has been assigned.
- (j) Prior to making any payment, the Contracting Officer may require the Contractor to furnish receipts or other evidence of payment from all persons performing work and supplying material to the Contractor, if the Contracting Officer determines such evidence is necessary to substantiate claimed costs.
- (k) The PHA shall not; (1) determine or adjust any claims for payment or disputes arising there under between the Contractor and its subcontractors or material suppliers; or, (2) withhold any moneys for the protection of the subcontractors or material suppliers. The failure or refusal of the PHA to withhold moneys from the Contractor shall in no wise impair the obligations of any surety or sureties under any bonds furnished under this contract.

## 28. Contract Modifications

- (a) Only the Contracting Officer has authority to modify any term or condition of this contract. Any contract modification shall be authorized in writing.
- (b) The Contracting Officer may modify the contract unilaterally (1) pursuant to a specific authorization stated in a contract clause (e.g., Changes); or (2) for administrative matters which do not change the rights or

responsibilities of the parties (e.g., change in the PHA address). All other contract modifications shall be in the form of supplemental agreements signed by the Contractor and the Contracting Officer.

- (c) When a proposed modification requires the approval of HUD prior to its issuance (e.g., a change order that exceeds the PHA's approved threshold), such modification shall not be effective until the required approval is received by the PHA.

## 29. Changes

- (a) The Contracting Officer may, at any time, without notice to the sureties, by written order designated or indicated to be a change order, make changes in the work within the general scope of the contract including changes:
  - (1) In the specifications (including drawings and designs);
  - (2) In the method or manner of performance of the work;
  - (3) PHA-furnished facilities, equipment, materials, services, or site; or,
  - (4) Directing the acceleration in the performance of the work.
- (b) Any other written order or oral order (which, as used in this paragraph (b), includes direction, instruction, interpretation, or determination) from the Contracting Officer that causes a change shall be treated as a change order under this clause; provided, that the Contractor gives the Contracting Officer written notice stating (1) the date, circumstances and source of the order and (2) that the Contractor regards the order as a change order.
- (c) Except as provided in this clause, no order, statement or conduct of the Contracting Officer shall be treated as a change under this clause or entitle the Contractor to an equitable adjustment.
- (d) If any change under this clause causes an increase or decrease in the Contractor's cost of, or the time required for the performance of any part of the work under this contract, whether or not changed by any such order, the Contracting Officer shall make an equitable adjustment and modify the contract in writing. However, except for an adjustment based on defective specifications, no proposal for any change under paragraph (b) above shall be allowed for any costs incurred more than 20 days (5 days for oral orders) before the Contractor gives written notice as required. In the case of defective specifications for which the PHA is responsible, the equitable adjustment shall include any increased cost reasonably incurred by the Contractor in attempting to comply with the defective specifications.
- (e) The Contractor must assert its right to an adjustment under this clause within 30 days after (1) receipt of a written change order under paragraph (a) of this clause, or (2) the furnishing of a written notice under paragraph (b) of this clause, by submitting a written statement describing the general nature and the amount of the proposal. If the facts justify it, the Contracting Officer may extend the period for submission. The proposal may be included in the notice required under paragraph (b) above. No proposal by the Contractor for an equitable adjustment shall be allowed if asserted after final payment under this contract.
- (f) The Contractor's written proposal for equitable adjustment shall be submitted in the form of a lump sum proposal supported with an itemized breakdown of all increases and decreases in the contract in at least the following details:

- (1) Direct Costs. Materials (list individual items, the quantity and unit cost of each, and the aggregate cost); Transportation and delivery costs associated with materials; Labor breakdowns by hours or unit costs (identified with specific work to be performed); Construction equipment exclusively necessary for the change; Costs of preparation and/ or revision to shop drawings resulting from the change; Worker's Compensation and Public Liability Insurance; Employment taxes under FICA and FUTA; and, Bond Costs when size of change warrants revision.
- (2) Indirect Costs. Indirect costs may include overhead, general and administrative expenses, and fringe benefits not normally treated as direct costs.
- (3) Profit. The amount of profit shall be negotiated and may vary according to the nature, extent, and complexity of the work required by the change. The allowability of the direct and indirect costs shall be determined in accordance with the Contract Cost Principles and Procedures for Commercial Firms in Part 31 of the Federal Acquisition Regulation (48 CFR 1-31), as implemented by HUD Handbook 2210.18, in effect on the date of this contract. The Contractor shall not be allowed a profit on the profit received by any subcontractor. Equitable adjustments for deleted work shall include a credit for profit and may include a credit for indirect costs. On proposals covering both increases and decreases in the amount of the contract, the application of indirect costs and profit shall be on the net-change in direct costs for the Contractor or subcontractor performing the work.
- (g) The Contractor shall include in the proposal its request for time extension (if any), and shall include sufficient information and dates to demonstrate whether and to what extent the change will delay the completion of the contract in its entirety.
- (h) The Contracting Officer shall act on proposals within 30 days after their receipt, or notify the Contractor of the date when such action will be taken.
- (i) Failure to reach an agreement on any proposal shall be a dispute under the clause entitled Disputes herein. Nothing in this clause, however, shall excuse the Contractor from proceeding with the contract as changed.
- (j) Except in an emergency endangering life or property, no change shall be made by the Contractor without a prior order from the Contracting Officer.

### 30. Suspension of Work

- (a) The Contracting Officer may order the Contractor in writing to suspend, delay, or interrupt all or any part of the work of this contract for the period of time that the Contracting Officer determines appropriate for the convenience of the PHA.
- (b) If the performance of all or any part of the work is, for an unreasonable period of time, suspended, delayed, or interrupted (1) by an act of the Contracting Officer in the administration of this contract, or (2) by the Contracting Officer's failure to act within the time specified (or within a reasonable time if not specified) in this contract an adjustment shall be made for any increase in the cost of performance of the contract (excluding profit) necessarily caused by such unreasonable suspension, delay, or interruption and the contract modified in writing accordingly. However, no adjustment shall be made under this clause for any suspension, delay, or interruption to the extent that performance would have

- been so suspended, delayed, or interrupted by any other cause, including the fault or negligence of the Contractor or for which any equitable adjustment is provided for or excluded under any other provision of this contract.
- (c) A claim under this clause shall not be allowed (1) for any costs incurred more than 20 days before the Contractor shall have notified the Contracting Officer in writing of the act or failure to act involved (but this requirement shall not apply as to a claim resulting from a suspension order); and, (2) unless the claim, in an amount stated, is asserted in writing as soon as practicable after the termination of the suspension, delay, or interruption, but not later than the date of final payment under the contract.

### 31. Disputes

- (a) "Claim," as used in this clause, means a written demand or written assertion by one of the contracting parties seeking, as a matter of right, the payment of money in a sum certain, the adjustment or interpretation of contract terms, or other relief arising under or relating to the contract. A claim arising under the contract, unlike a claim relating to the contract, is a claim that can be resolved under a contract clause that provides for the relief sought by the claimant. A voucher, invoice, or other routine request for payment that is not in dispute when submitted is not a claim. The submission may be converted to a claim by complying with the requirements of this clause, if it is disputed either as to liability or amount or is not acted upon in a reasonable time.
- (b) Except for disputes arising under the clauses entitled Labor Standards - Davis Bacon and Related Acts, herein, all disputes arising under or relating to this contract, including any claims for damages for the alleged breach thereof which are not disposed of by agreement, shall be resolved under this clause.
- (c) All claims by the Contractor shall be made in writing and submitted to the Contracting Officer for a written decision. A claim by the PHA against the Contractor shall be subject to a written decision by the Contracting Officer.
- (d) The Contracting Officer shall, within 60 (unless otherwise indicated) days after receipt of the request, decide the claim or notify the Contractor of the date by which the decision will be made.
- (e) The Contracting Officer's decision shall be final unless the Contractor (1) appeals in writing to a higher level in the PHA in accordance with the PHA's policy and procedures, (2) refers the appeal to an independent mediator or arbitrator, or (3) files suit in a court of competent jurisdiction. Such appeal must be made within (30 unless otherwise indicated) days after receipt of the Contracting Officer's decision.
- (f) The Contractor shall proceed diligently with performance of this contract, pending final resolution of any request for relief, claim, appeal, or action arising under or relating to the contract, and comply with any decision of the Contracting Officer.

### 32. Default

- (a) If the Contractor refuses or fails to prosecute the work, or any separable part thereof, with the diligence that will insure its completion within the time specified in this contract, or any extension thereof, or fails to complete said work within this time, the Contracting Officer may, by written notice to the Contractor, terminate the right to

proceed with the work (or separable part of the work) that has been delayed. In this event, the PHA may take over the work and complete it, by contract or otherwise, and may take possession of and use any materials, equipment, and plant on the work site necessary for completing the work. The Contractor and its sureties shall be liable for any damage to the PHA resulting from the **Convenience** Contractor's refusal or failure to complete the work within the specified time, whether or not the Contractor's right to proceed with the work is terminated. This liability includes any increased costs incurred by the PHA in completing the work.

- (b) The Contractor's right to proceed shall not be terminated or the Contractor charged with damages under this clause if—
- (1) The delay in completing the work arises from unforeseeable causes beyond the control and without the fault or negligence of the Contractor. Examples of such causes include (i) acts of God, or of the public enemy, (ii) acts of the PHA or other governmental entity in either its sovereign or contractual capacity, (iii) acts of another contractor in the performance of a contract with the PHA, (iv) fires, (v) floods, (vi) epidemics, (vii) quarantine restrictions, (viii) strikes, (ix) freight embargoes, (x) unusually severe weather, or (xi) delays of subcontractors or suppliers at any tier arising from unforeseeable causes beyond the control and without the fault or negligence of both the Contractor and the subcontractors or suppliers; and
  - (2) The Contractor, within days (10 days unless otherwise indicated) from the beginning of such delay (unless extended by the Contracting Officer) notifies the Contracting Officer in writing of the causes of delay. The Contracting Officer shall ascertain the facts and the extent of the delay. If, in the judgment of the Contracting Officer, the findings of fact warrant such action, time for completing the work shall be extended by written modification to the contract. The findings of the Contracting Officer shall be reduced to a written decision which shall be subject to the provisions of the Disputes clause of this contract.
- (c) If, after termination of the Contractor's right to proceed, it is determined that the Contractor was not in default, or that the delay was excusable, the rights and obligations of the parties will be the same as if the termination had been for convenience of the PHA.

### 33. Liquidated Damages

- (a) If the Contractor fails to complete the work within the time specified in the contract, or any extension, as specified in the clause entitled Default of this contract, the Contractor shall pay to the PHA as liquidated damages, the sum of \$ \_\_\_\_\_ [Contracting Officer insert amount] for each day of delay. If different completion dates are specified in the contract for separate parts or stages of the work, the amount of liquidated damages shall be assessed on those parts or stages which are delayed. To the extent that the Contractor's delay or nonperformance is excused under another clause in this contract, liquidated damages shall not be due the PHA. The Contractor remains liable for damages caused other than by delay.
- (b) If the PHA terminates the Contractor's right to proceed, the resulting damage will consist of liquidated damages until such reasonable time as may be required for final

completion of the work together with any increased costs occasioned the PHA in completing the work.

- (c) If the PHA does not terminate the Contractor's right to proceed, the resulting damage will consist of liquidated damages until the work is completed or accepted.

### 34. Termination for

- (a) The Contracting Officer may terminate this contract in whole, or in part, whenever the Contracting Officer determines that such termination is in the best interest of the PHA. Any such termination shall be effected by delivery to the Contractor of a Notice of Termination specifying the extent to which the performance of the work under the contract is terminated, and the date upon which such termination becomes effective.
- (b) If the performance of the work is terminated, either in whole or in part, the PHA shall be liable to the Contractor for reasonable and proper costs resulting from such termination upon the receipt by the PHA of a properly presented claim setting out in detail: (1) the total cost of the work performed to date of termination less the total amount of contract payments made to the Contractor; (2) the cost (including reasonable profit) of settling and paying claims under subcontracts and material orders for work performed and materials and supplies delivered to the site, payment for which has not been made by the PHA to the Contractor or by the Contractor to the subcontractor or supplier; (3) the cost of preserving and protecting the work already performed until the PHA or assignee takes possession thereof or assumes responsibility therefore; (4) the actual or estimated cost of legal and accounting services reasonably necessary to prepare and present the termination claim to the PHA; and (5) an amount constituting a reasonable profit on the value of the work performed by the Contractor.
- (c) The Contracting Officer will act on the Contractor's claim within days (60 days unless otherwise indicated) of receipt of the Contractor's claim.
- (d) Any disputes with regard to this clause are expressly made subject to the provisions of the Disputes clause of this contract.

### 35. Assignment of Contract

The Contractor shall not assign or transfer any interest in this contract; except that claims for monies due or to become due from the PHA under the contract may be assigned to a bank, trust company, or other financial institution. Such assignments of claims shall only be made with the written concurrence of the Contracting Officer. If the Contractor is a partnership, this contract shall inure to the benefit of the surviving or remaining member(s) of such partnership as approved by the Contracting Officer.

### 36. Insurance

- (a) Before commencing work, the Contractor and each subcontractor shall furnish the PHA with certificates of insurance showing the following insurance is in force and will insure all operations under the Contract:
  - (1) Workers' Compensation, in accordance with state or Territorial Workers' Compensation laws.
  - (2) Commercial General Liability with a combined single limit for bodily injury and property damage of not less than \$ \_\_\_\_\_ [Contracting Officer insert amount]

per occurrence to protect the Contractor and each subcontractor against claims for bodily injury or death and damage to the property of others. This shall cover the use of all equipment, hoists, and vehicles on the site(s) not covered by Automobile Liability under (3) below. If the Contractor has a "claims made" policy, then the following additional requirements apply: the policy must provide a "retroactive date" which must be on or before the execution date of the Contract; and the extended reporting period may not be less than five years following the completion date of the Contract.

- (3) Automobile Liability on owned and non-owned motor vehicles used on the site(s) or in connection therewith for a combined single limit for bodily injury and property damage of not less than \$ \_\_\_\_\_

[Contracting Officer insert amount] per occurrence.

- (b) Before commencing work, the Contractor shall furnish the PHA with a certificate of insurance evidencing that Builder's Risk (fire and extended coverage) Insurance on all work in place and/or materials stored at the building site(s), including foundations and building equipment, is in force. The Builder's Risk Insurance shall be for the benefit of the Contractor and the PHA as their interests may appear and each shall be named in the policy or policies as an insured. The Contractor in installing equipment supplied by the PHA shall carry insurance on such equipment from the time the Contractor takes possession thereof until the Contract work is accepted by the PHA. The Builder's Risk Insurance need not be carried on excavations, piers, footings, or foundations until such time as work on the superstructure is started. It need not be carried on landscape work. Policies shall furnish coverage at all times for the full cash value of all completed construction, as well as materials in place and/or stored at the site(s), whether or not partial payment has been made by the PHA. The Contractor may terminate this insurance on buildings as of the date taken over for occupancy by the PHA. The Contractor is not required to carry Builder's Risk Insurance for modernization work which does not involve structural alterations or additions and where the PHA's existing fire and extended coverage policy can be endorsed to include such work.
- (c) All insurance shall be carried with companies which are financially responsible and admitted to do business in the State in which the project is located. If any such insurance is due to expire during the construction period, the Contractor (including subcontractors, as applicable) shall not permit the coverage to lapse and shall furnish evidence of coverage to the Contracting Officer. All certificates of insurance, as evidence of coverage, shall provide that no coverage may be canceled or non-renewed by the insurance company until at least 30 days prior written notice has been given to the Contracting Officer.

### 37. Subcontracts

- (a) Definitions. As used in this contract -
- (1) "Subcontract" means any contract, purchase order, or other purchase agreement, including modifications and change orders to the foregoing, entered into by a subcontractor to furnish supplies, materials, equipment, and services for the performance of the prime contract or a subcontract.

- (2) "Subcontractor" means any supplier, vendor, or firm that furnishes supplies, materials, equipment, or services to or for the Contractor or another subcontractor.
- (b) The Contractor shall not enter into any subcontract with any subcontractor who has been temporarily denied participation in a HUD program or who has been suspended or debarred from participating in contracting programs by any agency of the United States Government or of the state in which the work under this contract is to be performed.
- (c) The Contractor shall be as fully responsible for the acts or omissions of its subcontractors, and of persons either directly or indirectly employed by them as for the acts or omissions of persons directly employed by the Contractor.
- (d) The Contractor shall insert appropriate clauses in all subcontracts to bind subcontractors to the terms and conditions of this contract insofar as they are applicable to the work of subcontractors.
- (e) Nothing contained in this contract shall create any contractual relationship between any subcontractor and the PHA or between the subcontractor and HUD.

### 38. Subcontracting with Small and Minority Firms, Women's Business Enterprise, and Labor Surplus Area Firms

The Contractor shall take the following steps to ensure that, whenever possible, subcontracts are awarded to small business firms, minority firms, women's business enterprises, and labor surplus area firms:

- (a) Placing qualified small and minority businesses and women's business enterprises on solicitation lists;
- (b) Ensuring that small and minority businesses and women's business enterprises are solicited whenever they are potential sources;
- (c) Dividing total requirements, when economically feasible, into smaller tasks or quantities to permit maximum participation by small and minority businesses and women's business enterprises;
- (d) Establishing delivery schedules, where the requirements of the contract permit, which encourage participation by small and minority businesses and women's business enterprises; and
- (e) Using the services and assistance of the U.S. Small Business Administration, the Minority Business Development Agency of the U.S. Department of Commerce, and State and local governmental small business agencies.

### 39. Equal Employment Opportunity

During the performance of this contract, the Contractor/Seller agrees as follows:

- (a) The Contractor/Seller shall not discriminate against any employee or applicant for employment because of race color, religion, sex, sexual orientation, gender identity, disability, or national origin.
- (b) The Contractor/Seller shall take affirmative action to ensure that applicants are employed, and that employees are treated during employment without regard to their race, color, religion, sex, sexual orientation, gender identity, disability, or national origin. Such action shall include, but not be limited to, (1) employment, (2) upgrading demotion, (4) transfer, (5) recruitment or recruitment advertising, (6) layoff or termination, (7) rates of pay or other forms of compensation, and (8) selection for training, including apprenticeship

(c) The Contractor/Seller agrees to post in conspicuous places available to employees and applicants for employment the notices to be provided by the Contracting Officer setting forth the provisions of this nondiscrimination clause.

(d) The Contractor/Seller shall, in all solicitations or advertisements for employees placed by or on behalf of the Contractor/Seller, state that all qualified applicants will receive consideration for employment without regard to race, color, religion, sex, or national origin.

(e) The Contractor/Seller shall send, to each labor union or representative of workers with which it has a collective bargaining agreement or other contract or understanding, the notice to be provided by the Contracting Officer advising the labor union or workers' representative of the Contractor's commitments under this clause, and post copies of the notice in conspicuous places available to employees and applicants for employment.

(f) The Contractor/Seller shall comply with Executive Order 11246, as amended, and the rules, regulations, and orders of the Secretary of Labor.

(g) The Contractor/Seller shall furnish all information and reports required by Executive Order 11246, as amended, Section 503 of the Rehabilitation Act of 1973, as amended, and by rules, regulations, and orders of the Secretary of Labor, or pursuant thereto. The Contractor/Seller shall permit

access to its books, records, and accounts by the Secretary of Labor for purposes of investigation to ascertain compliance with such rules, regulations, and orders.

(h) In the event of a that the Contractor/Seller is in noncompliance with the nondiscrimination clauses of this contract or with any of such rules, regulations, or orders, this contract may be canceled, terminated or suspended in whole or in part and the contractor/seller may be declared ineligible for further Government contracts in accordance with procedures authorized in Executive Order 11246 of September 24, 1965, and such other sanctions may be imposed and remedies invoked as provided in Executive Order 11246 of September 24, 1965, or by rule, regulation, or order of the Secretary of Labor, or as otherwise provided by law.

(i) The contractor/seller will include the provisions of paragraphs (a) through (h) in every subcontract or purchase order unless exempted by rules, regulations, or orders of the Secretary of Labor issued pursuant to section 204 of Executive Order 11246 of September 24, 1965, so that such provisions will be binding upon each sub[contractor/seller] or vendor. The [contractor/seller] will take such action with respect to any subcontract or purchase order as may be directed by the Secretary of Labor as a means of enforcing such provisions including sanctions for noncompliance: Provided, however, that in the event the [contractor/seller] becomes involved in, or is threatened with, litigation with a subcontractor or vendor as a result of such direction, the [contractor/seller] may request the United States to enter into such litigation to protect the interests of the United States.

(j) Compliance with the requirements of this clause shall be to the maximum extent consistent with, but not in derogation of, compliance with section 7(b) of the Indian Self-Determination and Education Assistance Act and the Indian Preference clause of this contract.

#### **40. Employment, Training, and Contracting Opportunities for Low-Income Persons, Section 3 of the Housing and Urban Development Act of 1968.**

(a) The work to be performed under this contract is subject to the requirements of Section 3 of the Housing and Urban Development Act of 1968, as amended, 12 U.S.C. 1701u (section 3). The purpose of section 3 is to ensure that employment and other economic opportunities generated by HUD assistance or HUD-assisted projects covered by Section 3, shall, to the greatest extent feasible, be directed to low- and very low-income persons, particularly persons who are recipients of HUD assistance for housing.

(b) The parties to this contract agree to comply with HUD's regulations in 24 CFR Part 75, which implement Section 3. As evidenced by their execution of this contract, the parties to this contract certify that they are under no contractual or other impediment that would prevent them from complying with the Part 75 regulations.

(c) The contractor agrees to send to each labor organization or representative of workers with which the contractor has a collective bargaining agreement or other understanding, if any, a notice advising the labor organization or workers' representative of the contractor's commitments under this section 3 clause and will post copies of the notice in conspicuous places at the work site where both employees and applicants for training and employment positions can see the notice. The notice shall describe the Section 3 prioritization requirements and shall state the minimum percentages of labor hour requirements established in the Benchmark Notice (FR-6085-N-04).

(d) The contractor agrees to include this section 3 clause in every subcontract subject to compliance with regulations in 24 CFR Part 75, and agrees to take appropriate action, as provided in an applicable provision of the subcontract or in this section 3 clause, upon a finding that the subcontractor is in violation of the regulations in 24 CFR Part 75. The contractor will not subcontract with any subcontractor where the contractor has notice or knowledge that the subcontractor has been found in violation of the regulations in 24 CFR Part 75.

(e) Noncompliance with HUD's regulations in 24 CFR Part 75 may result in sanctions, termination of this contract for default, and debarment or suspension from future HUD assisted contracts.

(f) Contracts, subcontracts, grants, or subgrants subject to Section 7(b) of the Indian Self-Determination and Education Assistance Act (25 U.S.C. 5307(b)) or subject to tribal preference requirements as authorized under 101(k) of the Native American Housing Assistance and Self-Determination Act (25 U.S.C. 4111(k)) must provide preferences in employment, training, and business opportunities to Indians and Indian organizations, and are therefore not subject to the requirements of 24 CFR Part 75.

---

#### 41. Interest of Members of Congress

No member of or delegate to the Congress of the United States of America shall be admitted to any share or part of this contract or to any benefit that may arise therefrom.

#### 42. Interest of Members, Officers, or Employees and Former Members, Officers, or Employees

No member, officer, or employee of the PHA, no member of the governing body of the locality in which the project is situated, no member of the governing body of the locality in which the PHA was activated, and no other public official of such locality or localities who exercises any functions or responsibilities with respect to the project, shall, during his or her tenure, or for one year thereafter, have any interest, direct or indirect, in this contract or the proceeds thereof.

#### 43. Limitations on Payments made to Influence Certain Federal Financial Transactions

- (a) The Contractor agrees to comply with Section 1352 of Title 31, United States Code which prohibits the use of **Acts** Federal appropriated funds to pay any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, and officer or employee of Congress, or an employee of a Member of Congress in connection with any of the following covered Federal actions: the awarding of any Federal contract; the making of any Federal grant; the making of any Federal loan; the entering into of any cooperative agreement; or the modification of any Federal contract, grant, loan, or cooperative agreement.
- (b) The Contractor further agrees to comply with the requirement of the Act to furnish a disclosure (OMB Standard Form LLL, Disclosure of Lobbying Activities) if any funds other than Federal appropriated funds (including profit or fee received under a covered Federal transaction) have been paid, or will be paid, to any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with a Federal contract, grant, loan, or cooperative agreement.

#### 44. Royalties and Patents

The Contractor shall pay all royalties and license fees. It shall defend all suits or claims for infringement of any patent rights and shall save the PHA harmless from loss on account thereof; except that the PHA shall be responsible for all such loss when a particular design, process or the product of a particular manufacturer or manufacturers is specified and the Contractor has no reason to believe that the specified design, process, or product is an infringement. If, however, the Contractor has reason to believe that any design, process or product specified is an infringement of a patent, the Contractor shall promptly notify the Contracting Officer. Failure to give such notice shall make the Contractor responsible for resultant loss.

#### 45. Examination and Retention of Contractor's Records

- (a) The PHA, HUD, or Comptroller General of the United States, or any of their duly authorized representatives shall, until 3 years after final payment under this contract, have access to and the right to examine any of the Contractor's directly pertinent books, documents, papers, or other records involving transactions related to this contract for the purpose of making audit, examination, excerpts, and transcriptions.
- (b) The Contractor agrees to include in first-tier subcontracts under this contract a clause substantially the same as paragraph (a) above. "Subcontract," as used in this clause, excludes purchase orders not exceeding \$10,000.
- (c) The periods of access and examination in paragraphs (a) and (b) above for records relating to (1) appeals under the Disputes clause of this contract, (2) litigation or settlement of claims arising from the performance of this contract, or (3) costs and expenses of this contract to which the PHA, HUD, or Comptroller General or any of their duly authorized representatives has taken exception shall continue until disposition of such appeals, litigation, claims, or exceptions.

#### 46. Labor Standards - Davis-Bacon and Related

If the total amount of this contract exceeds \$2,000, the Federal labor standards set forth in the clause below shall apply to the development or construction work to be performed under the contract.

- (a) Minimum Wages.
  - (1) All laborers and mechanics employed under this contract in the development or construction of the project(s) involved will be paid unconditionally and not less often than once a week, and without subsequent deduction or rebate on any account (except such payroll deductions as are permitted by regulations issued by the Secretary of Labor under the Copeland Act (29 CFR Part 3)), the full amount of wages and bona fide fringe benefits (or cash equivalents thereof) due at time of payment computed at rates not less than those contained in the wage determination of the Secretary of Labor which is attached hereto and made a part hereof, regardless of any contractual relationship which may be alleged to exist between the Contractor and such laborers and mechanics. Contributions made or costs reasonably anticipated for bona fide fringe benefits under Section 1(b)(2) of the Davis-Bacon Act on behalf of laborers or mechanics are considered wages paid to such laborers or mechanics, subject to the provisions of 29 CFR 5.5(a)(1)(iv); also, regular contributions made or costs incurred for more than a weekly period (but not less often than quarterly) under plans, funds, or programs which cover the regular weekly period, are deemed to be constructively made or incurred during such weekly period. Such laborers and mechanics shall be paid the appropriate wage rate and fringe benefits in the wage determination for the classification of work actually performed, without regard to skill, except as provided in 29 CFR 5.5(a)(4). Laborers or mechanics performing work in more than one classification may be compensated at the rate specified for each classification for the time actually worked therein; provided, that the employer's payroll records accurately set forth the time spent in each classification in which work is performed. The wage determination (including any additional classification and wage rates conformed under 29 CFR 5.5(a)(1)(ii) and the Davis-Bacon poster (WH-1321) shall



be posted at all times by the Contractor and its subcontractors at the site of the work in a prominent and accessible place where it can be easily seen by the workers.

(2) (i) Any class of laborers or mechanics, including helpers, which is not listed in the wage determination and which is to be employed under the contract shall be classified in conformance with the wage determination. HUD shall approve an additional classification and wage rate and fringe benefits therefor only when all the following criteria have been met: (A) The work to be performed by the classification requested is not performed by a classification in the wage determination; and (B) The classification is utilized in the area by the construction industry; and (C) The proposed wage rate, including any bona fide fringe benefits, bears a reasonable relationship to the wage rates contained in the wage determination.

(ii) If the Contractor and the laborers and mechanics to be employed in the classification (if known), or their representatives, and HUD or its designee agree on the classification and wage rate (including the amount designated for fringe benefits where appropriate), a report of the action taken shall be sent by HUD or its designee to the Administrator of the Wage and Hour Division, Employee Standards Administration, U.S. Department of Labor, Washington, DC 20210. The Administrator, or an authorized representative, will approve, modify, or disapprove every additional classification action within 30 days of receipt and so advise HUD or its designee or will notify HUD or its designee within the 30-day period that additional time is necessary.

(iii) In the event the Contractor, the laborers or mechanics to be employed in the classification or their representatives, and HUD or its designee do not agree on the proposed classification and wage rate (including the amount designated for fringe benefits, where appropriate), HUD or its designee shall refer the questions, including the views of all interested parties and the recommendation of HUD or its designee, to the Administrator of the Wage and Hour Division for determination. The Administrator, or an authorized representative, will issue a determination within 30 days of receipt and so advise HUD or its designee or will notify HUD or its designee within the 30-day period that additional time is necessary.

(iv) The wage rate (including fringe benefits where appropriate) determined pursuant to subparagraphs (a)(2)(ii) or (iii) of this clause shall be paid to all workers performing work in the classification under this contract from the first day on which work is performed in classification.

(3) Whenever the minimum wage rate prescribed in the contract for a class of laborers or mechanics includes a fringe benefit which is not expressed as an hourly rate, the Contractor shall either pay the benefit as stated in the wage determination or shall pay another bona fide fringe benefit or an hourly cash equivalent thereof.

(4) If the Contractor does not make payments to a trustee or other third person, the Contractor may consider as part of the wages of any laborer or mechanic the

amount of any costs reasonably anticipated in providing bona fide fringe benefits under a plan or program; provided, that the Secretary of Labor has found, upon the written request of the Contractor, that the applicable standards of the Davis-Bacon Act have been met. The Secretary of Labor may require the Contractor to set aside in a separate account assets for the meeting of obligations under the plan or program.

(b) Withholding of funds. HUD or its designee shall, upon its own action or upon written request of an authorized representative of the Department of Labor, withhold or cause to be withheld from the Contractor under this contract or any other Federal contract with the same prime Contractor, or any other Federally-assisted contract subject to Davis-Bacon prevailing wage requirements, which is held by the same prime Contractor, so much of the accrued payments or advances as may be considered necessary to pay laborers and mechanics, including apprentices, trainees, and helpers, employed by the Contractor or any subcontractor the full amount of wages required by the contract. In the event of failure to pay any laborer or mechanic, including any apprentice, trainee, or helper, employed or working in the construction or development of the project, all or part of the wages required by the contract, HUD or its designee may, after written notice to the Contractor, take such action as may be necessary to cause the suspension of any further payment, advance, or guarantee of funds until such violations have ceased. HUD or its designee may, after written notice to the Contractor, disburse such amounts withheld for and on account of the Contractor or subcontractor to the respective employees to whom they are due.

(c) Payrolls and basic records.

(1) Payrolls and basic records relating thereto shall be maintained by the Contractor during the course of the work and preserved for a period of three years thereafter for all laborers and mechanics working in the construction or development of the project. Such records shall contain the name, address, and social security number of each such worker, his or her correct classification, hourly rates of wages paid (including rates of contributions or costs anticipated for bona fide fringe benefits or cash equivalents thereof of the types described in section 1(b)(2)(B) of the Davis-Bacon Act), daily and weekly number of hours worked, deductions made, and actual wages paid. Whenever the Secretary of Labor has found, under 29 CFR 5.5(a)(1)(iv), that the wages of any laborer or mechanic include the amount of costs reasonably anticipated in providing benefits under a plan or program described in section 1(b)(2)(B) of the Davis-Bacon Act, the Contractor shall maintain records which show that the commitment to provide such benefits is enforceable, that the plan or program is financially responsible, and that the plan or program has been communicated in writing to the laborers or mechanics affected, and records which show the costs anticipated or the actual cost incurred in providing such benefits. Contractors employing apprentices or trainees under approved programs shall maintain written evidence of the registration of apprenticeship programs and certification of trainee programs, the registration of the apprentices and trainees, and the ratios and wage rates prescribed in the applicable programs.

(2) (i) The Contractor shall submit weekly for each week in which any contract work is performed a copy of all payrolls to the Contracting Officer for transmission to HUD or its designee. The payrolls submitted shall set out accurately and completely all of the information required to be maintained under subparagraph (c)(1) of this clause. This information may be submitted in any form desired. Optional Form WH-347 (Federal Stock Number 029-005-00014-1) is available for this purpose and may be purchased from the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402. The Contractor is responsible for the submission of copies of payrolls by all subcontractors. (Approved by the Office of Management and Budget under OMB Control Number 1214-0149.)

(ii) Each payroll submitted shall be accompanied by a "Statement of Compliance," signed by the Contractor or subcontractor or his or her agent who pays or supervises the payment of the persons employed under the contract and shall certify the following:

- (A) That the payroll for the payroll period contains the information required to be maintained under paragraph (c) (1) of this clause and that such information is correct and complete;
  - (B) That each laborer or mechanic (including each helper, apprentice, and trainee) employed on the contract during the payroll period has been paid the full weekly wages earned, without rebate, either directly or indirectly, and that no deductions have been made either directly or indirectly from the full wages earned, other than permissible deductions as set forth in 29 CFR Part 3; and
  - (C) That each laborer or mechanic has been paid not less than the applicable wage rates and fringe benefits or cash equivalents for the classification of work performed, as specified in the applicable wage determination incorporated into the contract.
- (iii) The weekly submission of a properly executed certification set forth on the reverse side of Optional Form WH-347 shall satisfy the requirements for submission of the "Statement of Compliance" required by subparagraph (c)(2)(ii) of this clause.
- (iv) The falsification of any of the above certifications may subject the Contractor or subcontractor to civil or criminal prosecution under Section 1001 of Title 18 and Section 3729 of Title 31 of the United States Code.

(3) The Contractor or subcontractor shall make the records required under subparagraph (c)(1) available for inspection, copying, or transcription by authorized representatives of HUD or its designee, the Contracting Officer, or the Department of Labor and shall permit such representatives to interview employees during working hours on the job. If the Contractor or subcontractor fails to submit the required records or to make them available, HUD or its designee may, after written notice to the Contractor, take such action as may be necessary to cause the suspension of any further payment, advance, or guarantee of funds. Furthermore, failure to submit the required records upon request or to

make such records available may be grounds for debarment action pursuant to 29 CFR 5.12.

- (d) (1) Apprentices. Apprentices will be permitted to work at less than the predetermined rate for the work they performed when they are employed pursuant to and individually registered in a bona fide apprenticeship program registered with the U.S. Department of Labor, Employment and Training Administration, Office of Apprenticeship and Training, Employer and Labor Services (OATELS), or with a State Apprenticeship Agency recognized by OATELS, or if a person is employed in his or her first 90 days of probationary employment as an apprentice in such an apprenticeship program, who is not individually registered in the program, but who has been certified by OATELS or a State Apprenticeship Agency (where appropriate) to be eligible for probationary employment as an apprentice. The allowable ratio of apprentices to journeymen on the job site in any craft classification shall not be greater than the ratio permitted to the Contractor as to the entire work force under the registered program. Any worker listed on a payroll at an apprentice wage rate, who is not registered or otherwise employed as stated in this paragraph, shall be paid not less than the applicable wage rate on the wage determination for the classification of work actually performed. In addition, any apprentice performing work on the job site in excess of the ratio permitted under the registered program shall be paid not less than the applicable wage rate on the wage determination for the work actually performed. Where a contractor is performing construction on a project in a locality other than that in which its program is registered, the ratios and wage rates (expressed in percentages of the journeyman's hourly rate) specified in the Contractor's or subcontractor's registered program shall be observed. Every apprentice must be paid at not less than the rate specified in the registered program for the apprentice's level of progress, expressed as a percentage of the journeyman hourly rate specified in the applicable wage determination. Apprentices shall be paid fringe benefits in accordance with the provisions of the apprenticeship program. If the apprenticeship program does not specify fringe benefits, apprentices must be paid the full amount of fringe benefits listed on the wage determination for the applicable classification. If the Administrator of the Wage and Hour Division determines that a different practice prevails for the applicable apprentice classification, fringes shall be paid in accordance with that determination. In the event OATELS, or a State Apprenticeship Agency recognized by OATELS, withdraws approval of an apprenticeship program, the Contractor will no longer be permitted to utilize apprentices at less than the applicable predetermined rate for the work performed until an acceptable program is approved.
- (2) Trainees. Except as provided in 29 CFR 5.16, trainees will not be permitted to work at less than the predetermined rate for the work performed unless they are employed pursuant to and individually registered in a program which has received prior approval, evidenced by formal certification by the U.S. Department of Labor, Employment and Training Administration. The ratio of trainees to journeymen on the job site shall not be greater than permitted under

the plan approved by the Employment and Training Administration. Every trainee must be paid at not less than the rate specified in the approved program for the trainee's level of progress, expressed as a percentage of the journeyman hourly rate specified in the applicable wage determination. Trainees shall be paid fringe benefits in accordance with the provisions of the trainee program. If the trainee program does not mention fringe benefits, trainees shall be paid the full amount of fringe benefits listed in the wage determination unless the Administrator of the Wage and Hour Division determines that there is an apprenticeship program associated with the corresponding journeyman wage rate in the wage determination which provides for less than full fringe benefits for apprentices. Any employee listed on the payroll at a trainee rate who is not registered and participating in a training plan approved by the Employment and Training Administration shall be paid not less than the applicable wage rate in the wage determination for the classification of work actually performed. In addition, any trainee performing work on the job site in excess of the ratio permitted under the registered program shall be paid not less than the applicable wage rate in the wage determination for the work actually performed. In the event the Employment and Training Administration withdraws approval of a training program, the Contractor will no longer be permitted to utilize trainees at less than the applicable predetermined rate for the work performed until an acceptable program is approved.

- (3) Equal employment opportunity. The utilization of apprentices, trainees, and journeymen under this clause shall be in conformity with the equal employment opportunity requirements of Executive Order 11246, as amended, and 29 CFR Part 30.
- (e) Compliance with Copeland Act requirements. The Contractor shall comply with the requirements of 29 CFR Part 3, which are hereby incorporated by reference in this contract.
- (f) Contract termination; debarment. A breach of this contract clause may be grounds for termination of the contract and for debarment as a Contractor and a subcontractor as provided in 29 CFR 5.12.
- (g) Compliance with Davis-Bacon and related Act requirements. All rulings and interpretations of the Davis-Bacon and related Acts contained in 29 CFR Parts 1, 3, and 5 are herein incorporated by reference in this contract.
- (h) Disputes concerning labor standards. Disputes arising out of the labor standards provisions of this clause shall not be subject to the general disputes clause of this contract. Such disputes shall be resolved in accordance with the procedures of the Department of Labor set forth in 29 CFR Parts 5, 6, and 7. Disputes within the meaning of this clause include disputes between the Contractor (or any of its subcontractors) and the PHA, HUD, the U.S. Department of Labor, or the employees or their representatives.
- (i) Certification of eligibility.
  - (1) By entering into this contract, the Contractor certifies that neither it (nor he or she) nor any person or firm who has an interest in the Contractor's firm is a person or firm ineligible to be awarded contracts by the United States Government by virtue of section 3(a) of the Davis-Bacon Act or 29 CFR 5.12(a)(1).

- (2) No part of this contract shall be subcontracted to any person or firm ineligible for award of a United States Government contract by virtue of section 3(a) of the Davis-Bacon Act or 29 CFR 5.12(a)(1).
- (3) The penalty for making false statements is prescribed in the U. S. Criminal Code, 18 U.S.C. 1001.
- (j) Contract Work Hours and Safety Standards Act. As used in this paragraph, the terms "laborers" and "mechanics" include watchmen and guards.
  - (1) Overtime requirements. No contractor or subcontractor contracting for any part of the contract work which may require or involve the employment of laborers or mechanics, including watchmen and guards, shall require or permit any such laborer or mechanic in any workweek in which the individual is employed on such work to work in excess of 40 hours in such workweek unless such laborer or mechanic receives compensation at a rate not less than one and one-half times the basic rate of pay for all hours worked in excess of 40 hours in such workweek.
  - (2) Violation; liability for unpaid wages; liquidated damages. In the event of any violation of the provisions set forth in subparagraph (j)(1) of this clause, the Contractor and any subcontractor responsible therefor shall be liable for the unpaid wages. In addition, such Contractor and subcontractor shall be liable to the United States (in the case of work done under contract for the District of Columbia or a territory, to such District or to such territory), for liquidated damages. Such liquidated damages shall be computed with respect to each individual laborer or mechanic (including watchmen and guards) employed in violation of the provisions set forth in subparagraph (j)(1) of this clause, in the sum of \$27 for each calendar day on which such individual was required or permitted to work in excess of the standard workweek of 40 hours without payment of the overtime wages required by provisions set forth in subparagraph (j)(1) of this clause. DOL posts current fines at: <https://www.dol.gov/whd/govcontracts/cwhssa.htm#cmp>
  - (3) Withholding for unpaid wages and liquidated damages. HUD or its designee shall upon its own action or upon written request of an authorized representative of the Department of Labor withhold or cause to be withheld, from any moneys payable on account of work performed by the Contractor or subcontractor under any such contract or any Federal contract with the same prime Contractor, or any other Federally-assisted contract subject to the Contract Work Hours and Safety Standards Act, which is held by the same prime Contractor, such sums as may be determined to be necessary to satisfy any liabilities of such Contractor or subcontractor for unpaid wages and liquidated damages as provided in the provisions set forth in subparagraph (j)(2) of this clause.
- (k) Subcontracts. The Contractor or subcontractor shall insert in any subcontracts all the provisions contained in this clause, and such other clauses as HUD or its designee may by appropriate instructions require, and also a clause requiring the subcontractors to include these provisions in any lower tier subcontracts. The prime Contractor shall be responsible for the compliance by any subcontractor or lower tier subcontractor with all these provisions.

---

47. Non-Federal Prevailing Wage Rates

(a) Any prevailing wage rate (including basic hourly rate and any fringe benefits), determined under State or tribal law to be prevailing, with respect to any employee in any trade or position employed under the contract, is inapplicable to the contract and shall not be enforced against the Contractor or any subcontractor, with respect to employees engaged under the contract whenever such non-Federal prevailing wage rate exceeds:

(1) The applicable wage rate determined by the Secretary of Labor pursuant to the Davis-Bacon Act (40 U.S.C. 3141 et seq.) to be prevailing in the locality with respect to such trade;

(b) An applicable apprentice wage rate based thereon specified in an apprenticeship program registered with the U.S. Department of Labor (DOL) or a DOL-recognized State Apprenticeship Agency; or

(c) An applicable trainee wage rate based thereon specified in a DOL-certified trainee program.

48. Procurement of Recovered Materials.

(a) In accordance with Section 6002 of the Solid Waste Disposal Act, as amended by the Resource Conservation and Recovery Act, the Contractor shall procure items designated in guidelines of the Environmental Protection Agency (EPA) at 40 CFR Part 247 that contain the highest percentage of recovered materials practicable, consistent with maintaining a satisfactory level of competition. The Contractor shall procure items designated in the EPA guidelines that contain the highest percentage of recovered materials practicable unless the Contractor determines that such items: (1) are not reasonably available in a reasonable period of time; (2) fail to meet reasonable performance standards, which shall be determined on the basis of the guidelines of the National Institute of Standards and Technology, if applicable to the item; or (3) are only available at an unreasonable price.

( ) Paragraph (a) of this clause shall apply to items purchased under this contract where: (1) the Contractor purchases in excess of \$10,000 of the item under this contract; or (2) during the preceding Federal fiscal year, the Contractor: (i) purchased any amount of the items for use under a contract that was funded with Federal appropriations and was with a Federal agency or a State agency or agency of a political subdivision of a State; and (ii) purchased a total of in excess of \$10,000 of the item both under and outside that contract.

# OWNER/CONTRACTOR AGREEMENT

**THIS AGREEMENT** made this \_\_\_\_\_ day of \_\_\_\_\_ in the year Two Thousand Twenty Four (2024) by and between:

a corporation organized and existing under laws of the State of Pennsylvania; hereinafter called the 'Contractor', and

**Housing Authority of the City of Lancaster  
325 Church Street  
Lancaster, PA 17602-4201**

hereinafter called the 'LCHA',

**WITNESSETH**, That the contractor and the LCHA for the consideration stated herein mutually agree as follows:

**ARTICLE 1. Statement of Work.** The contractor shall furnish all labor, material, equipment and services, and perform and complete all work required for Lighting Upgrades at Susquehanna Court in strict accordance with the Specifications and Addendum thereto numbered:

all as prepared by Hammel Associates, 25 E. Grant St., #102, Lancaster, PA 17602 and Moore Engineering 3637 Columbia Avenue, Lancaster, PA 17603, which said Specifications and Addenda are incorporated herein by reference and made a part hereof.

**ARTICLE 2. The Contract Price.** The LCHA shall pay the contractor for the performance of the contract, in current funds, subject to additions and deductions as provided in the Specifications, the sum of \_\_\_\_\_ (\$\_\_\_\_\_).

**ARTICLE 3. Contract Documents.** The contract shall consist of the following component parts:

- a. This Instrument
- b. General Conditions
- c. Special Conditions
- d. Project Manual and Technical Specifications
- e. Drawings

**Article 4. Section 3.**

All contractors claiming a preference in contracting by meeting any of the three qualifications including; a Resident Owned Business, Hiring 30% of New Hires and/or Sub-contracting at least 25% of total award to a Section 3 Concern shall maintain that status throughout the life of the contract. Failure to meet this requirement will result in penalties up to and including contract termination.

**Article 5. Davis Bacon Wages**

The applicable wage rates were included in the specification book and are posted onsite. They

are Decision number PA20240092 issued July 19, 2024 (Building).

This instrument, together with the other documents enumerated in this Article 3, which said other documents are as fully a part of the contract as if hereto attached or herein repeated, form the contract. In the event that any provision in any component part of this contract conflicts with any provision of any other component part, the provision of the component part first enumerated in this Article 3 shall govern, except as otherwise specifically stated. The various provisions in Addenda shall be construed in the order of preference of the component part of the contract which each modifies.

**IN WITNESS WHEREOF**, the parties hereto have caused this instrument to be executed in three (2) original counterparts as of the day and year first above written.

ATTEST:

\_\_\_\_\_  
(Contractor)

By: \_\_\_\_\_

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

Business Address:

ATTEST:

HOUSING AUTHORITY  
OF THE CITY OF LANCASTER

\_\_\_\_\_  
Beth Detz, Deputy Director

\_\_\_\_\_  
Barbara J. Wilson  
Executive Director

325 Church Street  
Lancaster, PA 17602-4201

## PERFORMANCE AND MAINTENANCE BOND

*KNOW ALL MEN*, that \_\_\_\_\_ (hereinafter called Principal) and \_\_\_\_\_ a \_\_\_\_\_ Corporation (hereinafter called Surety) are held and firmly bound unto the **HOUSING AUTHORITY OF THE CITY OF LANCASTER** (hereinafter called the obligee) in the sums of \_\_\_\_\_ Dollars (\$ \_\_\_\_\_) for faithful performance of the contract, and \_\_\_\_\_ Dollars (\$ \_\_\_\_\_) for maintenance (both sums in lawful money of the United States of America) to be paid to the Obligee, or its successors or assigns: To the payment of which sums truly to be made, we bind ourselves and each of our respective heirs, legal representatives, successors and assigns, jointly and severally, firmly by these presents, this \_\_\_\_\_ day of \_\_\_\_\_, 2024.

*WHEREAS, THE PRINCIPAL* has entered into a written agreement with the Obligee dated \_\_\_\_\_, 2024, for:

**Contract No.** - \_\_\_\_\_

which, agreement, together with the documents therein described as the contract documents, shall be deemed a part hereof as fully as if set out herein, and shall together be hereinafter referred to as the "Contract".

*AND WHEREAS*, it is one of the conditions of the award of said contract by the Obligee that this bond be executed.

*THEREFORE, THE CONDITION OF THIS OBLIGATION IS SUCH* that if the Principal shall faithfully perform the contract (including any alterations or additions thereto) at the time and in the manner therein provided, and shall indemnify and save harmless the Obligee from any expenses incurred through the Principal's failure to complete the work specified and for any damages growing out of the manner of performance of the contract by the Principal and all subcontractors and his or their servants, then this obligation for faithful performance to be void; but otherwise it shall remain in full force and effect.

And if the Principal shall remedy without cost to the owner any defects which may develop during the period of one (1) year from the date of completion and acceptance of the work performed under said contract, provided, in the judgment of the owner or its successor having jurisdiction in the premises, such defects are caused by defective or inferior materials or workmanship, then this obligation for maintenance shall be void; but otherwise, it shall remain in full force and effect.

The surety, for value received, agrees that no change, extension of time, alteration or addition to the terms of the contract to the work to be performed thereunder or specifications accompanying the same or any other forbearance on the part of either the Obligee or of the Principal to the other shall in any way effect its obligation on this bond; and it hereby waives notice of any such changes, extension of time, alteration, addition, or forbearance.





## LABOR AND MATERIAL PAYMENT BOND

**KNOW ALL MEN**, that \_\_\_\_\_ (hereinafter called Principal) and \_\_\_\_\_ a \_\_\_\_\_ Corporation (hereinafter called Surety) are held and firmly bound unto the **HOUSING AUTHORITY OF THE CITY OF LANCASTER** (hereinafter called the Obligee) in the sums of \_\_\_\_\_ Dollars (\$\_\_\_\_\_) for payment of which we do bind ourselves, our heirs, legal representative, successors and assigns, jointly and severally, firmly by these presents this \_\_\_\_\_ day of \_\_\_\_\_, 2023.

**WHEREAS, THE PRINCIPAL** has entered into a written agreement with the Obligee dated \_\_\_\_\_, 2024, for:

**Contract No.** \_\_\_\_\_

which, agreement, together with the documents therein described as the contract documents, shall be deemed a part hereof as fully as if set forth herein, and shall together be hereinafter referred to as the "Contract".

**AND WHEREAS**, it is one of the conditions of the award of said contract by the Obligee that this bond be executed.

**THEREFORE, THE CONDITION OF THIS OBLIGATION IS SUCH** that if the Principal and all of the Principal's subcontractors to who any portion of the work provided for in said contract is sublet, and all assignees of the Principal, and all assignees of such subcontractors, promptly shall pay, or shall cause to be paid, all monies which may be due for material furnished, labor supplied or performed and equipment rented in the prosecution of the work provided for in said contract in any amendment, extension or addition to said contract, whether or not the same entered into and became component parts of the work or improvements contemplated by said contract, or any amendment, extension or addition or said contract, then this obligation shall be void; but otherwise, this obligation shall remain in full force and effect.

The Surety, for value received, agrees that no change, extension of time, alteration or addition to the terms of the contract or to the work to be performed thereunder or the specifications accompanying the same or any other forbearance on the part of either the Obligee or of the Principal to the other shall in any way affect its obligation on this bond; and it hereby waives notice of any such changes, extension of time, alteration, addition or forbearance.

The Principal and the Surety hereby jointly and severally agree with the Obligee that every person, co-partnership, association or corporation, who whether as subcontractor or otherwise, has furnished material, or has supplies or performed labor, or has furnished equipment, in the prosecution of the work, as above provided, and who has not been paid therefor, may sue in assumpsit on this bond, as though such person, co-partnership, association or corporation were named herein, and may prosecute the same to final judgment for such sum or sums as may be justly due, and may have execution thereon; provided, however, that the Obligee shall not be liable for payment of any costs or expenses of such suit; but any such action or proceeding shall be brought within one (1) year after the time the cause of action accrued, all as provided in Section 10A of the Municipality Authorities Act of 1945, approved May 2, 1945, P.L. 382, as amended, of the Commonwealth of Pennsylvania.



RELEASE OF LIENS

Project:

Location:

Contract Description:

Contract Date:

Contract Number (if applicable):

Contractor:

Commonwealth of Pennsylvania :  
: ss  
County of Lancaster :

The undersigned, \_\_\_\_\_ being duly sworn on oath deposes and says that (he/she) is \_\_\_\_\_ (*title*) of \_\_\_\_\_ (*name of contractor, supplier or materialman*); that (he/she) is duly authorized to and does make this Release of Liens on its behalf for certain work performed by \_\_\_\_\_ (*name of contractor, supplier or materialman*) at the Project described above.

The sworn statement is being made pursuant to the contract (the "Contract") dated between \_\_\_\_\_ (*name of contractor, supplier or materialman*) and the Housing Authority of the City of Lancaster. This payment is for the amount of \$ \_\_\_\_\_.

\_\_\_\_\_ (*name of contractor, supplier or materialman*) hereby certifies that all payments, including retention (which payments made to \_\_\_\_\_ (*name of contractor, supplier or materialman*) have been made under the Contract. This Release is conditioned only upon receipt of payment set forth above.

This also acknowledges that the undersigned has paid all of its subcontractors and materialmen in full for all work performed or materials furnished in connection with the Project in strict compliance with the Contractor and Subcontractor Payment Act and any other applicable laws and regulations.

Furthermore, in consideration of the payment(s) received, \_\_\_\_\_  
(name of contractor, supplier or materialman) does hereby waive, release and relinquish all mechanics' lien claims, right of lien (if any), and all manner of actions, suits, debts, judgments, claims and demands whatsoever in law or in equity, which \_\_\_\_\_  
(name of contractor, supplier or materialman) ever had or may now have upon the Project for all work performed and all materials furnished. The undersigned agrees to indemnify or reimburse all persons so relying upon the Release for any and all sums, including attorney's fees and costs which may be incurred as the result of any claims made by the undersigned and/or its material suppliers, subcontractors or employees, servants, agents or assigns of such persons against the Project.

It is acknowledged that this Release is for the benefit of and may be relied upon the Housing Authority of the City of Lancaster, the general contractor (if different from the contractor, supplier or materialman executing this Release), any construction lenders, and the principal and surety on any labor and material bond for the Project.

\_\_\_\_\_  
(Name of contractor, supplier or materialman)

By: \_\_\_\_\_

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

Sworn to and subscribed before me this \_\_\_\_ day of \_\_\_\_\_, 20\_\_.

\_\_\_\_\_  
Notary Public

## SPECIAL CONDITIONS

1. HUD-5369-A *Representations, Certifications and Other Statements of Bidders* -- The completion and inclusion of this form with the bid **is required**.
2. This contract and the payment terms set forth herein supersede applicable provisions of the *Pennsylvania Contractor and Subcontractor Payment Act of 1994*, if any.

If at any time during the existence of this contract the LCHA, the Contracting Officer or the Architect discover an error in an estimate or invoice submitted by the Contractor or discover that work was not completed according to the specifications or quality standards set forth in the contract (a deficiency), the LCHA, the Contracting Officer or the Architect:

- a. shall notify the Contractor of such error or deficiency; and,
- b. may at any time during the contract withhold any payment to the Contractor (in addition to any retainage permitted under the contract) in an amount equal to 120% of the estimated cost to correct the error or deficiency until such correction is made.

The Contractor shall disclose the payment terms set forth herein and in the contract to each of the Contractor's subcontractors and material suppliers.

3. *Insurance*. In addition to the requirements listed in Paragraph 36 (Page 13 of 22) of the *General Conditions*, please note the following:
  - a. The Housing Authority of the City of Lancaster shall be added as an additional insured to the contractor's Comprehensive General Liability Coverage.
  - b. In addition to the above, the General Contractor will carry Builders Risk insurance for work to be performed on the units at Farnum Street East Towers.
4. *Access to Accounting Records*. The Contractor shall check all materials, equipment and labor entering into the work and shall keep such full and detailed accounts as may be necessary for proper financial management under this Agreement, and the system shall be satisfactory to the Owner. The Owner or its representative shall be afforded access to all the Contractor's records, books, correspondence, instructions, drawings, receipts vouchers, memoranda, and similar data relating to this Contract, and the Contractor shall preserve all such records for a period of three years, or for such longer period as may be required by law, after the final payment. (AIA Document A111-1978, Article 12)
5. *Assignment of Refund Rights*. The Contractor agrees to assign and transfer to the Owner all its rights to sales and use tax which may be refunded as a result of a claim for refund for materials purchased in connection with this contract. The Contractor further agrees that it will not file a claim for refund for any sales or use tax which is the subject of this assignment.
6. *Contracts with Subcontractors*. The Contractor agrees to include the "Access to Accounting Records" and "Assignment of Refund Rights" paragraphs, in full, in any contracts with subcontractors.
7. *Lead Based Paint Certification*. This project is federally-funded through the U.S. Department of Housing & Urban Development (HUD), therefore **all** contractors involved

in any work that impacts lead-based paint shall be certified through the Environmental Protection Agency (EPA) under the Renovation, Repair and Painting (RRP) Rule. After April 22, 2010, federal law requires you to be certified and that you use lead-safe work practices. To become certified, renovation contractors must submit an application and fee payment to the EPA.

## **ADDITIONAL PROVISIONS FOR PENNSYLVANIA AUTHORITIES**

These provisions are cumulative to any related provisions appearing elsewhere in these conditions.

- A. The contractor shall provide, where practicable employers' general liability insurance for the benefit of his employees not protected by the State Workmen's Compensation Laws.

In compliance with the foregoing, the contractor shall accept, insofar as the work covered by this contract is concerned, the provisions of the Workmen's Compensation Act of 1915, and any supplements or amendments thereto, and he will insure his liability thereunder or file with the Authority a Certificate of Exemption from insurance from the Bureau of Workmen's Compensation of the Department of Labor and Industry

- B. None but citizens of the United States shall be employed in any capacity under this contract, provided, that this restriction shall not apply to apprentices to a trade or profession who may be under twenty-one (21) years of age.
- C. The contractor agrees that in the hiring of employees for the performance of work under this contract or any subcontract hereunder, that neither the contractor nor any subcontractor, nor any person acting on behalf of such contractor or such subcontractor, shall by reason of race, creed or color discriminate against any citizen of the Commonwealth of Pennsylvania who is qualified and available to perform the work to which the employment relates.
- D. Neither the contractor, nor any subcontractor, nor any person on his behalf, shall in any manner, discriminate against or intimidate any employee hired for the performance or work under this contract on account of race, creed, or color.
- E. This contract may be canceled or terminated by the Authority and all money due, or to become due hereunder may be forfeited for a second or any subsequent violation of the terms or conditions of subsections d. and e. of this section.
- F. The contractor shall promptly pay for all material furnished, labor supplied or performed, rental for equipment employed and services rendered by public utilities in or in connection with the prosecution of the work whether or not the said material, labor, equipment or service enter into and become component parts of the work or improvement contemplated. This provision shall be deemed to be included for the benefit of every person, co-partnership, association or corporation who as subcontractor or otherwise, has furnished materials supplied or performed labor, rented equipment or services in or in connection with the prosecution of the work as aforesaid and the inclusion thereof in this contract shall preclude the filing by any person, co-partnership, association or corporation of any mechanic's lien claim for such material, labor or rental of equipment.
- G. The contractor must be currently licensed to do business in Pennsylvania and must provide written evidence of recent, similar job experience within the Commonwealth of Pennsylvania. They must also be registered with the Attorney General's Office and a registration number must be supplied to the Lancaster City Housing Authority.

**CERTIFICATION REGARDING DEBARMENT, SUSPENSION,  
INELIGIBILITY AND  
VOLUNTARY EXCLUSION**

**-- LOWER TIER COVERED TRANSACTIONS --**

*Instructions for Certification*

1. By signing and submitting this proposal, the prospective lower tier participant is providing the certification set out below.
2. The certification in this clause is a material representation of fact upon which reliance was placed when this transaction was entered into. If it is later determined that the prospective lower tier participant knowingly rendered an erroneous certification, in addition to other remedies available to the Federal Government, the department or agency with which this transaction originated may pursue available remedies, including suspension and/or debarment.
3. The prospective lower tier participant shall provide immediate written notice to the person to which this proposal is submitted if at any time the prospective lower tier participant learns that its certification was erroneous when submitted or has become erroneous by reason of changed circumstances.
4. The terms "covered transaction," "debarred," "suspended," "ineligible," "lower tier covered transaction," "participant," "person," "primary covered transaction," "principal," "proposal," and "voluntarily excluded," as used in this clause, have the meanings set out in the Definitions and Coverage sections of rules implementing Executive Order 12549. You may contact the person to which this proposal is submitted for assistance in obtaining a copy of those regulations.
5. The prospective lower tier participant agrees by submitting this proposal that, should the proposed covered transaction be entered into, it shall not knowingly enter into any lower tier covered transaction with a person who is debarred, suspended, declared ineligible, or voluntarily excluded from participation in this covered transaction, unless authorized by the department or agency with which this transaction originated.
6. The prospective lower tier participant further agrees by submitting this proposal that it will include this clause titled "Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion - Lower Tier Covered Transaction," without modification, in all lower tier covered transactions and in all solicitations for lower tier covered transactions.
7. A participant in a covered transaction may rely upon a certification of a prospective participant in a lower tier covered transaction that it is not debarred, suspended, ineligible, or voluntarily excluded from the covered transaction, unless it knows that the certification is erroneous. A participant may decide the method and frequency by which it determines the eligibility of its principals. Each participant may, but is not required to, check the Nonprocurement List (Tel. 202-501-3566 or 202-501-4740).
8. Nothing contained in the foregoing shall be construed to require establishment of a system of records in order to render in good faith the certification required by this clause. The knowledge and information of a participant is not required to exceed that which is normally possessed by a prudent person in the ordinary course of business dealings.



9. Except for transactions authorized under paragraph 5 of these instructions, if a participant in a covered transaction knowingly enters into a lower tier covered transaction with a person who is suspended, debarred, ineligible, or voluntarily excluded from participation in this transaction, in addition to other remedies available to the Federal Government, the department or agency with which this transaction originated may pursue available remedies, including suspension and/or debarment.

\_\_\_\_\_, the prospective lower tier participant certifies, by submission of this proposal, that neither it nor its principals is presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from participation in this transaction by any Federal department or agency.

**NOTE:** Where the prospective lower tier participant is unable to certify to any of the statements in this certification, such prospective participant shall attach an explanation to this proposal.

Explanation Attached? \_\_\_\_\_ YES \_\_\_\_\_ NO

\_\_\_\_\_  
Signature

\_\_\_\_\_  
Name Printed/Typed

\_\_\_\_\_  
Date

\_\_\_\_\_  
Firm Name

\_\_\_\_\_  
Address/City/State/Zip

# **FEDERAL WAGE RATE DETERMINATIONS**

*The Schedule of Occupation Classifications  
and Minimum Hourly Wage Rates*  
as required under the scope of this contract  
are included herewith.

"General Decision Number: PA20240092 07/19/2024

Superseded General Decision Number: PA20230092

State: Pennsylvania

Construction Type: Building

County: Lancaster County in Pennsylvania.

BUILDING CONSTRUCTION PROJECTS (does not include single family homes or apartments up to and including 4 stories).

Note: Contracts subject to the Davis-Bacon Act are generally required to pay at least the applicable minimum wage rate required under Executive Order 14026 or Executive Order 13658. Please note that these Executive Orders apply to covered contracts entered into by the federal government that are subject to the Davis-Bacon Act itself, but do not apply to contracts subject only to the Davis-Bacon Related Acts, including those set forth at 29 CFR 5.1(a)(1).

If the contract is entered into on or after January 30, 2022, or the contract is renewed or extended (e.g., an option is exercised) on or after January 30, 2022:	. Executive Order 14026 generally applies to the contract.  . The contractor must pay all covered workers at least \$17.20 per hour (or the applicable wage rate listed on this wage determination, if it is higher) for all hours spent performing on the contract in 2024.
If the contract was awarded on or between January 1, 2015 and January 29, 2022, and the contract is not renewed or extended on or after January 30, 2022:	. Executive Order 13658 generally applies to the contract.  . The contractor must pay all covered workers at least \$12.90 per hour (or the applicable wage rate listed on this wage determination, if it is higher) for all hours spent performing on that contract in 2024.

The applicable Executive Order minimum wage rate will be adjusted annually. If this contract is covered by one of the Executive Orders and a classification considered necessary for performance of work on the contract does not appear on this wage determination, the contractor must still submit a conformance request.

Additional information on contractor requirements and worker

protections under the Executive Orders is available at  
<http://www.dol.gov/whd/govcontracts>.

Modification Number	Publication Date
0	01/05/2024
1	01/12/2024
2	02/23/2024
3	04/05/2024
4	05/03/2024
5	05/17/2024
6	06/07/2024
7	07/12/2024
8	07/19/2024

ASBE0023-007 06/26/2023

	Rates	Fringes
ASBESTOS WORKER/HEAT & FROST INSULATOR - MECHANICAL (Duct, Pipe & Mechanical System Insulation) (Asbestos Abatement, Removal from Mechanical Systems Only).....	\$ 38.70	29.06

BOIL0013-008 01/01/2024

	Rates	Fringes
BOILERMAKER.....	\$ 52.10	35.38

BRPA0005-062 05/03/2020

	Rates	Fringes
BRICKLAYER (Including Pointing, Caulking, and Cleaning).....	\$ 33.99	16.87

CARP0274-004 05/01/2024

	Rates	Fringes
PILEDRIVERMAN.....	\$ 36.12	19.79

CARP0287-013 06/01/2023

	Rates	Fringes
CARPENTER (Includes Drywall Hanging, Metal Stud Installation, Form Work and Scaffold Building; Excludes Acoustical Ceiling Installation).....	\$ 33.27	19.31

ELEC0743-015 09/01/2023

	Rates	Fringes
ELECTRICIAN (Includes Alarm Installation, Installation of Sound and Communication Systems, and Low Voltage Wiring).....	\$ 42.52	24.83

ELEV0059-004 01/01/2024

	Rates	Fringes
ELEVATOR MECHANIC.....	\$ 56.26	37.885+a+b

FOOTNOTES:

A. Employer contributes 8% of basic hourly rate for 5 years or more of service as vacation pay credit, and 6% of basic hourly rate for less than 5 years of service.

B. Eight Paid Holidays (provided employee has worked 5 consecutive days before and the working day after the holiday): New Years's Day; Memorial Day; Independence Day; Labor Day; Veterans' Day; Thanksgiving Day and the Friday after Thanksgiving Day, and Christmas Day.

ENGI0066-044 07/01/2014

	Rates	Fringes
POWER EQUIPMENT OPERATOR		
Mechanic.....	\$ 28.37	15.66
Pump.....	\$ 25.20	15.66

ENGI0542-032 05/01/2023

	Rates	Fringes
POWER EQUIPMENT OPERATOR		
Crane.....	\$ 44.82	29.90
Hoist (Single Drum), Forklift (under 20 ft., excludes masonry work).....	\$ 39.57	28.34
Hoist (With Two Towers), Forklift (20 ft and over, excludes masonry work).....	\$ 42.29	29.15
Oiler.....	\$ 37.10	27.62

IRON0404-019 07/01/2023

	Rates	Fringes
IRONWORKER.....	\$ 36.26	31.38

\* LABO0373-001 01/01/2024

	Rates	Fringes
LABORER (Asbestos Abatement (Removal from Floors, Walls, and Ceilings)).....	\$ 26.97	19.39

LABO1180-013 05/01/2024

	Rates	Fringes
LABORER		
Concrete Worker; Concrete Saw (Walk Behind/Hand Held) ..	\$ 25.01	19.48
Forklift (Masonry Work Only).....	\$ 28.52	19.48
Jack Hammer; Mason Tender- Brick.....	\$ 27.02	19.48

LABO1180-020 05/01/2022

	Rates	Fringes
LABORER (Common or General).....	\$ 23.01	17.18

PAIN0057-036 06/01/2014

	Rates	Fringes
PAINTER (Spray Only).....	\$ 26.98	15.65

PAIN0411-005 05/01/2021

	Rates	Fringes
PAINTER: Brush and Roller Only...	\$ 25.84	16.30

PLUM0520-020 05/01/2023

	Rates	Fringes
PLUMBER.....	\$ 41.36	29.45

PLUM0520-021 05/01/2023

	Rates	Fringes
PIPEFITTER (Includes HVAC Pipe and HVAC Unit Installation).....	\$ 41.36	29.45

SFPA0669-004 04/01/2024

	Rates	Fringes
SPRINKLER FITTER (Fire		

Sprinklers).....\$ 46.45 28.37

-----  
SHEE0019-015 06/01/2024

	Rates	Fringes
SHEET METAL WORKER (Includes HVAC Duct Installation).....\$ 43.09		42.52

FOOTNOTE: Paid Holiday: Election Day

-----  
\* UAVG-PA-0016 01/01/2023

	Rates	Fringes
OPERATOR: Bulldozer.....\$ 37.85		22.72

-----  
\* SUPA2011-050 08/20/2014

	Rates	Fringes
CARPENTER (Acoustical Ceiling Installation Only).....\$ 37.73		4.59

CARPENTER, Excludes  
Acoustical Ceiling  
Installation, Drywall Hanging  
and Metal Stud Installation,  
Form Work, and Scaffold  
Building.....\$ 25.71 10.17

CEMENT MASON/CONCRETE FINISHER...\$ 35.46 5.50

FLOOR LAYER: Carpet Only.....\$ 18.78 5.02

FLOOR LAYER: Hardwood Floors  
Only.....\$ 26.91 11.88

FLOOR LAYER: Vinyl Flooring  
Only.....\$ 19.71 5.94

GLAZIER.....\$ 20.19 6.92

HVAC MECHANIC (HVAC  
Temperature Controls  
Installation Only).....\$ 22.00 6.18

LABORER: Landscape.....\$ 10.04 \*\* 0.00

LABORER: Mason Tender -  
Cement/Concrete.....\$ 26.17 4.88

MILLWRIGHT.....\$ 28.48 12.65

OPERATOR:  
Backhoe/Excavator/Trackhoe.....\$ 22.00 5.87

OPERATOR: Bobcat/Skid Steer/Skid Loader.....	\$ 24.14	13.55
OPERATOR: Drill.....	\$ 25.58	17.07
OPERATOR: Gradall.....	\$ 32.70	18.43
OPERATOR: Grader/Blade.....	\$ 32.51	17.98
OPERATOR: Loader.....	\$ 27.05	14.52
OPERATOR: Paver (Asphalt, Aggregate, and Concrete).....	\$ 30.39	15.05
OPERATOR: Roller.....	\$ 30.39	13.72
ROOFER, Excludes Waterproofing...	\$ 16.76 **	3.90
ROOFER: Waterproofing Only.....	\$ 28.60	18.02
TILE FINISHER.....	\$ 21.86	10.35
TILE SETTER.....	\$ 24.95	13.91
TRUCK DRIVER: Dump Truck.....	\$ 19.77	5.02

---

WELDERS - Receive rate prescribed for craft performing operation to which welding is incidental.

=====

\*\* Workers in this classification may be entitled to a higher minimum wage under Executive Order 14026 (\$17.20) or 13658 (\$12.90). Please see the Note at the top of the wage determination for more information. Please also note that the minimum wage requirements of Executive Order 14026 are not currently being enforced as to any contract or subcontract to which the states of Texas, Louisiana, or Mississippi, including their agencies, are a party.

Note: Executive Order (EO) 13706, Establishing Paid Sick Leave for Federal Contractors applies to all contracts subject to the Davis-Bacon Act for which the contract is awarded (and any solicitation was issued) on or after January 1, 2017. If this contract is covered by the EO, the contractor must provide employees with 1 hour of paid sick leave for every 30 hours they work, up to 56 hours of paid sick leave each year. Employees must be permitted to use paid sick leave for their own illness, injury or other health-related needs, including preventive care; to assist a family member (or person who is like family to the employee) who is ill, injured, or has other health-related needs, including preventive care; or for reasons resulting from, or to assist a family member (or person who is like family to the employee) who is a victim of, domestic violence, sexual assault, or stalking. Additional information on contractor requirements and worker protections under the EO



is available at  
<https://www.dol.gov/agencies/whd/government-contracts>.

Unlisted classifications needed for work not included within the scope of the classifications listed may be added after award only as provided in the labor standards contract clauses (29CFR 5.5 (a) (1) (iii)).

---

The body of each wage determination lists the classification and wage rates that have been found to be prevailing for the cited type(s) of construction in the area covered by the wage determination. The classifications are listed in alphabetical order of "identifiers" that indicate whether the particular rate is a union rate (current union negotiated rate for local), a survey rate (weighted average rate) or a union average rate (weighted union average rate).

#### Union Rate Identifiers

A four letter classification abbreviation identifier enclosed in dotted lines beginning with characters other than "SU" or "UAVG" denotes that the union classification and rate were prevailing for that classification in the survey. Example: PLUM0198-005 07/01/2014. PLUM is an abbreviation identifier of the union which prevailed in the survey for this classification, which in this example would be Plumbers. 0198 indicates the local union number or district council number where applicable, i.e., Plumbers Local 0198. The next number, 005 in the example, is an internal number used in processing the wage determination. 07/01/2014 is the effective date of the most current negotiated rate, which in this example is July 1, 2014.

Union prevailing wage rates are updated to reflect all rate changes in the collective bargaining agreement (CBA) governing this classification and rate.

#### Survey Rate Identifiers

Classifications listed under the "SU" identifier indicate that no one rate prevailed for this classification in the survey and the published rate is derived by computing a weighted average rate based on all the rates reported in the survey for that classification. As this weighted average rate includes all rates reported in the survey, it may include both union and non-union rates. Example: SULA2012-007 5/13/2014. SU indicates the rates are survey rates based on a weighted average calculation of rates and are not majority rates. LA indicates the State of Louisiana. 2012 is the year of survey on which these classifications and rates are based. The next number, 007 in the example, is an internal number used in producing the wage determination. 5/13/2014 indicates the survey completion date for the classifications and rates under that identifier.

Survey wage rates are not updated and remain in effect until a new survey is conducted.

#### Union Average Rate Identifiers

Classification(s) listed under the UAVG identifier indicate that no single majority rate prevailed for those classifications; however, 100% of the data reported for the classifications was union data. EXAMPLE: UAVG-OH-0010 08/29/2014. UAVG indicates that the rate is a weighted union average rate. OH indicates the state. The next number, 0010 in the example, is an internal number used in producing the wage determination. 08/29/2014 indicates the survey completion date for the classifications and rates under that identifier.

A UAVG rate will be updated once a year, usually in January of each year, to reflect a weighted average of the current negotiated/CBA rate of the union locals from which the rate is based.

#### State Adopted Rate Identifiers

Classifications listed under the "SA" identifier indicate that the prevailing wage rate set by a state (or local) government was adopted under 29 C.F.R. 1.3(g)-(h). Example: SAME2023-007 01/03/2024. SA reflects that the rates are state adopted. ME refers to the State of Maine. 2023 is the year during which the state completed the survey on which the listed classifications and rates are based. The next number, 007 in the example, is an internal number used in producing the wage determination. 01/03/2024 reflects the date on which the classifications and rates under the ?SA? identifier took effect under state law in the state from which the rates were adopted.

---

#### WAGE DETERMINATION APPEALS PROCESS

1.) Has there been an initial decision in the matter? This can be:

- \* an existing published wage determination
- \* a survey underlying a wage determination
- \* a Wage and Hour Division letter setting forth a position on a wage determination matter
- \* a conformance (additional classification and rate) ruling

On survey related matters, initial contact, including requests for summaries of surveys, should be with the Wage and Hour National Office because National Office has responsibility for the Davis-Bacon survey program. If the response from this initial contact is not satisfactory, then the process described in 2.) and 3.) should be followed.

With regard to any other matter not yet ripe for the formal process described here, initial contact should be with the

Branch of Construction Wage Determinations. Write to:

Branch of Construction Wage Determinations  
Wage and Hour Division  
U.S. Department of Labor  
200 Constitution Avenue, N.W.  
Washington, DC 20210

2.) If the answer to the question in 1.) is yes, then an interested party (those affected by the action) can request review and reconsideration from the Wage and Hour Administrator (See 29 CFR Part 1.8 and 29 CFR Part 7). Write to:

Wage and Hour Administrator  
U.S. Department of Labor  
200 Constitution Avenue, N.W.  
Washington, DC 20210

The request should be accompanied by a full statement of the interested party's position and by any information (wage payment data, project description, area practice material, etc.) that the requestor considers relevant to the issue.

3.) If the decision of the Administrator is not favorable, an interested party may appeal directly to the Administrative Review Board (formerly the Wage Appeals Board). Write to:

Administrative Review Board  
U.S. Department of Labor  
200 Constitution Avenue, N.W.  
Washington, DC 20210

4.) All decisions by the Administrative Review Board are final.

=====  
END OF GENERAL DECISION"

## CHANGE ORDER PROCEDURES

1. The combined overhead and profit described in document HUD-5370, subparagraph 29(f)(3) included in the total cost to the Owner of a change in the Work shall be based on the following schedule:
  - .1 For the Contractor, for Work performed by the Contractor's own forces, 10 percent of the cost.
  - .2 For the Contractor, for Work performed by the Contractor's Subcontractors, 10 percent of the amount due the Subcontractors.
  - .3 For each Subcontractor involved, for Work performed by that Subcontractor's own forces, 10 percent of the cost.
  - .4 For each Subcontractor involved, for Work performed by the Subcontractor's Sub-subcontractors, 10 percent of the amount due the Sub-subcontractor.
  - .5 Cost to which overhead and profit is to be applied shall be determined in accordance with document HUD-5370, Subparagraph 29(f).
  - .6 No other costs or mark-ups will be allowed or accepted
  - .7 The only time a supervision cost for changes are allowed is if it is warranted and additional supervision is required for the change. If the change does not require additional supervision time or additional supervision staff, supervision time is not allowed to be invoiced as part of the costs.
  - .8 Any costs for Contractor's corporate overhead, insurance, bonds, corporate staff such as project management, estimating, design, engineering or CAD staff costs are part of the 10 % overhead allowed. None of these costs are to be included in the cost of the change. They are to be a part of the overhead percentage.
  - .9 In order to facilitate checking of quotations for extras or credits, all proposals, except those so minor that their propriety can be seen by inspection, shall be accompanied by a complete itemization of costs including labor, materials and Subcontracts. Labor and materials shall be itemized in the manner prescribed above. Where major cost items are Subcontracts, they shall be itemized also. In no case will a change involving over \$1,000.00 be approved without such itemization.
  - .10 Hourly rates shall be based on the Federal Wage Rate Determination included in the Project Manual, unless alternate rates were submitted with the bid, approved by the Contracting Officer (LCHA) and included in the Contract.

## SECTION 011000 - SUMMARY

### PART 1 - GENERAL

#### 1.1 SUMMARY

##### A. Section Includes:

1. Project information.
2. Work covered by Contract Documents.
3. Contractor's use of site and premises.
4. Coordination with occupants.
5. Work restrictions.
6. Specification and Drawing conventions.

##### B. Related Requirements:

1. Section 015000 "Temporary Facilities and Controls" for limitations and procedures governing temporary use of Owner's facilities.

#### 1.2 PROJECT INFORMATION

##### A. Project Identification: Farnum Street Switchboard and Service Upgrade for the Lancaster City Housing Authority

1. Project Location: Farnum Street East, located at 33 East Farnum Street, Lancaster, PA.

##### B. Owner: Lancaster City Housing Authority, 325 Church Street, Lancaster, PA

1. Owner's Representative: Barbara J. Wilson, Executive Director.

##### C. Architect: Hammel Associates Architects, LLC, 25 East Grant Street, Suite 102, Lancaster, PA 17602.

##### D. Electrical Engineer: Moore Engineering Company, 3637 Columbia Avenue, Lancaster, PA 17603.

#### 1.3 WORK COVERED BY CONTRACT DOCUMENTS

##### A. The Work of Project is defined by the Contract Documents and consists of the following:

1. The work includes, but is not limited to demolition of existing window, demolition of existing masonry, installation of new hollow metal doors and frames, demolition of existing electrical switchboard and installation of new electrical switchboard and associated feeders, and provision of temporary power for interruptions of electrical power and interruptions of fire pump service, all systems complete and ready for use.

2. Type of Contract:
3. Project will be constructed under Single Prime Contracts, including the following:
  - a. Electrical Construction Contract

#### 1.4 PROJECT SCHEDULE AND COORDINATION WITH OWNER

- A. The intent for schedule and progress of work is as follows:
  1. All work must be substantially complete within 460 days of the issuance of the Notice to Proceed.
  2. Prior to commencement of work, the Contractor is to submit a construction schedule in accordance with section 013200 for the proposed sequence of work. Contractor is required to provide adequate resources, including but not limited to additional manpower, overtime work, second shift work and weekend work, as needed to meet approved schedule at no additional cost to the Owner.

#### 1.5 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 and as indicated by requirements of this Section.
- 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, parking areas, 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.
- 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.

#### 1.6 COORDINATION WITH OCCUPANTS

- A. Full Owner Occupancy: Owner will occupy site and existing 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.
- B. The owner will coordinate issues concerning occupied units including tenant notification, and relocation of stored items as required to allow the contractor to perform contracted work. The contractor will provide written notification to the respective building manager (5) five working days in advance of the scheduled date of work to be performed, or 14 days in advance of any

utility shutdown. No contractor will proceed with work until written notification to proceed is received from Owner.

- C. Contractor is required to provide temporary power as specified in section 015000, 3.3.

## 1.7 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 in the existing building to normal business working hours of 8:00 a.m. to 4:30 p.m., Monday through Friday, unless otherwise indicated. No work may be completed in occupied units before 9:00 a.m.
- C. No onsite work is permitted on federal holidays, when the Owner is closed for business.
- D. Existing Utility Interruptions: Do not interrupt utilities serving facilities occupied by Owner or others unless permitted under the following conditions and then only after providing 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.
  - 3. Provide temporary power as specified in section 015000, 3.3.
- E. 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 two days in advance of proposed disruptive operations.
  - 2. Obtain Owner's written permission before proceeding with disruptive operations.
- F. Smoking and Controlled Substance Restrictions: Use of tobacco products, alcoholic beverages, and other controlled substances on Owner's property is not permitted.
- G. Employee Identification: Provide identification tags for Contractor personnel working on Project site. Require personnel to use identification tags at all times.

## 1.8 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.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 011000



## SECTION 012300 - ALTERNATES

### PART 1 - GENERAL

#### 1.1 SUMMARY

- A. Section includes administrative and procedural requirements for alternates.

#### 1.2 DEFINITIONS

- A. Alternate: An amount proposed by bidders and stated on the Bid Form for certain work defined in the bidding requirements that may be added to or deducted from the base bid amount if the Owner decides to accept a corresponding change either in the amount of construction to be completed or in the products, materials, equipment, systems, or installation methods described in the Contract Documents.
  - 1. Alternates described in this Section are part of the Work only if enumerated in the Agreement.
  - 2. The cost or credit for each alternate is the net addition to or deduction from the Contract Sum to incorporate alternates into the Work. No other adjustments are made to the Contract Sum.

#### 1.3 PROCEDURES

- A. Coordination: Revise or adjust affected adjacent work as necessary to completely integrate work of the alternate into Project.
  - 1. Include as part of each alternate, miscellaneous devices, accessory objects, and similar items incidental to or required for a complete installation whether or not indicated as part of alternate.
- B. Execute accepted alternates under the same conditions as other work of the Contract.

### PART 2 - PRODUCTS (Not Used)

### PART 3 - EXECUTION

#### 3.1 SCHEDULE OF ALTERNATES

- A. See Schedule of Alternates on drawing CS1.1

END OF SECTION 012300

## SECTION 012500 - SUBSTITUTION PROCEDURES

### PART 1 - GENERAL

#### 1.1 RELATED REQUIREMENTS:

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

#### 1.2 SUMMARY

- A. Section includes administrative and procedural requirements for substitutions.
- B. Related Requirements:
  - 1. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Specification Sections, apply to this section.

#### 1.3 DEFINITIONS

- A. Substitutions: Changes in products, materials, equipment, and methods of construction from those required by the Contract Documents and proposed by Contractor.
  - 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 in order to meet other Project requirements but may offer advantage to Contractor or Owner.

#### 1.4 ACTION SUBMITTALS

- A. Substitution Requests: Submit three copies of each request for consideration. Identify product or fabrication or installation method to be replaced. Include Specification Section number and title and Drawing numbers and titles.
  - 1. Documentation: Show compliance with requirements for substitutions and the following, as applicable:
    - a. Statement indicating why specified product or fabrication or installation cannot be provided, if applicable.

- b. Coordination information that will be necessary to accommodate proposed substitution, including a list of changes or revisions needed to other parts of the Work and to construction performed by Owner and separate contractors.
  - c. Detailed comparison of significant qualities of proposed substitution 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 effect, 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. Material test reports from a qualified testing agency indicating and interpreting test results for compliance with requirements indicated.
  - h. Detailed comparison of Contractor's construction schedule using proposed substitution 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.
  - i. Cost information, including a proposal of change, if any, in the Contract Sum.
  - j. 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.
  - k. 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.
2. 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 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.

## PART 2 - PRODUCTS

### 2.1 SUBSTITUTIONS

- A. Any and all proposed substitutions of materials or methods of execution must be approved by the Engineer prior to submission of the Bid.
- B. 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 of 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.
- C. Substitutions for Convenience:
  - 1. Not allowed unless proposed substitution meets all conditions outlined in this Section below.
  - 2. Engineer will consider requests for substitution if received during the bid period only. Requests received after that time may be considered or rejected at discretion of Engineer.
  - 3. 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 of 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 3 - EXECUTION (Not Used)

END OF SECTION 012500

**Substitution Submittal Request Form**

<b>Contractor:</b>	
<b>Date:</b>	
<b>Substitution Request No:</b>	

<b>Reason for Request:</b>	
<input type="checkbox"/> <b>CAUSE</b> – submitted 15 days prior to related submittals	<input type="checkbox"/> <b>CONVENIENCE</b> – submitted within 60 days after commencement of work
<b>Reason for not providing specified item:</b>	

<b>Specification Title:</b>	
<b>Description:</b>	
<b>Section:</b>	
<b>Page:</b>	
<b>Article/Paragraph:</b>	
<b>Drawing No/Titles:</b>	

<b>Proposed Substitution:</b>	
<b>Manufacturer:</b>	
<b>Trade Name:</b>	
<b>Model No.:</b>	
<b>Warranty:</b>	
<b>Installer:</b>	
<b>Differences between proposed substitution and specified product:</b>	
<b>Proposed substitution affects other parts of Work:</b>	<input type="checkbox"/> No <input type="checkbox"/> Yes, explain:

<input type="checkbox"/> <b>Point-by-point Comparative Data attached – REQUIRED</b> Include chart providing line by line comparison of key product attributes. Significant qualities may include attributes such as performance, weight, size, durability, visual effect, sustainable design characteristics, warranties, and specific features and requirements.
--

<b>Cost Savings to Owner:</b>	\$
<b>Changes to Contract Time:</b>	<input type="checkbox"/> No <input type="checkbox"/> Yes [Add] [Deduct] _____ days

<b>Supporting Documents Attached:</b>	<input type="checkbox"/> Coordination Information (including list of changes/revisions to other work) <input type="checkbox"/> Product Data <input type="checkbox"/> Drawings <input type="checkbox"/> Samples <input type="checkbox"/> Tests <input type="checkbox"/> Reports <input type="checkbox"/> Certificates <input type="checkbox"/> _____
---------------------------------------	--

The Undersigned certifies:

- Proposed substitution has been fully investigated and determined to be equal or superior in all respects to specified product.
- Same warranty will be furnished for proposed substitution as for specified product.
- Same maintenance service and source of replacement parts, as applicable, are available.
- Proposed substitution will have no adverse effect on other trades.
- Proposed substitution does not affect dimensions and functional clearances.
- No additional costs will be incurred for changes to building design, including A/E design, detailing, and construction costs caused by the substitution.

Submitted by: \_\_\_\_\_

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

## SECTION 012600 - CONTRACT MODIFICATION PROCEDURES

### PART 1 - GENERAL

#### 1.1 RELATED REQUIREMENTS:

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

#### 1.2 SUMMARY

- A. Section includes administrative and procedural requirements for handling and processing Contract modifications.

#### 1.3 MINOR CHANGES IN THE WORK

- A. Architect will issue supplemental instructions authorizing minor changes in the Work, not involving adjustment to the Contract Sum or the Contract Time, on the Architect's standard form: "Architect's Supplemental Instructions."

#### 1.4 PROPOSAL REQUESTS

- A. Owner-Initiated Proposal Requests: Architect 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. Proposal Requests issued by Architect are not instructions either to stop work in progress or to execute the proposed change.
  - 2. Within time specified in Proposal Request or 10 days, when not otherwise specified, 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 Contractor's standard forms acceptable to Architect.

B. Contractor-Initiated Proposal Requests: If latent or changed conditions require modifications to the Contract, Contractor may initiate a claim by submitting a request for a change to Architect.

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 Division 01 Section "Substitution Procedures" if the proposed change requires substitution of one product or system for product or system specified.
7. Work Change Proposal Request Form: Use Contractor's standard form acceptable to Architect.

#### 1.5 ADMINISTRATIVE CHANGE ORDERS

- A. Allowance Adjustment: See Division 01 Section "Allowances" for administrative procedures for preparation of Change Order Proposal for adjusting the Contract Sum to reflect actual costs of allowances.
- B. Unit-Price Adjustment: See Division 01 Section "Unit Prices" for administrative procedures for preparation of Change Order Proposal for adjusting the Contract Sum to reflect measured scope of unit-price work.

#### 1.6 CHANGE ORDER PROCEDURES

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

#### 1.7 CONSTRUCTION CHANGE DIRECTIVE

- A. Construction Change Directive: Architect 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.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 012600

## SECTION 012900 - PAYMENT PROCEDURES

### PART 1 - GENERAL

#### 1.1 RELATED REQUIREMENTS:

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

#### 1.2 SUMMARY

- A. Section includes administrative and procedural requirements necessary to prepare and process Applications for Payment.

#### 1.3 RELATED DOCUMENTS

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

#### 1.4 SCHEDULE OF VALUES

- A. Coordination: Coordinate preparation of the schedule of values with preparation of Contractor's construction schedule.
  - 1. Coordinate line items in the schedule of values with other required administrative forms and schedules, including the following:
    - a. Application for Payment forms with continuation sheets.
    - b. Submittal schedule.
    - c. Items required to be indicated as separate activities in Contractor's construction schedule.
  - 2. Submit the schedule of values to Engineer at earliest possible date but no later than seven days before the date scheduled for submittal of initial Applications for Payment.
  - 3. Sub-schedules for Phased Work: Where the Work is separated into phases requiring separately-phased payments, provide sub-schedules 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. Name of Engineer.
  - c. Engineer's project number.
  - d. Contractor's name and address.
  - e. Date of submittal.
2. Arrange schedule of values consistent with format of the HUD Form-51000, Schedule of Amounts for Contract Payments.
  3. Provide a breakdown of the Contract Sum in enough detail to facilitate continued evaluation of Applications for Payment and progress reports. Coordinate with Project Manual table of contents. Provide multiple line items for principal subcontract amounts in excess of five percent of the Contract Sum.
  4. Round amounts to nearest whole dollar; total shall equal 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.
  6. Provide separate line items in the schedule of values for initial cost of materials, for each subsequent stage of completion, and for total installed value of that part of the Work.
  7. Allowances: Provide a separate line item in the schedule of values for each allowance. Show line-item value of unit-cost allowances, as a product of the unit cost, multiplied by measured quantity. Use information indicated in the Contract Documents to determine quantities.
  8. Each item in the schedule of values and Applications for Payment shall be complete. Include total cost and proportionate share of general overhead and profit for each item.
    - a. Temporary facilities and other major cost items that are not direct cost of actual work-in-place may be shown either as separate line items in the schedule of values or distributed as general overhead expense, at Contractor's option.
  9. Schedule Updating: Update and resubmit the schedule of values before the next Applications for Payment when Change Orders or Construction Change Directives result in a change in the Contract Sum.

#### 1.5 APPLICATIONS FOR PAYMENT

- A. Each Application for Payment shall be consistent with previous applications and payments as certified by Engineer and paid for by Owner.
  1. Initial Application for Payment, Application for Payment at time of Substantial Completion, and final Application for Payment involve additional requirements.
- B. Payment Application Times: Submit Application for Payment to Engineer by the 25th of the month. The period covered by each Application for Payment is one month, ending on the last day of the month.

- C. Application for Payment Forms: Use form HUD-51001 as form for Applications for Payment.
- 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 of Change Orders and Construction Change Directives issued before last day of construction period covered by application.
  - 3. Certified Payroll Forms must be submitted with each Application for Payment.
- E. Transmittal: Submit four 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.
- F. 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. Schedule of unit prices.
  - 5. Submittal schedule (preliminary if not final).
  - 6. List of Contractor's staff assignments.
  - 7. List of Contractor's principal consultants.
  - 8. Copies of building permits.
  - 9. Copies of authorizations and licenses from authorities having jurisdiction for performance of the Work.
  - 10. Initial progress report.
  - 11. Report of preconstruction conference.
  - 12. Certificates of insurance and insurance policies.
- G. 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.
  - 2. This application shall reflect Certificates of Partial Substantial Completion issued previously for Owner occupancy of designated portions of the Work.

- H. 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. Insurance certificates for products and completed operations where required and proof that taxes, fees, and similar obligations were paid.
  3. Updated final statement, accounting for final changes to the Contract Sum.
  4. AIA Document G706-1994, "Contractor's Affidavit of Payment of Debts and Claims."
  5. AIA Document G706A-1994, "Contractor's Affidavit of Release of Liens."
  6. AIA Document G707-1994, "Consent of Surety to Final Payment."
  7. Evidence that claims have been settled.
  8. 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.
  9. Final liquidated damages settlement statement.

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 REQUIREMENTS:

- A. All drawings and general provisions of the Contract, including General and Supplementary Conditions and other 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 Project coordination procedures
  2. Administrative and supervisory personnel
  3. Coordination drawings
  4. Requests for Information (RFIs).
  5. Project meetings.

#### 1.3 DEFINITIONS

- A. RFI: Request from Owner, Engineer or Contractor seeking information from each other during construction.

#### 1.4 COORDINATION

- 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. Coordination: Each contractor shall coordinate its construction operations with those of other contractors and entities to ensure efficient and orderly installation of each part of the Work. Each

contractor shall coordinate its own operations with 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 with other contractors to ensure maximum performance and accessibility for required maintenance, service, and repair.
  3. Make adequate provisions to accommodate items scheduled for later installation.
- C. 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.
- D. Administrative Procedures: Coordinate scheduling and timing of required administrative procedures with other construction activities and activities of other contractors 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.
  9. Project closeout activities.
- E. Conservation: Coordinate construction activities to ensure that operations are carried out with consideration given to conservation of energy, water, and materials. Coordinate use of temporary utilities to minimize waste.
1. Salvage materials and equipment involved in performance of, but not actually incorporated into, the Work. Refer to other Sections for disposition of salvaged materials that are designated as Owner's property.

## 1.5 KEY PERSONNEL

- A. 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 and phone numbers, including home, office and cellular telephone numbers and email addresses. Provide names, addresses and



telephone numbers of individuals assigned as standbys in the absence of individuals assigned to Project..

1. Post copies of list in project meeting room, in temporary field office and by each temporary telephone. Keep list current at all times.

#### 1.6 REQUESTS FOR INFORMATION (RFIs)

A. General: Immediately on discovery of the need for additional information or interpretation of the Contract Documents, Contractor shall prepare and submit an RFI in the form specified.

1. Engineer will return RFIs submitted to Engineer by other entities controlled by Contractor with no response.
2. Coordinate and submit RFIs in a prompt manner so as 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. Project number.
3. Date.
4. Name of Contractor.
5. Name of Engineer and Contractor.
6. RFI number, numbered sequentially, by Prime Contract (eg: RFI GC-1).
7. RFI subject.
8. Specification Section number and title and related paragraphs, as appropriate.
9. Drawing number and detail references, as appropriate.
10. Field dimensions and conditions, as appropriate.
11. Contractor's suggested resolution. If Contractor's solution(s) impacts the Contract Time or the Contract Sum, Contractor shall state impact in the RFI.
12. Contractor's signature.
13. Attachments: Include sketches, descriptions, measurements, photos, Product Data, Shop Drawings, coordination drawings, and other information necessary to fully describe items needing interpretation.

C. RFI Forms: To be submitted on Contractor's standard form.

D. Engineer's Action: Engineer and Contractor will review each RFI, determine action required, and respond. Allow ten working days for Engineer's and Contractor response for each RFI. RFIs received by Engineer and Contractor after 1:00 p.m. will be considered as received the following working day.

1. The following RFIs will be returned without action:
  - a. Requests for approval of submittals.

- b. Requests for approval of substitutions.
  - c. Requests for coordination information already indicated in the Contract Documents.
  - d. Requests for adjustments in the Contract Time or the Contract Sum.
  - e. Requests for interpretation of Engineer's actions on submittals.
  - f. 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 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 Division 01 Section "Contract Modification Procedures."
    - a. If Contractor believes the RFI response warrants change in the Contract Time or the Contract Sum, notify Engineer in writing within 10 working days of receipt of the RFI response.
- E. On receipt of Engineer's and Contractor'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.
- F. RFI Log: Prepare, maintain, and submit a tabular log of RFIs organized by the RFI number. Submit log weekly.
1. Project name.
  2. Name and address of Contractor.
  3. Name and address of Engineer.
  4. RFI number including RFIs that were dropped and not submitted.
  5. RFI description.
  6. Date the RFI was submitted.
  7. Date Engineer's response was received.

## 1.7 PROJECT MEETINGS

- A. Preconstruction Conference: Contractor will 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, 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. Tentative construction schedule.
    - b. Critical work sequencing and long-lead items.

- c. Designation of key personnel and their duties.
  - d. Procedures for processing field decisions and Change Orders.
  - e. Procedures for RFIs.
  - f. Procedures for processing Applications for Payment.
  - g. Distribution of the Contract Documents.
  - h. Submittal procedures.
  - i. Preparation of record documents.
  - j. Use of the premises and existing building.
  - k. Work restrictions.
  - l. Working hours.
  - m. Owner's occupancy requirements.
  - n. Responsibility for temporary facilities and controls.
  - o. Procedures for disruptions and shutdowns.
  - p. Construction waste management and recycling.
  - q. Parking availability.
  - r. Office, work, and storage areas.
  - s. Equipment deliveries and priorities.
  - t. Progress cleaning.
3. Minutes: Contractor will record and distribute meeting minutes.
- B. Progress Meetings: Contractor will conduct progress meetings at biweekly intervals.
1. 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.
  2. Agenda and Minutes: Contractor will prepare agenda and record and distribute the meeting minutes to each party present and to parties requiring information.
- C. Coordination Meetings: Conduct Project coordination meetings at weekly intervals. Project 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, Contractor, 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 meetings shall be familiar with Project and authorized to conclude matters relating to the Work.
  2. Agenda: Review and correct or approve minutes of the previous coordination meeting. Review other items of significance that could affect progress. Include topics for discussion as appropriate to status of Project.

- a. Combined Contractor's Construction Schedule: Review progress since the last coordination meeting. Determine whether each contract is on time, ahead of schedule, or behind schedule, in relation to combined 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.
  - b. Schedule Updating: Revise combined Contractor's construction schedule after each coordination meeting where revisions to the schedule have been made or recognized. Issue revised schedule concurrently with report of each meeting.
  - c. Review present and future needs of each contractor present, including the following:
    - 1) Interface requirements.
    - 2) Sequence of operations.
    - 3) Status of submittals.
    - 4) Deliveries.
    - 5) Off-site fabrication.
    - 6) Access.
    - 7) Site use.
    - 8) Temporary facilities and controls.
    - 9) Work hours.
    - 10) Hazards and risks.
    - 11) Progress cleaning.
    - 12) Quality and work standards.
    - 13) Status of RFIs.
    - 14) Proposal Requests.
    - 15) Change Orders.
    - 16) Pending changes.
3. Reporting: Record meeting results and distribute copies to everyone in attendance and to others affected by decisions or actions resulting from each meeting.
- D. 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, Contractor of scheduled meeting dates.
  2. Agenda: Review progress of other construction activities and preparations for the particular 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.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 013100

## SECTION 013200 - CONSTRUCTION SCHEDULES

### PART 1 - GENERAL

#### 1.1 RELATED REQUIREMENTS:

- A. All drawings and general provisions of the Contract, including General and Supplementary Conditions and other 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. Contractor's construction schedule.
  - 2. Daily construction reports.
  - 3. Site condition reports.

#### 1.3 RELATED DOCUMENTS

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

#### 1.4 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. 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 when activities can be performed and the critical path of Project.
- C. Critical Path: The longest connected chain of interdependent activities through the network schedule that establishes the minimum overall Project duration and contains no float.

- D. Float: The measure of leeway in starting and completing an activity.

#### 1.5 INFORMATIONAL SUBMITTALS

- A. Format for Submittals: Submit required submittals in the following format:
  - 1. Digital Submission.
- B. Contractor's Construction Schedule: Initial schedule, of size required to display entire schedule for entire construction period.
- C. CPM Reports: Concurrent with CPM schedule, submit each of the following reports. Format for each activity in reports shall contain activity number, activity description, 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 all 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 all activities, sorted in ascending order by activity number and then early start date, or actual start date if known.
  - 3. Total Float Report: List of all activities sorted in ascending order of total float.
- D. Construction Schedule Updating Reports: Submit at monthly intervals.
- E. Daily Construction Reports: Submit at monthly intervals.
- F. Site Condition Reports: Submit at time of discovery of differing conditions.

#### 1.6 COORDINATION

- A. Coordinate preparation and processing of schedules and reports with performance of construction activities and with scheduling and reporting of separate contractors.
- B. 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.

## PART 2 - PRODUCTS

### 2.1 CONTRACTOR'S CONSTRUCTION SCHEDULE, GENERAL

- A. 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.
- B. Activities: Treat each phase 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 30 days, unless specifically allowed by Architect.
  2. Procurement Activities: Include procurement process activities for the long lead 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.
  3. Submittal Review Time: Include review and resubmittal times indicated in Division 01 Section "Submittal Procedures" in schedule. Coordinate submittal review times in Contractor's construction schedule with submittal schedule.
  4. Startup and Testing Time: Include no fewer than 15 days for startup and testing.
  5. Substantial Completion: Indicate completion in advance of date established for Substantial Completion, and allow time for Architect's administrative procedures necessary for certification of Substantial Completion.
- C. 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 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. Seasonal variations.
    - g. Environmental control.



- D. Milestones: Include milestones indicated in the Contract Documents in schedule, including, but not limited to, the Notice to Proceed, Substantial Completion, and final completion, and the following interim milestones:
  - 1. Completion dates of phased construction.
- E. 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.

## 2.2 CONTRACTOR'S CONSTRUCTION SCHEDULE (CPM SCHEDULE)

- A. General: Prepare network diagrams using AON (activity-on-node) format.
- B. Startup Network Diagram: Submit diagram within 14 days of date established for the 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 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 30 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, regardless of Architect's approval of the schedule.
  - 2. Establish procedures for monitoring and updating CPM schedule and for reporting progress. Coordinate procedures with progress meeting and payment request dates.
  - 3. Use "one workday" as the unit of time for individual activities. Indicate nonworking days and holidays incorporated into the schedule in order 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. Testing.
  - i. Punch list and final completion.
  - j. 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. Sub-networks on separate sheets are permissible for activities clearly off the critical path.
- 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.
- 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.

## 2.3 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. Accidents.
  8. Meetings and significant decisions.
  9. Unusual events.
  10. Stoppages, delays, shortages, and losses.
  11. Meter readings and similar recordings.
  12. Emergency procedures.
  13. Orders and requests of authorities having jurisdiction.
  14. Change Orders received and implemented.
  15. Services connected and disconnected.
  16. Equipment or system tests and startups.
  17. Partial completions and occupancies.
  18. Substantial Completions authorized.
- B. 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.

## PART 3 - EXECUTION

### 3.1 CONTRACTOR'S CONSTRUCTION SCHEDULE

- A. Contractor's Construction Schedule Updating: At monthly intervals, update schedule to reflect actual construction progress and activities.
1. 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.
  2. As the Work progresses, indicate final completion percentage for each activity.
- B. Distribution: Distribute copies of approved schedule to Architect, Owner, separate contractors, 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.

END OF SECTION 013200

## SECTION 013300 - SUBMITTAL PROCEDURES

### PART 1 - GENERAL

#### 1.1 RELATED REQUIREMENTS:

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

#### 1.2 SUMMARY

- A. Section includes requirements for the submittal schedule and administrative and procedural requirements for submitting Shop Drawings, Product Data, Samples, and other submittals.

#### 1.3 DEFINITIONS

- A. Action Submittals: Written and graphic information and physical samples that require Engineer's responsive action.
- 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.

#### 1.4 ACTION SUBMITTALS

- A. Submittal Schedule: Submit a schedule 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 modifications to submittals noted by the Engineer and additional time for handling and reviewing submittals required by those corrections.

#### 1.5 SUBMITTAL ADMINISTRATIVE REQUIREMENTS

- A. 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. Coordinate transmittal of different types of submittals for related parts of the Work 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.

- B. Processing Time: Allow time for submittal review, including time for re-submittals, 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 re-submittals.
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. Re-submittal Review: Allow 15 days for review of each re-submittal.
- C. Identification and Information: Place a permanent label or title block on each paper copy submittal item for identification.
1. Indicate name of firm or entity that prepared each submittal on label or title block.
  2. Provide a space approximately 6 by 8 inches (150 by 200 mm) on label or beside title block to record Contractor's review and approval markings and action taken by Engineer.
  3. Include the following information for processing and recording action taken:
    - a. Project name.
    - b. Date.
    - c. Name of Engineer.
    - d. Name of Contractor.
    - e. Name of subcontractor.
    - f. Name of supplier.
    - g. Name of manufacturer.
    - h. Submittal number or other unique identifier, including revision identifier.
      - 1) Submittal number shall use Specification Section number followed by a decimal point and then a sequential number (e.g., 061000.01). Re-submittals shall include an alphabetic suffix after another decimal point (e.g., 061000.01.A).
    - i. Number and title of appropriate Specification Section.
    - j. Drawing number and detail references, as appropriate.
    - k. Other necessary identification.
- D. Transmittal: Assemble each submittal individually and appropriately for transmittal and handling. Transmit each submittal using a transmittal form. Engineer will return submittals, without review, received from sources other than Contractor.
1. Transmittal Form: Use Contractor's standard form.
  2. On an attached separate sheet, prepared on Contractor's letterhead, record relevant information, requests for data, revisions other than those requested by Engineer on previous submittals, and deviations from requirements in the Contract Documents, including minor variations and limitations. Include same identification information as related submittal.
- E. Options: Identify options requiring selection by the Engineer.

- F. Deviations: Identify deviations from the Contract Documents on submittals.
- G. Re-submittals: Make re-submittals 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.
- H. 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.
- I. Use for Construction: Use only final submittals that are marked with approval notation from Engineer's action stamp.

## PART 2 - PRODUCTS

### 2.1 SUBMITTAL PROCEDURES

- A. General Submittal Procedure Requirements:
  - 1. Action Submittals: Submit digital submittals to the Engineer via email or other format as required by the Engineer.
  - 2. Informational Submittals: Submit digital submittals of each submittal, unless otherwise indicated.
- B. 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 not suitable 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 showing 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 or concurrent with Samples.
- C. 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. Sheet Size: Except for templates, patterns, and similar full-size drawings, submit Shop Drawings on sheets at least 8-1/2 by 11 inches (215 by 280 mm) but no larger than 30 by 42 inches (750 by 1067 mm).
- D. Samples: Submit Samples for review of kind, color, pattern, and texture for a check of these characteristics with other elements and for a comparison of these characteristics between submittal and actual component as delivered and installed.
  1. Transmit Samples that contain multiple, related components such as accessories together in one submittal package.
  2. Identification: Attach label on unexposed side of Samples that includes the following:
    - a. Generic description of Sample.
    - b. Product name and name of manufacturer.
    - c. Sample source.
    - d. Number and title of applicable Specification Section.
  3. Disposition: Maintain sets of approved Samples at Project site, available for quality-control comparisons throughout the course of construction activity. Sample sets may be used to determine final acceptance of construction associated with each set.
    - a. Samples that may be incorporated into the Work are indicated in individual Specification Sections. Such Samples must be in an undamaged condition at time of use.
    - b. Samples not incorporated into the Work, or otherwise designated as Owner's property, are the property of Contractor.
  4. Samples for Initial Selection: Submit manufacturer's color charts consisting of units or sections of units showing the full range of colors, textures, and patterns available.



- a. Number of Samples: Submit one (1) full set(s) of available choices where color, pattern, texture, or similar characteristics are required to be selected from manufacturer's product line. Engineer will return submittal with options selected.
5. Samples for Verification: Submit full-size units or Samples of size indicated, prepared from same material to be used for the Work, cured and finished in manner specified, and physically identical with material or product proposed for use, and that show full range of color and texture variations expected. Samples include, but are not limited to, the

following: partial sections of manufactured or fabricated components; small cuts or containers of materials; complete units of repetitively used materials; swatches showing color, texture, and pattern; color range sets; and components used for independent testing and inspection.

- a. Number of Samples: Submit three (3) sets of Samples. Engineer will retain two (2) Sample sets; remainder will be returned. Mark up and retain one returned Sample set as a Project record sample.
    - 1) If variation in color, pattern, texture, or other characteristic is inherent in material or product represented by a Sample, submit at least three (3) sets of paired units that show approximate limits of variations.
- E. 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.
  - F. 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.
  - G. Product Certificates: Submit written statements on manufacturer's letterhead certifying that product complies with requirements in the Contract Documents.
  - H. Material Certificates: Submit written statements on manufacturer's letterhead certifying that material complies with requirements in the Contract Documents.
  - I. 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.
  - J. Product Test Reports: Submit written reports indicating 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.
  - K. 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.
  - L. 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 primers and substrate preparation needed for adhesion.

- M. Field Test Reports: Submit 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.
- N. Maintenance Data: Comply with requirements specified in Division 01 Section "Operation and Maintenance Data."
- O. Design Data: Prepare and submit written and graphic information, including, but not limited to, performance and design criteria, list of applicable codes and regulations, and calculations. Include list of assumptions and other performance and design criteria and a summary of loads. Include load diagrams if applicable. Provide name and version of software, if any, used for calculations. Include page numbers.

### PART 3 -

#### 3.1 CONTRACTOR'S REVIEW

- A. Action 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. Approval Stamp: Stamp each submittal with a uniform, approval stamp. Include Project name and location, submittal number, Specification Section title and number, 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.

#### 3.2 ENGINEER'S ACTION

- A. General: Engineer will not review submittals that do not bear Contractor's approval stamp and will return them without action.
- B. Action Submittals: Engineer will review each submittal, make marks to indicate corrections or modifications required, and return it. Engineer will stamp each submittal with an action stamp and will mark stamp appropriately to indicate action.
- C. 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.
- D. Incomplete submittals are not acceptable, will be considered nonresponsive, and will be returned without review.
- E. Submittals not required by the Contract Documents may not be reviewed and may be discarded.

END OF SECTION 013300

## SECTION 014000 - QUALITY REQUIREMENTS

### PART 1 - GENERAL

#### 1.1 RELATED REQUIREMENTS:

- A. All drawings and general provisions of the Contract, including General and Supplementary Conditions and other 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 inspecting 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. Specified tests, inspections, and related actions do not limit Contractor's other quality-assurance and -control procedures that facilitate compliance with the Contract Document requirements.
  - 2. Requirements for Contractor to provide quality-assurance and -control services required by Architect, Owner or authorities having jurisdiction are not limited by provisions of this Section.

#### 1.3 DEFINITIONS

- A. Quality-Assurance Services: Activities, actions, and procedures performed before and during execution of the Work to guard against defects and deficiencies and substantiate that proposed construction will comply with requirements.
- B. 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. Services do not include contract enforcement activities performed by Architect.
- C. Mockups: Full-size physical assemblies that are constructed on-site. Mockups are constructed to verify selections made under Sample submittals; to demonstrate aesthetic effects and, where indicated, 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.

- D. Field Quality-Control Testing: Tests and inspections that are performed on-site for installation of the Work and for completed Work.
- E. Testing Agency: An entity engaged to perform specific tests, inspections, or both. Testing laboratory shall mean the same as testing agency.
- F. 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, and similar operations.
  - 1. Use of trade-specific terminology in referring to a trade or entity does not require that certain construction activities be performed by accredited or unionized individuals, or that requirements specified apply exclusively to specific trade(s).
- G. Experienced: When used with an entity or individual, "experienced" 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.

#### 1.4 CONFLICTING REQUIREMENTS

- A. Referenced Standards: If compliance with two or more standards is specified and the standards establish different or conflicting requirements for minimum quantities or quality levels, comply with the most stringent requirement. Refer conflicting requirements that are different, but apparently equal, to Architect for a decision 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 Architect for a decision before proceeding.

#### 1.5 INFORMATIONAL SUBMITTALS

- A. 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.

#### 1.6 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, and telephone number 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 inspecting.
  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 Field Reports: Prepare written information documenting tests and inspections specified in other Sections. Include the following:
1. Name, address, and telephone number of representative making report.
  2. Statement on condition of substrates and their acceptability for installation of product.
  3. Summary of installation procedures being followed, whether they comply with requirements and, if not, what corrective action was taken.
  4. Results of operational and other tests and a statement of whether observed performance complies with requirements.
  5. Other required items indicated in individual Specification Sections.
- C. Permits, Licenses, and Certificates: For Owner's records, 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 QUALITY ASSURANCE
- A. General: 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 similar to those indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units.
- C. Fabricator Qualifications: A firm experienced in producing products similar to 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, 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 are 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 for the activities indicated.
  - 1. Requirements of authorities having jurisdiction shall supersede requirements for specialists.
- G. **Testing Agency Qualifications:** An NRTL, an NVLAP, or an independent agency with the experience and capability to conduct testing and inspecting indicated, as documented according to ASTM E 329; and with additional qualifications specified in individual Sections; and, where required by authorities having jurisdiction, that is acceptable to authorities.
  - 1. NRTL: A nationally recognized testing laboratory according to 29 CFR 1910.7.
  - 2. NVLAP: A testing agency accredited according to NIST's National Voluntary Laboratory Accreditation Program.
- H. **Manufacturer's 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. **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:
  - 1. Contractor responsibilities include the following:
    - a. Provide test specimens representative of proposed products and construction.
    - b. Submit specimens in a timely manner with sufficient time for testing and analyzing results to prevent delaying the Work.
    - c. When testing is complete, remove test specimens, assemblies and mockups do not reuse products on Project.
  - 2. **Testing Agency Responsibilities:** Submit a certified written report of each test, inspection, and similar quality-assurance service to Architect, 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.

- J. 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 in location and of size indicated or, if not indicated, as directed by Architect.
  - 2. Notify Architect seven days in advance of dates and times when mockups will be constructed.
  - 3. Demonstrate the proposed range of aesthetic effects and workmanship.
  - 4. Obtain Architect's approval of mockups before starting work, fabrication, or construction.
    - a. Allow seven days for initial review and each re-review of each mockup.
  - 5. Maintain mockups during construction in an undisturbed condition as a standard for judging the completed Work.
  - 6. Demolish and remove mockups when directed unless otherwise indicated.

## 1.8 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 inspecting they are engaged to perform.
  - 2. 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.
  - 3. Quality Control Services to be provided by the Owner:
    - a. Special Tests and Inspections, as indicated in the attached Form UCC-6
- B. Contractor Responsibilities: Tests and inspections not explicitly assigned to Owner are Contractor's responsibility. Perform additional quality-control activities required to verify that the Work complies with requirements, whether specified or not.
  - 1. Where services are indicated as Contractor's responsibility, engage a qualified testing agency to perform these quality-control services.
    - a. Contractor shall not employ same entity engaged by Owner, unless agreed to in writing by Owner.
  - 2. Notify testing agencies at least 24 hours in advance, or as required by testing agency, of time when Work that requires testing or inspecting will be performed.
  - 3. Where quality-control services are indicated as Contractor's responsibility, submit a certified written report, in duplicate, of each quality-control service.
  - 4. Testing and inspecting requested by Contractor and not required by the Contract Documents are Contractor's responsibility.



5. Submit additional copies of each written report directly to authorities having jurisdiction, when they so direct.
- C. **Manufacturer's Field Services:** Where indicated, engage a manufacturer's representative to observe and inspect the Work. Manufacturer's representative's services include examination of substrates and conditions, verification of materials, inspection of completed portions of the Work, and submittal of written reports.
- D. **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.
- E. **Testing Agency Responsibilities:** Cooperate with Architect and Contractor in performance of duties. Provide qualified personnel to perform required tests and inspections.
1. Notify Architect and Contractor promptly of irregularities or deficiencies observed in the Work during performance of its services.
  2. Determine the location 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 any duties of Contractor.
- F. **Associated Services:** Cooperate with agencies 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 inspecting. 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 proposed for use for material mixes that require control by testing agency.
  7. Security and protection for samples and for testing and inspecting equipment at Project site.
- G. **Coordination:** Coordinate sequence of activities to accommodate required quality-assurance and -control services with a minimum of delay and to avoid necessity of removing and replacing construction to accommodate testing and inspecting.

1. Schedule times for tests, inspections, obtaining samples, and similar activities.

## 1.9 SPECIAL TESTS AND INSPECTIONS

- A. Special Tests and Inspections: Owner will engage a qualified testing agency or special inspector to conduct special tests and inspections required by authorities having jurisdiction as the responsibility of Owner, including the following:
  1. Structural steel inspections
  2. Load Bearing Masonry Inspections
  3. Elevator Shaft Construction Inspections

## 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.
  2. Description of the Work tested or inspected.
  3. Date test or inspection results were transmitted to Architect.
  4. Identification of testing agency or special inspector conducting test or inspection.
- B. Maintain log at Project site. Post changes and revisions as they occur. Provide access to test and inspection log for Architect's reference during normal working hours.

### 3.2 REPAIR AND PROTECTION

- A. General: On completion of testing, inspecting, 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 Division 01 Section "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 REQUIREMENTS:

- A. All drawings and general provisions of the Contract, including General and Supplementary Conditions and other 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 Architect's action on Contractor's submittals, applications, and requests, "approved" is limited to Architect's duties and responsibilities as stated in the Conditions of the Contract.
- C. "Directed": A command or instruction by Architect. 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 be defined as indicated on drawing CS1.1 or 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. Industry Organizations: 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 subject to change and is believed to be accurate as of the date of the Contract Documents.
  - 1. AABC - Associated Air Balance Council; [www.aabc.com](http://www.aabc.com).
  - 2. AAMA - American Architectural Manufacturers Association; [www.aamanet.org](http://www.aamanet.org).
  - 3. AAPFCO - Association of American Plant Food Control Officials; [www.aapfco.org](http://www.aapfco.org).
  - 4. AASHTO - American Association of State Highway and Transportation Officials; [www.transportation.org](http://www.transportation.org).
  - 5. AATCC - American Association of Textile Chemists and Colorists; [www.aatcc.org](http://www.aatcc.org).
  - 6. ABMA - American Bearing Manufacturers Association; [www.americanbearings.org](http://www.americanbearings.org).
  - 7. ABMA - American Boiler Manufacturers Association; [www.abma.com](http://www.abma.com).
  - 8. ACI - American Concrete Institute; (Formerly: ACI International); [www.concrete.org](http://www.concrete.org)
  - 9. ACPA - American Concrete Pipe Association; [www.concrete-pipe.org](http://www.concrete-pipe.org).
  - 10. AEIC - Association of Edison Illuminating Companies, Inc. (The); [www.aeic.org](http://www.aeic.org).
  - 11. AF&PA - American Forest & Paper Association; [www.afandpa.org](http://www.afandpa.org).
  - 12. AGA - American Gas Association; [www.aga.org](http://www.aga.org).
  - 13. AHAM - Association of Home Appliance Manufacturers; [www.aham.org](http://www.aham.org).
  - 14. AHRI - Air-Conditioning, Heating, and Refrigeration Institute (The); [www.ahrinet.org](http://www.ahrinet.org).
  - 15. AI - Asphalt Institute; [www.asphaltinstitute.org](http://www.asphaltinstitute.org).
  - 16. AIA - American Institute of Architects (The); [www.aia.org](http://www.aia.org).
  - 17. AISC - American Institute of Steel Construction; [www.aisc.org](http://www.aisc.org).
  - 18. AISI - American Iron and Steel Institute; [www.steel.org](http://www.steel.org).
  - 19. AITC - American Institute of Timber Construction; [www.aitc-glulam.org](http://www.aitc-glulam.org).
  - 20. AMCA - Air Movement and Control Association International, Inc.; [www.amca.org](http://www.amca.org).
  - 21. ANSI - American National Standards Institute; [www.ansi.org](http://www.ansi.org).
  - 22. AOSA - Association of Official Seed Analysts, Inc.; [www.aosaseed.com](http://www.aosaseed.com).
  - 23. APA - APA - The Engineered Wood Association; [www.apawood.org](http://www.apawood.org).
  - 24. APA - Architectural Precast Association; [www.archprecast.org](http://www.archprecast.org).
  - 25. API - American Petroleum Institute; [www.api.org](http://www.api.org).
  - 26. ARI - Air-Conditioning & Refrigeration Institute; (See AHRI).

27. ARI - American Refrigeration Institute; (See AHRI).
28. ARMA - Asphalt Roofing Manufacturers Association; [www.asphaltroofing.org](http://www.asphaltroofing.org).
29. ASCE - American Society of Civil Engineers; [www.asce.org](http://www.asce.org).
30. ASCE/SEI - American Society of Civil Engineers/Structural Engineering Institute; (See ASCE).
31. ASHRAE - American Society of Heating, Refrigerating and Air-Conditioning Engineers; [www.ashrae.org](http://www.ashrae.org).
32. ASME - ASME International; (American Society of Mechanical Engineers); [www.asme.org](http://www.asme.org).
33. ASSE - American Society of Safety Engineers (The); [www.asse.org](http://www.asse.org).
34. ASSE - American Society of Sanitary Engineering; [www.asse-plumbing.org](http://www.asse-plumbing.org).
35. ASTM - ASTM International; [www.astm.org](http://www.astm.org).
36. ATIS - Alliance for Telecommunications Industry Solutions; [www.atis.org](http://www.atis.org).
37. AWEA - American Wind Energy Association; [www.awea.org](http://www.awea.org).
38. AWI - Architectural Woodwork Institute; [www.awinet.org](http://www.awinet.org).
39. AWMAC - Architectural Woodwork Manufacturers Association of Canada; [www.awmac.com](http://www.awmac.com).
40. AWPA - American Wood Protection Association; [www.awpa.com](http://www.awpa.com).
41. AWS - American Welding Society; [www.aws.org](http://www.aws.org).
42. AWWA - American Water Works Association; [www.awwa.org](http://www.awwa.org).
43. BHMA - Builders Hardware Manufacturers Association; [www.buildershardware.com](http://www.buildershardware.com).
44. BIA - Brick Industry Association (The); [www.gobrick.com](http://www.gobrick.com).
45. BICSI - BICSI, Inc.; [www.bicsi.org](http://www.bicsi.org).
46. BIFMA - BIFMA International; (Business and Institutional Furniture Manufacturer's Association); [www.bifma.org](http://www.bifma.org).
47. BISSC - Baking Industry Sanitation Standards Committee; [www.bissc.org](http://www.bissc.org).
48. BWF - Badminton World Federation; (Formerly: International Badminton Federation); [www.bissc.org](http://www.bissc.org).
49. CDA - Copper Development Association; [www.copper.org](http://www.copper.org).
50. CE - Conformance Europeenne; <http://ec.europa.eu/growth/single-market/ce-marking/>
51. CEA - Canadian Electricity Association; [www.electricity.ca](http://www.electricity.ca).
52. CEA - Consumer Electronics Association; [www.ce.org](http://www.ce.org).
53. CFFA - Chemical Fabrics and Film Association, Inc.; [www.chemicalfabricsandfilm.com](http://www.chemicalfabricsandfilm.com).
54. CFSEI - Cold-Formed Steel Engineers Institute; [www.cfsei.org](http://www.cfsei.org).
55. CGA - Compressed Gas Association; [www.cganet.com](http://www.cganet.com).
56. CIMA - Cellulose Insulation Manufacturers Association; [www.cellulose.org](http://www.cellulose.org).
57. CISCA - Ceilings & Interior Systems Construction Association; [www.cisca.org](http://www.cisca.org).
58. CISPI - Cast Iron Soil Pipe Institute; [www.cispi.org](http://www.cispi.org).
59. CLFMI - Chain Link Fence Manufacturers Institute; [www.chainlinkinfo.org](http://www.chainlinkinfo.org).
60. CPA - Composite Panel Association; [www.pbmdf.com](http://www.pbmdf.com).
61. CRI - Carpet and Rug Institute (The); [www.carpet-rug.org](http://www.carpet-rug.org).
62. CRRC - Cool Roof Rating Council; [www.coolroofs.org](http://www.coolroofs.org).
63. CRSI - Concrete Reinforcing Steel Institute; [www.crsi.org](http://www.crsi.org).
64. CSA - Canadian Standards Association; [www.csa.ca](http://www.csa.ca).
65. CSA - CSA International; (Formerly: IAS - International Approval Services); [www.csa-international.org](http://www.csa-international.org).
66. CSI - Construction Specifications Institute (The); [www.csinet.org](http://www.csinet.org).
67. CSSB - Cedar Shake & Shingle Bureau; [www.cedarbureau.org](http://www.cedarbureau.org).
68. CTI - Cooling Technology Institute; (Formerly: Cooling Tower Institute); [www.cti.org](http://www.cti.org).
69. CWC - Composite Wood Council; (See CPA).
70. DASMA - Door and Access Systems Manufacturers Association; [www.dasma.com](http://www.dasma.com).

71. DHI - Door and Hardware Institute; [www.dhi.org](http://www.dhi.org).
72. ECA - Electronic Components Association; (See ECIA).
73. ECAMA - Electronic Components Assemblies & Materials Association; (See ECIA).
74. ECIA - Electronic Components Industry Association; [www.eciaonline.org](http://www.eciaonline.org).
75. EIA - Electronic Industries Alliance; (See TIA).
76. EIMA - EIFS Industry Members Association; [www.eima.com](http://www.eima.com).
77. EJMA - Expansion Joint Manufacturers Association, Inc.; [www.ejma.org](http://www.ejma.org).
78. ESD - ESD Association; (Electrostatic Discharge Association); [www.esda.org](http://www.esda.org).
79. ESTA - Entertainment Services and Technology Association; (See PLASA).
80. ETL - Intertek (See Intertek); [www.intertek.com](http://www.intertek.com).
81. EVO - Efficiency Valuation Organization; [www.evo-world.org](http://www.evo-world.org).
82. FCI - Fluid Controls Institute; [www.fluidcontrolsintstitute.org](http://www.fluidcontrolsintstitute.org).
83. FIBA - Federation Internationale de Basketball; (The International Basketball Federation); [www.fiba.com](http://www.fiba.com).
84. FIVB - Federation Internationale de Volleyball; (The International Volleyball Federation); [www.fivb.org](http://www.fivb.org).
85. FM Approvals - FM Approvals LLC; [www.fmglobal.com](http://www.fmglobal.com).
86. FM Global - FM Global; (Formerly: FMG - FM Global); [www.fmglobal.com](http://www.fmglobal.com).
87. FRSA - Florida Roofing, Sheet Metal & Air Conditioning Contractors Association, Inc.; [www.floridarroof.com](http://www.floridarroof.com).
88. FSA - Fluid Sealing Association; [www.fluidsealing.com](http://www.fluidsealing.com).
89. FSC - Forest Stewardship Council U.S.; [www.fscus.org](http://www.fscus.org).
90. GA - Gypsum Association; [www.gypsum.org](http://www.gypsum.org).
91. GANA - Glass Association of North America; [www.glasswebsite.com](http://www.glasswebsite.com).
92. GS - Green Seal; [www.greenseal.org](http://www.greenseal.org).
93. HI - Hydraulic Institute; [www.pumps.org](http://www.pumps.org).
94. HI/GAMA - Hydronics Institute/Gas Appliance Manufacturers Association; (See AHRI).
95. HMMA - Hollow Metal Manufacturers Association; (See NAAMM).
96. HPVA - Hardwood Plywood & Veneer Association; [www.hpva.org](http://www.hpva.org).
97. HPW - H. P. White Laboratory, Inc.; [www.hpwhite.com](http://www.hpwhite.com).
98. IAPSC - International Association of Professional Security Consultants; [www.iapsc.org](http://www.iapsc.org).
99. IAS - International Accreditation Service; [www.iasonline.org](http://www.iasonline.org).
100. IAS - International Approval Services; (See CSA).
101. ICBO - International Conference of Building Officials; (See ICC).
102. ICC - International Code Council; [www.iccsafe.org](http://www.iccsafe.org).
103. ICEA - Insulated Cable Engineers Association, Inc.; [www.icea.net](http://www.icea.net).
104. ICPA - International Cast Polymer Alliance; [www.icpa-hq.org](http://www.icpa-hq.org).
105. ICRI - International Concrete Repair Institute, Inc.; [www.icri.org](http://www.icri.org).
106. IEC - International Electrotechnical Commission; [www.iec.ch](http://www.iec.ch).
107. IEEE - Institute of Electrical and Electronics Engineers, Inc. (The); [www.ieee.org](http://www.ieee.org).
108. IES - Illuminating Engineering Society; (Formerly: Illuminating Engineering Society of North America); [www.ies.org](http://www.ies.org).
109. IESNA - Illuminating Engineering Society of North America; (See IES).
110. IEST - Institute of Environmental Sciences and Technology; [www.iest.org](http://www.iest.org).
111. IGMA - Insulating Glass Manufacturers Alliance; [www.igmaonline.org](http://www.igmaonline.org).
112. IGSHPA - International Ground Source Heat Pump Association; [www.igshpa.okstate.edu](http://www.igshpa.okstate.edu).
113. ILI - Indiana Limestone Institute of America, Inc.; [www.iliai.com](http://www.iliai.com).
114. Intertek - Intertek Group; (Formerly: ETL SEMCO; Intertek Testing Service NA); [www.intertek.com](http://www.intertek.com).

115. ISA - International Society of Automation (The); (Formerly: Instrumentation, Systems, and Automation Society); [www.isa.org](http://www.isa.org).
116. ISAS - Instrumentation, Systems, and Automation Society (The); (See ISA).
117. ISFA - International Surface Fabricators Association; (Formerly: International Solid Surface Fabricators Association); [www.isfanow.org](http://www.isfanow.org).
118. ISO - International Organization for Standardization; [www.iso.org](http://www.iso.org).
119. ISSFA - International Solid Surface Fabricators Association; (See ISFA).
120. ITU - International Telecommunication Union; [www.itu.int/home](http://www.itu.int/home).
121. KCMA - Kitchen Cabinet Manufacturers Association; [www.kcma.org](http://www.kcma.org).
122. LMA - Laminating Materials Association; (See CPA).
123. LPI - Lightning Protection Institute; [www.lightning.org](http://www.lightning.org).
124. MBMA - Metal Building Manufacturers Association; [www.mbma.com](http://www.mbma.com).
125. MCA - Metal Construction Association; [www.metalconstruction.org](http://www.metalconstruction.org).
126. MFMA - Maple Flooring Manufacturers Association, Inc.; [www.maplefloor.org](http://www.maplefloor.org).
127. MFMA - Metal Framing Manufacturers Association, Inc.; [www.metalframingmfg.org](http://www.metalframingmfg.org).
128. MHIA - Material Handling Industry of America; [www.mhia.org](http://www.mhia.org).
129. MIA - Marble Institute of America; [www.marble-institute.com](http://www.marble-institute.com).
130. MMPA - Moulding & Millwork Producers Association; [www.wmmpa.com](http://www.wmmpa.com).
131. MPI - Master Painters Institute; [www.paintinfo.com](http://www.paintinfo.com).
132. MSS - Manufacturers Standardization Society of The Valve and Fittings Industry Inc.; [www.mss-hq.org](http://www.mss-hq.org).
133. NAAMM - National Association of Architectural Metal Manufacturers; [www.naamm.org](http://www.naamm.org).
134. NACE - NACE International; (National Association of Corrosion Engineers International); [www.nace.org](http://www.nace.org).
135. NADCA - National Air Duct Cleaners Association; [www.nadca.com](http://www.nadca.com).
136. NAIMA - North American Insulation Manufacturers Association; [www.naima.org](http://www.naima.org).
137. NBGQA - National Building Granite Quarries Association, Inc.; [www.nbgqa.com](http://www.nbgqa.com).
138. NBI - New Buildings Institute; [www.newbuildings.org](http://www.newbuildings.org).
139. NCAA - National Collegiate Athletic Association (The); [www.ncaa.org](http://www.ncaa.org).
140. NCMA - National Concrete Masonry Association; [www.ncma.org](http://www.ncma.org).
141. NEBB - National Environmental Balancing Bureau; [www.nebb.org](http://www.nebb.org).
142. NECA - National Electrical Contractors Association; [www.necanet.org](http://www.necanet.org).
143. NeLMA - Northeastern Lumber Manufacturers Association; [www.nelma.org](http://www.nelma.org).
144. NEMA - National Electrical Manufacturers Association; [www.nema.org](http://www.nema.org).
145. NETA - InterNational Electrical Testing Association; [www.netaworld.org](http://www.netaworld.org).
146. NFHS - National Federation of State High School Associations; [www.nfhs.org](http://www.nfhs.org).
147. NFPA - National Fire Protection Association; [www.nfpa.org](http://www.nfpa.org).
148. NFPA - NFPA International; (See NFPA).
149. NFRC - National Fenestration Rating Council; [www.nfrc.org](http://www.nfrc.org).
150. NHLA - National Hardwood Lumber Association; [www.nhla.com](http://www.nhla.com).
151. NLGA - National Lumber Grades Authority; [www.nlga.org](http://www.nlga.org).
152. NOFMA - National Oak Flooring Manufacturers Association; (See NWFA).
153. NOMMA - National Ornamental & Miscellaneous Metals Association; [www.nomma.org](http://www.nomma.org).
154. NRCA - National Roofing Contractors Association; [www.nrca.net](http://www.nrca.net).
155. NRMCA - National Ready Mixed Concrete Association; [www.nrmca.org](http://www.nrmca.org).
156. NSF - NSF International; [www.nsf.org](http://www.nsf.org).
157. NSPE - National Society of Professional Engineers; [www.nspe.org](http://www.nspe.org).
158. NSSGA - National Stone, Sand & Gravel Association; [www.nssga.org](http://www.nssga.org).
159. NTMA - National Terrazzo & Mosaic Association, Inc. (The); [www.ntma.com](http://www.ntma.com).
160. NWFA - National Wood Flooring Association; [www.nwfa.org](http://www.nwfa.org).



161. PCI - Precast/Prestressed Concrete Institute; [www.pci.org](http://www.pci.org).
162. PDI - Plumbing & Drainage Institute; [www.pdionline.org](http://www.pdionline.org).
163. PLASA - PLASA; (Formerly: ESTA - Entertainment Services and Technology Association); <http://www.plasa.org>.
164. RCSC - Research Council on Structural Connections; [www.boltcouncil.org](http://www.boltcouncil.org).
165. RFCI - Resilient Floor Covering Institute; [www.rfci.com](http://www.rfci.com).
166. RIS - Redwood Inspection Service; [www.redwoodinspection.com](http://www.redwoodinspection.com).
167. SAE - SAE International; [www.sae.org](http://www.sae.org).
168. SCTE - Society of Cable Telecommunications Engineers; [www.scte.org](http://www.scte.org).
169. SDI - Steel Deck Institute; [www.sdi.org](http://www.sdi.org).
170. SDI - Steel Door Institute; [www.steeldoor.org](http://www.steeldoor.org).
171. SEFA - Scientific Equipment and Furniture Association (The); [www.sefalabs.com](http://www.sefalabs.com).
172. SEI/ASCE - Structural Engineering Institute/American Society of Civil Engineers; (See ASCE).
173. SIA - Security Industry Association; [www.siaonline.org](http://www.siaonline.org).
174. SJI - Steel Joist Institute; [www.steeljoist.org](http://www.steeljoist.org).
175. SMA - Screen Manufacturers Association; [www.smainfo.org](http://www.smainfo.org).
176. SMACNA - Sheet Metal and Air Conditioning Contractors' National Association; [www.smacna.org](http://www.smacna.org).
177. SMPTE - Society of Motion Picture and Television Engineers; [www.smpte.org](http://www.smpte.org).
178. SPFA - Spray Polyurethane Foam Alliance; [www.sprayfoam.org](http://www.sprayfoam.org).
179. SPIB - Southern Pine Inspection Bureau; [www.spib.org](http://www.spib.org).
180. SPRI - Single Ply Roofing Industry; [www.spri.org](http://www.spri.org).
181. SRCC - Solar Rating & Certification Corporation; [www.solar-rating.org](http://www.solar-rating.org).
182. SSINA - Specialty Steel Industry of North America; [www.ssina.com](http://www.ssina.com).
183. SSPC - SSPC: The Society for Protective Coatings; [www.sspc.org](http://www.sspc.org).
184. STI - Steel Tank Institute; [www.steeltank.com](http://www.steeltank.com).
185. SWI - Steel Window Institute; [www.steelwindows.com](http://www.steelwindows.com).
186. SWPA - Submersible Wastewater Pump Association; [www.swpa.org](http://www.swpa.org).
187. TCA - Tilt-Up Concrete Association; [www.tilt-up.org](http://www.tilt-up.org).
188. TCNA - Tile Council of North America, Inc.; [www.tileusa.com](http://www.tileusa.com).
189. TEMA - Tubular Exchanger Manufacturers Association, Inc.; [www.tema.org](http://www.tema.org).
190. TIA - Telecommunications Industry Association (The); (Formerly: TIA/EIA - Telecommunications Industry Association/Electronic Industries Alliance); [www.tiaonline.org](http://www.tiaonline.org).
191. TIA/EIA - Telecommunications Industry Association/Electronic Industries Alliance; (See TIA).
192. TMS - The Masonry Society; [www.masonrysociety.org](http://www.masonrysociety.org).
193. TPI - Truss Plate Institute; [www.tpinst.org](http://www.tpinst.org).
194. TPI - Turfgrass Producers International; [www.turfgrasssod.org](http://www.turfgrasssod.org).
195. TRI - Tile Roofing Institute; [www.tilerroofing.org](http://www.tilerroofing.org).
196. UL - Underwriters Laboratories Inc.; <http://www.ul.com>.
197. UNI - Uni-Bell PVC Pipe Association; [www.uni-bell.org](http://www.uni-bell.org).
198. USAV - USA Volleyball; [www.usavolleyball.org](http://www.usavolleyball.org).
199. USGBC - U.S. Green Building Council; [www.usgbc.org](http://www.usgbc.org).
200. USITT - United States Institute for Theatre Technology, Inc.; [www.usitt.org](http://www.usitt.org).
201. WASTEC - Waste Equipment Technology Association; [www.wastec.org](http://www.wastec.org).
202. WCLIB - West Coast Lumber Inspection Bureau; [www.wclib.org](http://www.wclib.org).
203. WCMA - Window Covering Manufacturers Association; [www.wcmanet.org](http://www.wcmanet.org).
204. WDMA - Window & Door Manufacturers Association; [www.wdma.com](http://www.wdma.com).
205. WI - Woodwork Institute; [www.wicnet.org](http://www.wicnet.org).

206. WSRCA - Western States Roofing Contractors Association; [www.wsrca.com](http://www.wsrca.com).
207. WWPA - Western Wood Products Association; [www.wwpa.org](http://www.wwpa.org).

C. 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. DIN - Deutsches Institut fur Normung e.V.; [www.din.de](http://www.din.de).
2. IAPMO - International Association of Plumbing and Mechanical Officials; [www.iapmo.org](http://www.iapmo.org).
3. ICC - International Code Council; [www.iccsafe.org](http://www.iccsafe.org).
4. ICC-ES - ICC Evaluation Service, LLC; [www.icc-es.org](http://www.icc-es.org).

D. 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).

E. 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/ccb](http://www.wbdg.org/ccb).
  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).
- F. State 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. This information is subject to change and is believed to be accurate as of the date of the Contract Documents.
1. CBHF; State of California; Department of Consumer Affairs; Bureau of Electronic and Appliance Repair, Home Furnishings and Thermal Insulation; [www.bearhfti.ca.gov](http://www.bearhfti.ca.gov).
  2. CCR; California Code of Regulations; Office of Administrative Law; California Title 24 Energy Code; [www.calregs.com](http://www.calregs.com).
  3. CDHS; California Department of Health Services; (See CDPH).
  4. CDPH; California Department of Public Health; Indoor Air Quality Program; [www.cal-iaq.org](http://www.cal-iaq.org).
  5. CPUC; California Public Utilities Commission; [www.cpuc.ca.gov](http://www.cpuc.ca.gov).
  6. SCAQMD; South Coast Air Quality Management District; [www.aqmd.gov](http://www.aqmd.gov).
  7. 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 015000 - TEMPORARY FACILITIES AND CONTROLS

### PART 1 - GENERAL

#### 1.1 SUMMARY

- A. Section includes requirements for temporary utilities, support facilities, and security and protection facilities.
- B. Related Requirements:
  - 1. Section 011000 "Summary" for work restrictions and limitations on utility interruptions.

#### 1.2 USE CHARGES

- A. Installation, removal, and use charges for temporary facilities shall be included in the Contract Sum unless otherwise indicated. Allow other entities engaged in the Project to use temporary services and facilities without cost, including, but not limited to, Owner's construction forces, Engineer, testing agencies, and authorities having jurisdiction.
- B. Water and Sewer Service from Existing System: Water from Owner's existing water system is available for use without metering and without payment of use charges. Provide connections and extensions of services as required for construction operations.
- C. Electric Power Service from Existing System: Electric power from Owner's existing system is available for use without metering and without payment of use charges. Provide connections and extensions of services as required for construction operations.

#### 1.3 INFORMATIONAL SUBMITTALS

- A. Site Utilization Plan: Show temporary facilities, temporary utility lines and connections, staging areas, construction site entrances, vehicle circulation, and parking areas for construction personnel.
- B. Project Identification and Temporary Signs: Show fabrication and installation details, including plans, elevations, details, layouts, typestyles, graphic elements, and message content.
- C. Fire-Safety Program: Show compliance with requirements of NFPA 241 and authorities having jurisdiction. Indicate Contractor personnel responsible for management of fire-prevention program.
- D. Moisture- and Mold-Protection Plan: Describe procedures and controls for protecting materials and construction from water absorption and damage and mold. Describe delivery, handling, storage, installation, and protection provisions for materials subject to water absorption or water damage.

1. Indicate procedures for discarding water-damaged materials, protocols for mitigating water intrusion into completed Work, and requirements for replacing water-damaged Work.
2. Indicate methods to be used to avoid trapping water in finished work.

#### 1.4 QUALITY ASSURANCE

- A. Electric Service: Comply with NECA, NEMA, and UL standards and regulations for temporary electric service. Install service to comply with NFPA 70.
- B. Tests and Inspections: Arrange for authorities having jurisdiction to test and inspect each temporary utility before use. Obtain required certifications and permits.

#### 1.5 PROJECT CONDITIONS

- A. Temporary Use of Permanent Facilities: Engage Installer of each permanent service to assume responsibility for operation, maintenance, and protection of each permanent service during its use as a construction facility before Owner's acceptance, regardless of previously assigned responsibilities.

### PART 2 - PRODUCTS

#### 2.1 TEMPORARY FACILITIES

- A. Field Offices and Storage: No space is available within the buildings or onsite for contractor's field offices. Contractor is required to provide any temporary facilities required for field offices or materials storage.

#### 2.2 EQUIPMENT

- A. Fire Extinguishers: Portable, UL rated; with class and extinguishing agent as required by locations and classes of fire exposures.

### PART 3 - EXECUTION

#### 3.1 TEMPORARY FACILITIES, GENERAL

- A. Conservation: Coordinate construction and use of temporary facilities with consideration given to conservation of energy, water, and materials. Coordinate use of temporary utilities to minimize waste.

### 3.2 INSTALLATION, GENERAL

- A. Locate facilities where they will serve Project adequately and result in minimum interference with performance of the Work. Relocate and modify facilities as required by progress of the Work.
- B. Provide each facility ready for use when needed to avoid delay. Do not remove until facilities are no longer needed or are replaced by authorized use of completed permanent facilities.
- C. Isolation of Work Areas in Occupied Facilities: Prevent dust, fumes, and odors from entering occupied areas.

### 3.3 TEMPORARY ELECTRIC POWER

- A. **Throughout the duration of this contract which effects the primary electric power service to the building, the contractor must comply with the following requirements:**
  - 1. **All utility disruptions must be approved by the Owner 14 days or more prior to the planned utility shut down. The Owner has the sole right to approve or disapprove any planned utility shutdown.**
  - 2. **Maximum length of duration for any utility shutdown is 6 hours in any 24 hour period. For utility shutdown in excess of six hours, the contractor must provide a generator to provide power to the building until such time until permanent power is restored to the building.**

### 3.4 TEMPORARY UTILITY INSTALLATION

- A. General: Install temporary service or connect to existing service.
  - 1. Arrange with utility company, Owner, and existing users for time when service can be interrupted, if necessary, to make connections for temporary services.
- B. Sewers and Drainage: Provide temporary utilities to remove effluent lawfully.
  - 1. Connect temporary sewers to private system indicated as directed by authorities having jurisdiction.
- C. Sanitary Facilities: Provide temporary toilets, wash facilities, safety shower and eyewash facilities, and drinking water for use of construction personnel. Comply with requirements of authorities having jurisdiction for type, number, location, operation, and maintenance of fixtures and facilities.
- D. Temporary Lighting: Contractor is required to maintain safe light levels during construction. Lighting replacement is to be scheduled and sequenced to ensure that lighting is provided at all building entrances and exits at all times throughout the duration of construction.

### 3.5 SUPPORT FACILITIES INSTALLATION

- A. Comply with the following:
  - 1. If required, provide construction for temporary field offices, shops, and sheds located within construction area or within 30 feet (9 m) of building lines that is noncombustible according to ASTM E136. Comply with NFPA 241.
  - 2. Owner will provide a designated area at LCHA Administrative Office for biweekly job conferences.
  - 3. Maintain support facilities until Engineer schedules Substantial Completion inspection. Remove before Substantial Completion. Personnel remaining after Substantial Completion will be permitted to use permanent facilities, under conditions acceptable to Owner.
- B. Traffic Controls: Comply with requirements of authorities having jurisdiction.
  - 1. Protect existing site improvements to remain including curbs, pavement, and utilities.
  - 2. Maintain access for fire-fighting equipment and access to fire hydrants.
- C. Parking: Use designated areas of Owner's existing parking areas for construction personnel, parking of construction vehicles, waste disposal and storage of materials, as needed.
- D. Storage and Staging: Use designated areas of Project site for storage and staging needs.
- E. Waste Disposal Facilities: Provide waste-collection containers in sizes adequate to handle waste from construction operations. Comply with requirements of authorities having jurisdiction. Comply with progress cleaning requirements in Section 017300 "Execution."

### 3.6 SECURITY AND PROTECTION FACILITIES INSTALLATION

- A. Protection of Existing Facilities: Protect existing vegetation, equipment, structures, utilities, and other improvements at Project site and on adjacent properties, except those indicated to be removed or altered. Repair damage to existing facilities.
  - 1. Where access to adjacent properties is required in order to affect protection of existing facilities, obtain written permission from adjacent property owner to access property for that purpose.
- B. Environmental Protection: Provide protection, operate temporary facilities, and conduct construction as required to comply with environmental regulations and that minimize possible air, waterway, and subsoil contamination or pollution or other undesirable effects.
- C. Temporary Erosion and Sedimentation Control: Comply with requirements of EPA Construction General Permit or authorities having jurisdiction, whichever is more stringent.
- D. Stormwater Control: Comply with requirements of authorities having jurisdiction. Provide barriers in and around excavations and subgrade construction to prevent flooding by runoff of stormwater from heavy rains.

- E. **Tree and Plant Protection:** Install temporary fencing located as indicated or outside the drip line of trees to protect vegetation from damage from construction operations. Protect tree root systems from damage, flooding, and erosion.
- F. **Security Enclosure and Lockup:** Install temporary enclosure around partially completed areas of construction. Provide lockable entrances to prevent unauthorized entrance, vandalism, theft, and similar violations of security. Lock entrances at end of each workday.
- G. **Barricades, Warning Signs, and Lights:** Comply with requirements of authorities having jurisdiction for erecting structurally adequate barricades, including warning signs and lighting.
- H. **Temporary Egress:** Provide temporary egress from existing occupied facilities as indicated and as required by authorities having jurisdiction. Provide signage directing occupants to temporary egress.
- I. **Temporary Enclosures:** Provide temporary enclosures for protection of construction, in progress and completed, from exposure, foul weather, other construction operations, and similar activities. Provide temporary weathertight enclosure for building exterior.
  - 1. Where heating or cooling is needed and permanent enclosure is incomplete, insulate temporary enclosures.
- J. **Temporary Partitions:** Provide floor-to-ceiling dustproof partitions to limit dust and dirt migration and to separate areas occupied by Owner from fumes and noise.
  - 1. Construct dustproof partitions with gypsum wallboard with joints taped on occupied side, and fire-retardant-treated plywood on construction operations side.
  - 2. Provide walk-off mats at each entrance through temporary partition.

### 3.7 MOISTURE AND MOLD CONTROL

- A. **Moisture and Mold Protection:** Protect stored materials and installed Work in accordance with Moisture and Mold Protection Plan.
- B. **Controlled Construction Period:** Throughout the project, maintain as follows:
  - 1. Control moisture and humidity inside building by maintaining effective dry-in conditions.
  - 2. Use permanent HVAC system to control humidity within ranges specified for installed and stored materials.
  - 3. Comply with manufacturer's written instructions for temperature, relative humidity, and exposure to water limits.

### 3.8 OPERATION, TERMINATION, AND REMOVAL

- A. **Supervision:** Enforce strict discipline in use of temporary facilities. To minimize waste and abuse, limit availability of temporary facilities to essential and intended uses.
- B. **Maintenance:** Maintain facilities in good operating condition until removal.



1. Maintain operation of temporary enclosures, heating, cooling, humidity control, ventilation, and similar facilities on a 24-hour basis where required to achieve indicated results and to avoid possibility of damage.
- C. Temporary Facility Changeover: Do not change over from using temporary security and protection facilities to permanent facilities until Substantial Completion.
- D. Termination and Removal: Remove each temporary facility when need for its service has ended, when it has been replaced by authorized use of a permanent facility, or no later than Substantial Completion. Complete or, if necessary, restore permanent construction that may have been delayed because of interference with temporary facility. Repair damaged Work, clean exposed surfaces, and replace construction that cannot be satisfactorily repaired.
1. Materials and facilities that constitute temporary facilities are property of Contractor. Owner reserves right to take possession of Project identification signs.
  2. At Substantial Completion, repair, renovate, and clean permanent facilities used during construction period. Comply with final cleaning requirements specified in Section 017700 "Closeout Procedures."

END OF SECTION 015000

## SECTION 016000 - PRODUCT REQUIREMENTS

### PART 1 - GENERAL

#### 1.1 RELATED REQUIREMENTS:

- A. All drawings and general provisions of the Contract, including General and Supplementary Conditions and other 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.

#### 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. Products salvaged or recycled from other projects are not considered new products.
  - 3. Comparable Product: Product that is demonstrated and approved through submittal process 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 specific manufacturer's product is named and accompanied by the words "basis-of-design product," including make or model number or other designation, to establish the significant qualities related to type, function, dimension, in-service performance, physical properties, appearance, and other characteristics for purposes of evaluating comparable products of additional manufacturers named in the specification.

#### 1.4 ACTION SUBMITTALS

- A. Comparable Product Requests: Submit request for consideration of each comparable product. Identify product or fabrication or installation method to be replaced. Include Specification Section number and title and Drawing numbers and titles.
  - 1. Include data to indicate compliance with the requirements specified in "Comparable Products" Article.
  - 2. Architect's Action: If necessary, Architect will request additional information or documentation for evaluation within one week of receipt of a comparable product request. Architect will notify Contractor of approval or rejection of proposed comparable product request within 15 days of receipt of request, or seven days of receipt of additional information or documentation, whichever is later.
    - a. Form of Approval: As specified in Division 01 Section "Submittal Procedures."
    - b. Use product specified if Architect does not issue a decision on use of a comparable product request within time allocated.
- B. Basis-of-Design Product Specification Submittal: Comply with requirements in Division 01 Section "Submittal Procedures." Show compliance with requirements.

#### 1.5 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. Each contractor is responsible for providing products and construction methods compatible with products and construction methods of other contractors.
  - 2. If a dispute arises between contractors over concurrently selectable but incompatible products, Architect will determine which products shall be used.

#### 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 to determine that products are undamaged and properly protected.

C. Storage:

1. Store products to allow for inspection and measurement of quantity or counting of units.
2. Store materials in a manner that will not endanger Project structure.
3. Store products that are subject to damage by the elements, under cover in a weathertight enclosure above ground, with ventilation adequate to prevent condensation.
4. Protect foam plastic from exposure to sunlight, except to extent necessary for period of installation and concealment.
5. Comply with product manufacturer's written instructions for temperature, humidity, ventilation, and weather-protection requirements for storage.
6. Protect stored products from damage and liquids from freezing.
7. 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. Manufacturer's disclaimers and limitations on product warranties do not relieve Contractor of obligations under requirements of the Contract Documents.
1. Manufacturer's Warranty: Written warranty furnished by individual manufacturer for a particular product and specifically endorsed by manufacturer to Owner.
  2. Special Warranty: Written warranty required by the Contract Documents to provide specific rights for 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 with the Specifications, prepare a written document using indicated form properly executed.
  3. See Divisions 02 through 33 Sections for specific content requirements and particular requirements for submitting special warranties.
- C. Submittal Time: Comply with requirements in Division 01 Section "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 a 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 not in conflict with requirements of the Contract Documents.
  4. Where products are accompanied by the term "as selected," Architect 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 "or approved equal," or "or approved," comply with requirements in "Comparable Products" Article to obtain approval for use of an unnamed product.
- B. Product Selection Procedures:
1. 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.
  2. 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.
  3. Products:
    - a. Nonrestricted List: 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. Comply with requirements in "Comparable Products" Article for consideration of an unnamed product.
  4. Manufacturers:
    - a. Nonrestricted List: 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. Comply with requirements in "Comparable Products" Article for consideration of an unnamed manufacturer's product.
  5. 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

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.

- C. Visual Matching Specification: Where Specifications require "match Architect's sample", provide a product that complies with requirements and matches Architect's sample. Architect's decision will be final on whether a proposed product matches.
  - 1. If no product available within specified category matches and complies with other specified requirements, comply with requirements in Division 01 Section "Substitution Procedures" for proposal of product.
- D. Visual Selection Specification: Where Specifications include the phrase "as selected by Architect from manufacturer's full range" or similar phrase, select a product that complies with requirements. Architect will select color, gloss, pattern, density, or texture from manufacturer's product line that includes both standard and premium items.

## 2.2 COMPARABLE PRODUCTS

- A. Conditions for Consideration: Architect will consider Contractor's request for comparable product when the following conditions are satisfied. If the following conditions are not satisfied, Architect may return requests without action, except to record noncompliance with these requirements:
  - 1. Evidence that the proposed product does not require revisions to the Contract Documents, that it is consistent with the Contract Documents and will produce the indicated results, and that it is compatible with other portions of the Work.
  - 2. Detailed comparison of significant qualities of proposed product with those named in the Specifications. Significant qualities include attributes such as performance, weight, size, durability, visual effect, and specific features and requirements indicated.
  - 3. Evidence that proposed product provides specified warranty.
  - 4. List of similar installations for completed projects with project names and addresses and names and addresses of architects and owners, if requested.
  - 5. Samples, if requested.

PART 3 - EXECUTION (Not Used)

END OF SECTION 016000

## SECTION 017300 - EXECUTION

### PART 1 - GENERAL

#### 1.1 RELATED REQUIREMENTS:

- A. All drawings and general provisions of the Contract, including General and Supplementary Conditions and other 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-installed products.
  - 6. Progress cleaning.
  - 7. Starting and adjusting.
  - 8. Protection of installed construction.
  - 9. Correction of the Work.

#### 1.3 DEFINITIONS

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

#### 1.4 INFORMATIONAL SUBMITTALS

- A. Cutting and Patching Plan: Submit plan describing procedures at least 15 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.
- B. Landfill Receipts: Submit copy of receipts issued by a landfill facility, licensed to accept hazardous materials, for hazardous waste disposal.

## 1.5 QUALITY ASSURANCE

- A. 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, notify Architect of locations and details of cutting and await directions from Architect 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. Mechanical systems and piping.
    - c. Control systems.
    - d. Communication systems.
    - e. Fire-detection and -alarm systems.
    - f. Electrical wiring systems.
  3. 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 Architect's opinion, reduce the building's aesthetic qualities. Remove and replace construction that has been cut and patched in a visually unsatisfactory manner.
- B. Manufacturer's Installation Instructions: Obtain and maintain on-site manufacturer's written recommendations and instructions for installation of products and equipment.



## PART 2 - PRODUCTS

### 2.1 MATERIALS

- A. 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 Architect for the visual and functional performance of in-place materials.

## 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, 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.
  - 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 caused by differing field conditions outside the control of Contractor, submit a request for information to Architect according to requirements in Division 01 Section "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. If discrepancies are discovered, notify Architect promptly.
- B. 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.
- C. 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 Architect.

### 3.4 FIELD ENGINEERING

- A. 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 Architect. Report lost or destroyed permanent benchmarks or control points promptly. Report the need to relocate permanent benchmarks or control points to Architect before proceeding.
  - 2. Replace lost or destroyed permanent benchmarks and control points promptly. Base replacements on the original survey control points.
- B. Benchmarks: Establish and maintain a minimum of 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.

### 3.5 INSTALLATION

- A. General: 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.
- 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 the best possible results. 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 in excess of that expected during normal conditions of occupancy.
- 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: Do not use tools or equipment that produce harmful 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 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.
  - 1. Mounting Heights: Where mounting heights are not indicated, mount components at heights directed by Architect.
  - 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. Fit exposed connections together to form hairline joints.
- J. Hazardous Materials: Use products, cleaners, and installation materials that are not considered hazardous.

### 3.6 CUTTING AND PATCHING

- A. Cutting and Patching, 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 according to requirements in Division 01 Section "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 proposed 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. Additional limitations contained in other specification sections and drawings for removal of mortar for repointing of masonry do not permit use of rotary or power tools.
  - 4. 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.
  - 5. 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. 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 minimize 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. 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 PROGRESS CLEANING

- A. General: 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 (27 deg C).
  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 in Finished Areas: 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.
- 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 assure that no part of the construction, completed or in progress, is subject to harmful, dangerous, damaging, or otherwise deleterious exposure during the construction period.

### 3.8 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.

### 3.9 PROTECTION 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. Comply with manufacturer's written instructions for temperature and relative humidity.

END OF SECTION 017300

## SECTION 017700 - CLOSEOUT PROCEDURES

### PART 1 - GENERAL

#### 1.1 RELATED REQUIREMENTS:

- A. All drawings and general provisions of the Contract, including General and Supplementary Conditions and other 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.

#### 1.3 SUBSTANTIAL COMPLETION

- A. Preliminary Procedures: Before requesting inspection for determining date of Substantial Completion, complete the following. List items below that are incomplete with request.
  - 1. Prepare a list of items to be completed and corrected (punch list), the value of items on the list, and reasons why the Work is not complete.
  - 2. Advise Owner of pending insurance changeover requirements.
  - 3. Submit specific warranties, workmanship bonds, maintenance service agreements, final certifications, and similar documents.
  - 4. Obtain and submit releases permitting Owner unrestricted use of the Work and access to services and utilities. Include occupancy permits, operating certificates, and similar releases.
  - 5. Prepare and submit Project Record Documents, operation and maintenance manuals, final completion construction photographic documentation, damage or settlement surveys, property surveys, and similar final record information.
  - 6. Deliver tools, spare parts, extra materials, and similar items to location designated by Owner. Label with manufacturer's name and model number where applicable.
  - 7. Make final changeover of permanent locks and deliver keys to Owner. Advise Owner's personnel of changeover in security provisions.
  - 8. Complete startup testing of systems.
  - 9. Submit test/adjust/balance records.



10. Terminate and remove temporary facilities from Project site, along with mockups, construction tools, and similar elements.
11. Advise Owner of changeover in heat and other utilities.
12. Submit changeover information related to Owner's occupancy, use, operation, and maintenance.
13. Complete final cleaning requirements, including touchup painting.
14. Touch up and otherwise repair and restore marred exposed finishes to eliminate visual defects.

B. Inspection: Submit a written request for inspection for Substantial Completion. On receipt of request, Architect will either proceed with inspection or notify Contractor of unfulfilled requirements. Architect 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 Architect, that must be completed or corrected before certificate will be issued.

1. Reinspection: 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.

#### 1.4 FINAL COMPLETION

A. Preliminary Procedures: Before requesting final inspection for determining final completion, complete the following:

1. Submit a final Application for Payment according to Division 01 Section "Payment Procedures."
2. Submit certified copy of Architect's Substantial Completion inspection list of items to be completed or corrected (punch list), endorsed and dated by Architect. The certified copy of the list shall state that each item has been completed or otherwise resolved for acceptance.
3. Submit evidence of final, continuing insurance coverage complying with insurance requirements.
4. Submit pest-control final inspection report and warranty.
5. Instruct Owner's personnel in operation, adjustment, and maintenance of products, equipment, and systems.

B. Inspection: Submit a written request for final inspection for acceptance. On receipt of request, Architect will either proceed with inspection or notify Contractor of unfulfilled requirements. Architect 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. Reinspection: Request reinspection when the Work identified in previous inspections as incomplete is completed or corrected.

## 1.5 LIST OF INCOMPLETE ITEMS (PUNCH LIST)

- 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 items applying to each space by major element, including categories for ceiling, individual walls, floors, equipment, and building systems.

## 1.6 WARRANTIES

- A. Submittal Time: Submit written warranties on request of Architect for designated portions of the Work where commencement of warranties other than date of Substantial Completion is indicated.
- B. Organize warranty documents into an orderly sequence based on the table of contents of the Project Manual.
  - 1. Bind warranties and bonds in heavy-duty, 3-ring, vinyl-covered, loose-leaf binders, thickness as necessary to accommodate contents, and sized to receive 8-1/2-by-11-inch (215-by-280-mm) 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.
- C. 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. Comply with the VOC requirements of section 018113.13 for all cleaning agents.

## 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 portion of Project:
    - a. Clean Project site, yard, and grounds, in areas disturbed by construction activities, including landscape development areas, 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. Remove snow and ice to provide safe access to building.
    - e. 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.
    - f. Remove debris and surface dust from limited access spaces, including roofs, plenums, shafts, trenches, equipment vaults, manholes, attics, and similar spaces.
    - g. Sweep concrete or unfinished wood floors broom clean in unoccupied spaces.
    - h. Vacuum carpet and similar soft surfaces, removing debris and excess nap; shampoo 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. Replace chipped or broken glass and other damaged transparent materials. Polish mirrors and glass, taking care not to scratch surfaces.
    - j. Remove labels that are not permanent.
    - k. Touch up and otherwise repair and restore marred, exposed finishes and surfaces. Replace finishes and surfaces that cannot be satisfactorily repaired or restored or that already show evidence of repair or restoration.
      - 1) Do not paint over "UL" and other required labels and identification, including mechanical and electrical nameplates.
  - 1. Wipe surfaces of mechanical and electrical equipment, elevator equipment, and similar equipment. Remove excess lubrication, paint and mortar droppings, and other foreign substances.

- m. Replace parts subject to operating conditions during construction that may impede operation or reduce longevity.
  - n. Clean plumbing fixtures to a sanitary condition, free of stains, including stains resulting from water exposure.
  - o. Replace disposable air filters and clean permanent air filters. Clean exposed surfaces of diffusers, registers, and grills.
  - p. Clean light fixtures, lamps, globes, and reflectors to function with full efficiency. Replace burned-out bulbs, and those noticeably dimmed by hours of use, and defective and noisy starters in fluorescent and mercury vapor fixtures to comply with requirements for new fixtures.
  - q. Leave Project clean and ready for occupancy.
- C. Pest Control: Engage an experienced, licensed exterminator to make a final inspection and rid Project of rodents, insects, and other pests. Prepare a report.

END OF SECTION 017700

## SECTION 017823 - OPERATION AND MAINTENANCE DATA

### PART 1 - GENERAL

#### 1.1 RELATED REQUIREMENTS:

- A. All drawings and general provisions of the Contract, including General and Supplementary Conditions and other 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.

#### 1.3 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. Architect and Commissioning Authority 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 one paper copy, bound in a 3-ring binder
  - 2. Submit 3 copies on digital media acceptable to Architect. Enable reviewer comments on draft submittals.
- C. 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. Architect and Commissioning Authority will return copy with comments.

1. Correct or revise each manual to comply with Architect's and Commissioning Authority's comments. Submit copies of each corrected manual within 15 days of receipt of Architect's and Commissioning Authority's comments and prior to commencing demonstration and training.
- D. Comply with Section 017700 "Closeout Procedures" for schedule for submitting operation and maintenance documentation.

#### 1.4 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.
- B. Manuals, Paper Copy: Submit manuals in the form of hard-copy, bound and labeled volumes.
  1. Binders: Heavy-duty, three-ring, vinyl-covered, loose-leaf binders, in thickness necessary to accommodate contents, sized to hold 8-1/2-by-11-inch (215-by-280-mm) paper; with clear plastic sleeve on spine to hold label describing contents and with pockets inside covers to hold folded oversize sheets.
  2. Drawings: Attach reinforced, punched binder tabs on drawings and bind with text.
    - a. If oversize drawings are necessary, fold drawings to same size as text pages and use as foldouts.
    - b. If drawings are too large to be used as foldouts, fold and place drawings in labeled envelopes and bind envelopes in rear of manual. At appropriate locations in manual, insert typewritten pages indicating drawing titles, descriptions of contents, and drawing locations.

#### 1.5 REQUIREMENTS FOR 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 Architect.
  7. Name and contact information for Commissioning Authority.
  8. Names and contact information for major consultants to the Architect that designed the systems contained in the manuals.
  9. 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.
- 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."

#### 1.6 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.
- 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.

## 1.7 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.
- 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. **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.
- D. **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.
- E. **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.
- F. **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.
- 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.
- H. **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.

1.8 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. 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.
- D. 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.
- E. Repair Materials and Sources: Include lists of materials and local sources of materials and related services.
- F. 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 REQUIREMENTS:

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

#### 1.2 SUMMARY

- A. This Section includes administrative and procedural requirements for Project Record Documents, including the following:
  - 1. Record Drawings.
  - 2. Record Specifications.
  - 3. Record Product Data.

#### 1.3 SUBMITTALS

- A. Record Drawings: Comply with the following:
  - 1. Number of Copies: Submit one set(s) of marked-up Record Prints.
- B. Record Specifications: Submit one copy of Project's Specifications, including addenda and contract modifications.
- C. Record Product Data: Submit one copy of each Product Data submittal.

### PART 2 - PRODUCTS

#### 2.1 RECORD DRAWINGS

- A. Record Prints: Maintain one set of blue- or black-line white prints of the Contract Drawings and Shop Drawings.
  - 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 prepare the 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. Record data as soon as possible after obtaining it. Record and check the markup before enclosing concealed installations.
2. Mark the Contract Drawings or Shop Drawings, whichever is most capable of showing actual physical conditions, completely and accurately. If Shop Drawings are marked, show cross-reference on the Contract Drawings.
  3. Mark record sets with erasable, red-colored pencil. Use other colors to distinguish between changes for different categories of the Work at same location.
  4. Note Construction Change Directive numbers, alternate numbers, Change Order numbers, and similar identification, where applicable.
- B. Format: Identify and date each Record Drawing; include the designation "PROJECT RECORD DRAWING" in a prominent location.
1. Record Prints: Organize Record Prints and newly prepared Record Drawings into manageable sets. Bind each set with durable paper cover sheets. Include identification on cover sheets.
  2. Identification: As follows:
    - a. Project name.
    - b. Date.
    - c. Designation "PROJECT RECORD DRAWINGS."
    - d. Name of Architect.
    - e. Name of Contractor.

## 2.2 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. Note related Change Orders, Record Product Data, and Record Drawings where applicable.

### 2.3 RECORD PRODUCT DATA

- A. 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.

### 2.4 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.

## PART 3 - EXECUTION

### 3.1 RECORDING AND MAINTENANCE

- A. Recording: Maintain one copy of each submittal during the construction period for Project Record Document purposes. Post changes and modifications to Project Record Documents as they occur; do not wait until the end of Project.
- B. Maintenance of Record Documents and Samples: Store Record Documents and Samples 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 Architect's reference during normal working hours.

END OF SECTION 017839

## SECTION 024119 - SELECTIVE DEMOLITION

### PART 1 - GENERAL

#### 1.1 SUMMARY

A. Section Includes:

1. Demolition and removal of selected portions of building or structure.

#### 1.2 MATERIALS OWNERSHIP

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

#### 1.3 INFORMATIONAL SUBMITTALS

- A. Proposed Protection Measures: Submit report, including Drawings, that indicates the measures proposed for protecting individuals and property, for environmental protection, for dust control. Indicate proposed locations and construction of barriers.
- B. Schedule of selective demolition activities with starting and ending dates for each activity.
- C. Predemolition photographs or video.

#### 1.4 CLOSEOUT SUBMITTALS

- A. Inventory of items that have been removed and salvaged.

#### 1.5 FIELD CONDITIONS

- A. Owner will occupy portions of building immediately adjacent to selective demolition area. Conduct selective demolition so Owner's operations will not be disrupted.
- B. Conditions existing at time of inspection for bidding purpose will be maintained by Owner as far as practical.
1. Before selective demolition, Owner will remove loose furnishings, equipment and personal item.
- C. Notify Architect of discrepancies between existing conditions and Drawings before proceeding with selective demolition.
- D. Hazardous Materials: It is not expected that hazardous materials will be encountered in the Work.

1. If suspected hazardous materials are encountered, do not disturb; immediately notify Architect and Owner. Hazardous materials will be removed by Owner under a separate contract.

E. Storage or sale of removed items or materials on-site is not permitted.

F. Utility Service: Maintain existing utilities indicated to remain in service and protect them against damage during selective demolition operations.

1. Maintain fire-protection facilities in service during selective demolition operations.

## 1.6 WARRANTY

A. Existing Warranties: Remove, replace, patch, and repair materials and surfaces cut or damaged during selective demolition, by methods and with materials and using approved contractors so as not to void existing warranties.

## PART 2 - PRODUCTS

### 2.1 PERFORMANCE REQUIREMENTS

A. Regulatory Requirements: Comply with governing EPA notification regulations before beginning selective demolition. Comply with hauling and disposal regulations of authorities having jurisdiction.

B. Standards: Comply with ASSE A10.6 and NFPA 241.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

A. Verify that utilities have been disconnected and capped before starting selective demolition operations.

B. Inventory and record the condition of items to be removed and salvaged.

### 3.2 UTILITY SERVICES AND MECHANICAL/ELECTRICAL SYSTEMS

A. Existing Services/Systems to Remain: Maintain services/systems indicated to remain and protect them against damage.

B. Existing Services/Systems to Be Removed, Relocated, or Abandoned: Locate, identify, disconnect, and seal or cap off utility services and mechanical/electrical systems serving areas to be selectively demolished.

1. Arrange to shut off utilities with utility companies.

2. If services/systems are required to be removed, relocated, or abandoned, provide temporary services/systems that bypass area of selective demolition and that maintain continuity of services/systems to other parts of building.
3. Disconnect, demolish, and remove fire-suppression systems, plumbing, and HVAC systems, equipment, and components indicated on Drawings to be removed.
  - a. Piping to Be Removed: Remove portion of piping indicated to be removed and cap or plug remaining piping with same or compatible piping material.
  - b. Piping to Be Abandoned in Place: Drain piping and cap or plug piping with same or compatible piping material and leave in place.
  - c. Equipment to Be Removed: Disconnect and cap services and remove equipment.
  - d. Equipment to Be Removed and Reinstalled: Disconnect and cap services and remove, clean, and store equipment; when appropriate, reinstall, reconnect, and make equipment operational.
  - e. Equipment to Be Removed and Salvaged: Disconnect and cap services and remove equipment and deliver to Owner.
  - f. Ducts to Be Removed: Remove portion of ducts indicated to be removed and plug remaining ducts with same or compatible ductwork material.

### 3.3 PROTECTION

- A. Temporary Protection: Provide temporary barricades and other protection required to prevent injury to people and damage to adjacent buildings and facilities to remain.
- B. Temporary Shoring: Design, provide, and maintain shoring, bracing, and structural supports as required to preserve stability and prevent movement, settlement, or collapse of construction and finishes to remain, and to prevent unexpected or uncontrolled movement or collapse of construction being demolished.
- C. Remove temporary barricades and protections where hazards no longer exist.

### 3.4 SELECTIVE DEMOLITION

- A. General: Demolish and remove existing construction only to the extent required by new construction and as indicated. Use methods required to complete the Work within limitations of governing regulations and as follows:
  1. Neatly cut openings and holes plumb, square, and true to dimensions required. Use cutting methods least likely to damage construction to remain or adjoining construction. Use hand tools or small power tools designed for sawing or grinding, not hammering and chopping. Temporarily cover openings to remain.
  2. Cut or drill from the exposed or finished side into concealed surfaces to avoid marring existing finished surfaces.
  3. Do not use cutting torches until work area is cleared of flammable materials. At concealed spaces, such as duct and pipe interiors, verify condition and contents of hidden space before starting flame-cutting operations. Maintain portable fire-suppression devices during flame-cutting operations.
  4. Maintain fire watch during and for at least 12 hours after flame-cutting operations.



5. Locate selective demolition equipment and remove debris and materials so as not to impose excessive loads on supporting walls, floors, or framing.
  6. Dispose of demolished items and materials promptly. Comply with requirements in Division 1 Section "Information Regarding Proper Disposal of Construction Demolition Waste."
- B. Site Access and Temporary Controls: Conduct selective demolition and debris-removal operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities.
- C. Removed and Reinstalled Items:
1. Clean and repair items to functional condition adequate for intended reuse.
  2. Pack or crate items after cleaning and repairing. Identify 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. Provide connections, supports, and miscellaneous materials necessary to make item functional for use indicated.
- D. Existing Items to Remain: Protect construction indicated to remain against damage and soiling during selective demolition. When permitted by Architect, items may be removed to a suitable, protected storage location during selective demolition and reinstalled in their original locations after selective demolition operations are complete.

### 3.5 CLEANING

- A. Remove demolition waste materials from Project site and dispose of them in an EPA-approved construction and demolition waste landfill acceptable to authorities having jurisdiction and recycle or dispose of them according to Division 1 Section "Information Regarding Proper Disposal of Construction Demolition Waste."
1. Do not allow demolished materials to accumulate on-site.
  2. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.
  3. Remove debris from elevated portions of building by chute, hoist, or other device that will convey debris to grade level in a controlled descent.
  4. Comply with requirements specified in Division 1 Section "Information Regarding Proper Disposal of Construction Demolition Waste."
- B. Burning: Do not burn demolished materials.
- C. Clean adjacent structures and improvements of dust, dirt, and debris caused by selective demolition operations. Return adjacent areas to condition existing before selective demolition operations began.

END OF SECTION 024119

## SECTION 079200 - JOINT SEALANTS

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

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

#### 1.2 SUMMARY

- A. Section Includes:
  - 1. Silicone joint sealants.
  - 2. Urethane joint sealants.

#### 1.3 ACTION SUBMITTALS

- A. Product Data: For each joint-sealant product indicated.
- B. Samples: For each kind and color of joint sealant required.
- C. Joint-Sealant Schedule: Include the following information:
  - 1. Joint-sealant application, joint location, and designation.
  - 2. Joint-sealant manufacturer and product name.
  - 3. Joint-sealant formulation.
  - 4. Joint-sealant color.

#### 1.4 INFORMATIONAL SUBMITTALS

- A. Product test reports.
- B. Warranties.

#### 1.5 WARRANTY

- A. Special Installer's Warranty: Manufacturer's standard form in which Installer agrees to repair or replace joint sealants that do not comply with performance and other requirements specified in this Section within specified warranty period.
  - 1. Warranty Period: Five years from date of Substantial Completion.

- B. Special Manufacturer's Warranty: Manufacturer's standard form in which joint-sealant manufacturer agrees to furnish joint sealants to repair or replace those that do not comply with performance and other requirements specified in this Section within specified warranty period.
  - 1. Warranty Period:
    - a. 20 years from date of Substantial Completion for silicone sealants.
    - b. 5 years from date of Substantial Completion for uncoated urethane sealants.
    - c. 10 years from date of Substantial Completion for coated urethane sealants.

## PART 2 - PRODUCTS

### 2.1 MATERIALS, GENERAL

- A. Liquid-Applied Joint Sealants: Comply with ASTM C 920 and other requirements indicated for each liquid-applied joint sealant specified, including those referencing ASTM C 920 classifications for type, grade, class, and uses related to exposure and joint substrates.
  - 1. Suitability for Immersion in Liquids. Where sealants are indicated for Use I for joints that will be continuously immersed in liquids, provide products that have undergone testing according to ASTM C 1247. Liquid used for testing sealants is deionized water, unless otherwise indicated.
- B. Stain-Test-Response Characteristics: Where sealants are specified to be nonstaining to porous substrates, provide products that have undergone testing according to ASTM C 1248 and have not stained porous joint substrates indicated for Project.

### 2.2 SILICONE JOINT SEALANTS

- A. Mildew-Resistant, Neutral-Curing or Acid-Curing Silicone Joint Sealant as indicated on drawings: ASTM C 920.
  - 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
    - a. Pecora Corporation.
    - b. Tremco Incorporated.
  - 2. Type: Single component (S).
  - 3. Grade: nonsag (NS).
  - 4. Uses Related to Exposure: Nontraffic (NT).

### 2.3 URETHANE JOINT SEALANTS

- A. Urethane Joint Sealant: ASTM C 920.
  - 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

- a. Pecora Corporation.
  - b. Tremco Incorporated.
2. Type: multicomponent (M) or Single Component (S) as specified
  3. Grade: Pourable (P).
  4. Uses Related to Exposure: Traffic (T).

#### 2.4 JOINT SEALANT BACKING

- A. Cylindrical Sealant Backings: ASTM C 1330, Type C (closed-cell material with a surface skin), and of size and density to control sealant depth and otherwise contribute to producing optimum sealant performance.
- B. Bond-Breaker Tape: Polyethylene tape or other plastic tape recommended by sealant manufacturer.

#### 2.5 MISCELLANEOUS MATERIALS

- A. Primer: Material recommended by joint-sealant manufacturer where required for adhesion of sealant to joint substrates indicated, as determined from preconstruction joint-sealant-substrate tests and field tests.
- B. Cleaners for Nonporous Surfaces: Chemical cleaners acceptable to manufacturers of sealants and sealant backing materials.
- C. Masking Tape: Nonstaining, nonabsorbent material compatible with joint sealants and surfaces adjacent to joints.

### PART 3 - EXECUTION

#### 3.1 PREPARATION

- A. Surface Cleaning of Joints: Clean out joints immediately before installing joint sealants to comply with joint-sealant manufacturer's written instructions.
  1. Remove laitance and form-release agents from concrete.
  2. Clean nonporous joint substrate surfaces with chemical cleaners or other means that do not stain, harm substrates, or leave residues capable of interfering with adhesion of joint sealants.
- B. Joint Priming: Prime joint substrates where recommended by joint-sealant manufacturer or as indicated by preconstruction joint-sealant-substrate tests or prior experience. Apply primer to comply with joint-sealant manufacturer's written instructions. Confine primers to areas of joint-sealant bond; do not allow spillage or migration onto adjoining surfaces.
- C. Masking Tape: Use masking tape where required to prevent contact of sealant or primer with adjoining surfaces that otherwise would be permanently stained or damaged by such contact or

by cleaning methods required to remove sealant smears. Remove tape immediately after tooling without disturbing joint seal.

### 3.2 INSTALLATION

- A. Sealant Installation Standard: Comply with recommendations in ASTM C 1193 for use of joint sealants as applicable to materials, applications, and conditions indicated.
- B. Install sealant backings of kind indicated to support sealants during application and at position required to produce cross-sectional shapes and depths of installed sealants relative to joint widths that allow optimum sealant movement capability.
  - 1. Do not leave gaps between ends of sealant backings.
  - 2. Do not stretch, twist, puncture, or tear sealant backings.
  - 3. Remove absorbent sealant backings that have become wet before sealant application and replace them with dry materials.
- C. Install bond-breaker tape behind sealants where sealant backings are not used between sealants and backs of joints.
- D. Install sealants using proven techniques that comply with the following and at the same time backings are installed:
  - 1. Place sealants so they directly contact and fully wet joint substrates.
  - 2. Completely fill recesses in each joint configuration.
  - 3. Produce uniform, cross-sectional shapes and depths relative to joint widths that allow optimum sealant movement capability.
- E. Tooling of Nonsag Sealants: Immediately after sealant application and before skinning or curing begins, tool sealants according to requirements specified in subparagraphs below to form smooth, uniform beads of configuration indicated; to eliminate air pockets; and to ensure contact and adhesion of sealant with sides of joint.
  - 1. Remove excess sealant from surfaces adjacent to joints.
  - 2. Use tooling agents that are approved in writing by sealant manufacturer and that do not discolor sealants or adjacent surfaces.
  - 3. Provide concave joint profile per Figure 8A in ASTM C 1193, unless otherwise indicated.
- F. Clean off excess sealant or sealant smears adjacent to joints as the Work progresses by methods and with cleaning materials approved in writing by manufacturers of joint sealants and of products in which joints occur.

### 3.3 JOINT-SEALANT SCHEDULE

- A. See Joint Sealer Schedule on sheet CS1.1.

END OF SECTION 079200

## SECTION 081113 - HOLLOW METAL DOORS AND FRAMES

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

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

#### 1.2 SUMMARY

- A. Section includes hollow-metal work.

#### 1.3 DEFINITIONS

- A. Minimum Thickness: Minimum thickness of base metal without coatings according to NAAMM-HMMA 803 or SDI A250.8.

#### 1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Shop Drawings: Include elevations, door edge details, frame profiles, metal thicknesses, preparations for hardware, and other details.
- C. Schedule: Prepared by or under the supervision of supplier, using same reference numbers for details and openings as those on Drawings.

#### 1.5 INFORMATIONAL SUBMITTALS

- A. Product test reports.

### PART 2 - PRODUCTS

#### 2.1 MANUFACTURERS

- A. Manufactures: Subject to compliance with requirements, available manufacturers include, but are not limited to the following:
  1. Mesker Openings Group, Inc
  2. Ceco Door; ADDA ABLOY.
  3. Curries Company; ASSA ABLOY.
  4. Gensteel Doors, Inc.
  5. Republic Doors and Frames.

6. Steelcraft; an Ingersoll-Rand Company.

B. Heavy-Duty Doors and Frames: SDI A250.8, Level 2; All exterior doors

1. Physical Performance: Level B according to SDI A250.4.

2. Doors:

a. Type: As indicated in the Door and Frame Schedule.

b. Thickness: 1-3/4 inches.

c. Face: Metallic-coated for exterior doors, cold-rolled steel sheet, minimum thickness-16 gauge.

d. Edge Construction: Model 1, Full Flush.

e. Core: Polystyrene for exterior doors.

3. Frames:

a. Materials: metallic-coated for exterior doors, steel sheet, minimum thickness -16 gauge.

b. Construction: fully welded for exterior doors.

4. Exposed Finish: Prime.

## 2.2 FRAME ANCHORS

A. Jamb Anchors:

1. Masonry Type: Adjustable strap-and-stirrup or T-shaped anchors to suit frame size, not less than 0.042 inch (1.0 mm) thick, with corrugated or perforated straps not less than 2 inches (51 mm) wide by 10 inches (254 mm) long; or wire anchors not less than 0.177 inch (4.5 mm) thick. Provide galvanized steel for all anchors in masonry.

## 2.3 MATERIALS

A. Cold-Rolled Steel Sheet: ASTM A 1008/A 1008M, Commercial Steel (CS), Type B; suitable for exposed applications.

B. Hot-Rolled Steel Sheet: ASTM A 1011/A 1011M, Commercial Steel (CS), Type B; free of scale, pitting, or surface defects; pickled and oiled.

C. Metallic-Coated Steel Sheet: ASTM A 653/A 653M, Commercial Steel (CS), Type B.

D. Frame Anchors: ASTM A 879/A 879M, Commercial Steel (CS), 04Z (12G) coating designation; mill phosphatized.

1. For anchors built into exterior and masonry walls, steel sheet complying with ASTM A 1008/A 1008M or ASTM A 1011/A 1011M, hot-dip galvanized according to ASTM A 153/A 153M, Class B.

E. Inserts, Bolts, and Fasteners: Hot-dip galvanized according to ASTM A 153/A 153M.

F. Power-Actuated Fasteners in Concrete: From corrosion-resistant materials.

- G. Grout: ASTM C 476, except with a maximum slump of 4 inches (102 mm), as measured according to ASTM C 143/C 143M.
- H. Bituminous Coating: Cold-applied asphalt mastic, compounded for 15-mil (0.4-mm) dry film thickness per coat.

## 2.4 FABRICATION

- A. Fabricate hollow-metal work to be rigid and free of defects, warp, or buckle. Accurately form metal to required sizes and profiles, with minimum radius for metal thickness. Where practical, fit and assemble units in manufacturer's plant. To ensure proper assembly at Project site, clearly identify work that cannot be permanently factory assembled before shipment.
- B. Hollow-Metal Doors:
  - 1. Exterior Doors: Provide weep-hole openings in bottoms of exterior doors to permit moisture to escape. Seal joints in top edges of doors against water penetration.
- C. Hollow-Metal Frames: Where frames are fabricated in sections due to shipping or handling limitations, provide alignment plates or angles at each joint, fabricated of same thickness metal as frames.
  - 1. Provide countersunk, flat head exposed screws and bolts for exposed fasteners unless otherwise indicated.
  - 2. Grout Guards: Weld guards to frame at back of hardware mortises in frames to be grouted.
  - 3. Floor Anchors: Weld anchors to bottoms of jambs with at least four spot welds per anchor; however, for slip-on drywall frames, provide anchor clips or countersunk holes at bottoms of jambs.
  - 4. Jamb Anchors: Provide number and spacing of anchors as follows:
    - a. Masonry Type: Locate anchors not more than 16 inches (406 mm) from top and bottom of frame. Space anchors not more than 32 inches (813 mm) o.c., to match coursing, and as follows:
      - 1) Two anchors per jamb up to 60 inches (1524 mm) high.
      - 2) Three anchors per jamb from 60 to 90 inches (1524 to 2286 mm) high.
      - 3) Four anchors per jamb from 90 to 120 inches (2286 to 3048 mm) high.
      - 4) Four anchors per jamb plus one additional anchor per jamb for each 24 inches (610 mm) or fraction thereof above 120 inches (3048 mm) high.
    - b. Compression Type: Not less than two anchors in each frame.
- D. Hardware Preparation: Factory prepare hollow-metal work to receive templated mortised hardware; include cutouts, reinforcement, mortising, drilling, and tapping according to SDI A250.6, the Door Hardware Schedule, and templates.
  - 1. Reinforce doors and frames to receive nontemplated, mortised, and surface-mounted door hardware.
  - 2. Comply with applicable requirements in SDI A250.6 and BHMA A156.115 for preparation of hollow-metal work for hardware.



## 2.5 STEEL FINISHES

A. Prime Finish: Clean, pretreat, and apply manufacturer's standard primer.

1. Shop Primer: SDI A250.10.

## 2.6 ACCESSORIES

A. Grout Guards: Formed from same material as frames, not less than 0.016 inch (0.4 mm) thick.

## PART 3 - EXECUTION

### 3.1 INSTALLATION

A. Hollow-Metal Frames: Install hollow-metal frames for doors of size and profile indicated. Comply with SDI A250.11 or NAAMM-HMMA 840 as required by standards specified.

1. Set frames accurately in position; plumbed, aligned, and braced securely until permanent anchors are set. After wall construction is complete, remove temporary braces, leaving surfaces smooth and undamaged.

a. Where frames are fabricated in sections because of shipping or handling limitations, field splice at approved locations by welding face joint continuously; grind, fill, dress, and make splice smooth, flush, and invisible on exposed faces.

b. Install frames with removable stops located on secure side of opening.

c. Remove temporary braces necessary for installation only after frames have been properly set and secured.

d. Check plumb, square, and twist of frames as walls are constructed. Shim as necessary to comply with installation tolerances.

e. Field apply bituminous coating to backs of frames that will be filled with grout.

2. Floor Anchors: Provide floor anchors for each jamb and mullion that extends to floor, and secure with post installed expansion anchors.

a. Floor anchors may be set with power-actuated fasteners instead of post installed expansion anchors if so indicated and approved on Shop Drawings.

3. Masonry Walls: Coordinate installation of frames to allow for solidly filling space between frames and masonry with grout.

4. Installation Tolerances: Adjust hollow-metal door frames for squareness, alignment, twist, and plumb to the following tolerances:

a. Squareness: Plus or minus 1/16 inch (1.6 mm), measured at door rabbet on a line 90 degrees from jamb perpendicular to frame head.

b. Alignment: Plus or minus 1/16 inch (1.6 mm), measured at jambs on a horizontal line parallel to plane of wall.

c. Twist: Plus or minus 1/16 inch (1.6 mm), measured at opposite face corners of jambs on parallel lines, and perpendicular to plane of wall.

d. Plumbness: Plus or minus 1/16 inch (1.6 mm), measured at jambs at floor.

- B. Hollow-Metal Doors: Fit hollow-metal doors accurately in frames, within clearances specified below. Shim as necessary.
  - 1. Non-Fire-Rated Steel Doors:
    - a. Between Door and Frame Jambs and Head: 1/8 inch (3.2 mm) plus or minus 1/32 inch (0.8 mm).
    - b. At Bottom of Door: 3/4 inch (19.1 mm) plus or minus 1/32 inch (0.8 mm).
    - c. Between Door Face and Stop: 1/16 inch (1.6 mm) to 1/8 inch (3.2 mm) plus or minus 1/32 inch (0.8 mm).

### 3.2 ADJUSTING AND CLEANING

- A. Final Adjustments: Check and readjust operating hardware items immediately before final inspection. Leave work in complete and proper operating condition. Remove and replace defective work, including hollow-metal work that is warped, bowed, or otherwise unacceptable.
- B. Remove grout and other bonding material from hollow-metal work immediately after installation.
- C. Prime-Coat Touchup: Immediately after erection, sand smooth rusted or damaged areas of prime coat and apply touchup of compatible air-drying, rust-inhibitive primer. Touchup prime coat prior to finish painting.
- D. Metallic-Coated Surface Touchup: Clean abraded areas and repair with galvanizing repair paint according to manufacturer's written instructions

END OF SECTION 081113

## SECTION 087100 – DOOR HARDWARE

### PART 1 - GENERAL

#### 1.1 RELATED REQUIREMENTS:

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

#### 1.2 SUMMARY

- A. This Section includes commercial door hardware for the following:
  - 1. Swinging doors.
- B. Door hardware includes, but is not necessarily limited to, the following:
  - 1. Mechanical door hardware.
  - 2. Cylinders specified for doors in other sections.
- C. Related Sections:
  - 1. Division 08 Section “Hollow Metal Doors and Frames”.
- D. Codes and References: Comply with the version year adopted by the Authority Having Jurisdiction.
  - 1. ANSI A117.1 - Accessible and Usable Buildings and Facilities.
  - 2. ICC/IBC - International Building Code.
  - 3. NFPA 70 - National Electrical Code.
  - 4. NFPA 80 - Fire Doors and Windows.
  - 5. NFPA 101 - Life Safety Code.
  - 6. NFPA 105 - Installation of Smoke Door Assemblies.
  - 7. State Building Codes, Local Amendments.
- E. Standards: All hardware specified herein shall comply with the following industry standards:
  - 1. ANSI/BHMA Certified Product Standards - A156 Series

### 1.3 SUBMITTALS

- A. Product Data: Manufacturer's product data sheets including installation details, material descriptions, dimensions of individual components and profiles, operational descriptions and finishes.
- B. Door Hardware Schedule: Prepared by or under the supervision of supplier, detailing fabrication and assembly of door hardware, as well as procedures and diagrams. Coordinate the final Door Hardware Schedule with doors, frames, and related work to ensure proper size, thickness, hand, function, and finish of door hardware.
  - 1. Format: Comply with scheduling sequence and vertical format in DHI's "Sequence and Format for the Hardware Schedule."
  - 2. Organization: Organize the Door Hardware Schedule into door hardware sets indicating complete designations of every item required for each door or opening. Organize door hardware sets in same order as in the Door Hardware Sets at the end of Part 3. Submittals that do not follow the same format and order as the Door Hardware Sets will be rejected and subject to resubmission.
  - 3. Content: Include the following information:
    - a. Type, style, function, size, label, hand, and finish of each door hardware item.
    - b. Manufacturer of each item.
    - c. Fastenings and other pertinent information.
    - d. Location of door hardware set, cross-referenced to Drawings, both on floor plans and in door and frame schedule.
    - e. Explanation of abbreviations, symbols, and codes contained in schedule.
    - f. Mounting locations for door hardware.
    - g. Door and frame sizes and materials.
    - h. Warranty information for each product.
  - 4. Submittal Sequence: Submit the final Door Hardware Schedule at earliest possible date, particularly where approval of the Door Hardware Schedule must precede fabrication of other work that is critical in the Project construction schedule. Include Product Data, Samples, Shop Drawings of other work affected by door hardware, and other information essential to the coordinated review of the Door Hardware Schedule.
- C. Keying Schedule: After a keying meeting with the owner has taken place prepare a separate keying schedule detailing final instructions. Submit the keying schedule in electronic format. Include keying system explanation, door numbers, key set symbols, hardware set numbers and special instructions. Owner must approve submitted keying schedule prior to the ordering of permanent cylinders/cores.
- D. Informational Submittals:
  - 1. Product Test Reports: Indicating compliance with cycle testing requirements, based on evaluation of comprehensive tests performed by manufacturer and witnessed by a qualified independent testing agency.

- E. Operating and Maintenance Manuals: Provide manufacturers operating and maintenance manuals for each item comprising the complete door hardware installation in quantity as required in Division 01, Closeout Submittals.

#### 1.4 QUALITY ASSURANCE

- A. Manufacturers Qualifications: Engage qualified manufacturers with a minimum 5 years of documented experience in producing hardware and equipment similar to that indicated for this Project and that have a proven record of successful in-service performance.
- B. Installer Qualifications: A minimum 3 years documented experience installing both standard and electrified door hardware similar in material, design, and extent to that indicated for this Project and whose work has resulted in construction with a record of successful in-service performance.
- C. Door Hardware Supplier Qualifications: Experienced commercial door hardware distributors with a minimum 5 years documented experience supplying both mechanical and electromechanical hardware installations comparable in material, design, and extent to that indicated for this Project. Supplier recognized as a factory direct distributor by the manufacturers of the primary materials with a warehousing facility in Project's vicinity. Supplier to have on staff a certified Architectural Hardware Consultant (AHC) available during the course of the Work to consult with Contractor, Architect, and Owner concerning both standard and electromechanical door hardware and keying.
- D. Source Limitations: Obtain each type and variety of door hardware specified in this section from a single source unless otherwise indicated.
- E. Each unit to bear third party permanent label demonstrating compliance with the referenced standards.
- F. Keying Conference: Conduct conference to comply with requirements in Division 01 Section "Project Meetings." Keying conference to incorporate the following criteria into the final keying schedule document:
  - 1. Function of building, purpose of each area and degree of security required.
  - 2. Plans for existing and future key system expansion.
  - 3. Requirements for key control storage and software.
  - 4. Installation of permanent keys, cylinder cores and software.
  - 5. Address and requirements for delivery of keys.
- G. At completion of installation, provide written documentation that components were applied to manufacturer's instructions and recommendations and according to approved schedule.

#### 1.5 DELIVERY, STORAGE, AND HANDLING

- A. Inventory door hardware on receipt and provide secure lock-up and shelving for door hardware delivered to Project site. Do not store electronic access control hardware, software or accessories at Project site without prior authorization.

- B. Tag each item or package separately with identification related to the final Door Hardware Schedule, and include basic installation instructions with each item or package.
- C. Deliver, as applicable, permanent keys, cylinders, cores, access control credentials, software and related accessories directly to Owner via registered mail or overnight package service. Instructions for delivery to the Owner shall be established at the "Keying Conference".

#### 1.6 COORDINATION

- A. Templates: Obtain and distribute to the parties involved templates for doors, frames, and other work specified to be factory prepared for installing standard hardware. Check Shop Drawings of other work to confirm that adequate provisions are made for locating and installing hardware to comply with indicated requirements.
- B. Door and Frame Preparation: Doors and corresponding frames are to be prepared, reinforced and pre-wired (if applicable) to receive the installation of the specified electrified, monitoring, signaling and access control system hardware without additional in-field modifications.

#### 1.7 WARRANTY

- A. General Warranty: Reference Division 01, General Requirements. Special warranties specified in this Article shall not deprive Owner of other rights Owner may have under other provisions of the Contract Documents and shall be in addition to, and run concurrent with, other warranties made by Contractor under requirements of the Contract Documents.
- B. Warranty Period: Written warranty, executed by manufacturer(s), agreeing to repair or replace components of standard and electrified door hardware that fails in materials or workmanship within specified warranty period after final acceptance by the Owner. Failures include, but are not limited to, the following:
  - 1. Structural failures including excessive deflection, cracking, or breakage.
  - 2. Faulty operation of the hardware.
  - 3. Deterioration of metals, metal finishes, and other materials beyond normal weathering.
- C. Standard Warranty Period: One year from date of Substantial Completion, unless otherwise indicated.
- D. Special Warranty Periods:
  - 1. Seven years for heavy duty cylindrical (bored) locks and latches.
  - 2. Twenty five years for manual surface door closer bodies.

#### 1.8 MAINTENANCE SERVICE

- A. Maintenance Tools and Instructions: Furnish a complete set of specialized tools and maintenance instructions as needed for Owner's continued adjustment, maintenance, and removal and replacement of door hardware.

## PART 2 - PRODUCTS

### 2.1 SCHEDULED DOOR HARDWARE

- A. General: Provide door hardware for each door to comply with requirements in Door Hardware Sets and each referenced section that products are to be supplied under.
- B. Designations: Requirements for quantity, item, size, finish or color, grade, function, and other distinctive qualities of each type of door hardware are indicated in the Door Hardware Sets at the end of Part 3. Products are identified by using door hardware designations, as follows:
- C. Named Manufacturer's Products: Product designation and manufacturer are listed for each door hardware type required for the purpose of establishing requirements. Manufacturers' names are abbreviated in the Door Hardware Schedule.
- D. Substitutions: Requests for substitution and product approval for inclusive mechanical and electromechanical door hardware in compliance with the specifications must be submitted in writing and in accordance with the procedures and time frames outlined in Division 01, Substitution Procedures. Approval of requests is at the discretion of the architect, owner, and their designated consultants.

### 2.2 HANGING DEVICES

- A. Hinges: ANSI/BHMA A156.1 certified butt hinges with number of hinge knuckles as specified in the Door Hardware Sets.
  - 1. Quantity: Provide the following hinge quantity, unless otherwise indicated:
    - a. Two Hinges: For doors with heights up to 60 inches.
    - b. Three Hinges: For doors with heights 61 to 90 inches.
    - c. Four Hinges: For doors with heights 91 to 120 inches.
    - d. For doors with heights more than 120 inches, provide 4 hinges, plus 1 hinge for every 30 inches of door height greater than 120 inches.
  - 2. Hinge Size: Provide the following, unless otherwise indicated, with hinge widths sized for door thickness and clearances required:
    - a. Widths up to 3'0": 4-1/2" standard or heavy weight as specified.
    - b. Sizes from 3'1" to 4'0": 5" standard or heavy weight as specified.
  - 3. Hinge Weight and Base Material: Unless otherwise indicated, provide the following:
    - a. Exterior Doors: Heavy weight, non-ferrous, ball bearing or oil impregnated bearing hinges unless Hardware Sets indicate standard weight.
  - 4. Hinge Options: Comply with the following where indicated in the Hardware Sets or on Drawings:

- a. Non-removable Pins: Provide set screw in hinge barrel that, when tightened into a groove in hinge pin, prevents removal of pin while door is closed; for the all out-swinging lockable doors.

5. See Drawings for Acceptable Manufacturers

## 2.3 CYLINDERS AND KEYING

- A. General: Cylinder manufacturer to have minimum (10) years experience designing secured master key systems and have on record a published security keying system policy.
- B. Source Limitations: Obtain each type of keyed cylinder and keys from the same source manufacturer as locksets and exit devices, unless otherwise indicated.
  1. Manufacturers:
    - a. As required to coordinate with owner's existing system..
- C. Cylinders: Original manufacturer cylinders complying with the following:
  1. Mortise Type: Threaded cylinders with rings and cams to suit hardware application.
  2. Rim Type: Cylinders with back plate, flat-type vertical or horizontal tailpiece, and raised trim ring.
  3. Bored-Lock Type: Cylinders with tailpieces to suit locks.
  4. Mortise and rim cylinder collars to be solid and recessed to allow the cylinder face to be flush and be free spinning with matching finishes.
  5. Keyway: Manufacturer's Standard, as required to coordinate with owner's existing system.
- D. Permanent Cores: Manufacturer's standard; finish face to match lockset; complying with the following:
  1. Removable Cores: Core insert, removable by use of a special key, and for use with only the core manufacturer's cylinder and door hardware. Provide removable core (small or large format) as specified in Hardware Sets.
- E. Keying System: Each type of lock and cylinders to be factory keyed.
  1. Conduct specified "Keying Conference" to define and document keying system instructions and requirements.
  2. Furnish factory cut, nickel-silver large bow permanently inscribed with a visual key control number as directed by Owner.
  3. Existing System: Key locks to Owner's existing system.
- F. Key Quantity: Provide the following minimum number of keys:
  1. Change Keys per Cylinder: Two (2)
  2. Construction Keys (where required): Two (2).
  3. Construction Control Keys (where required): Two (2).
  4. Permanent Control Keys (where required): Two (2).
- G. Construction Keying: Provide temporary keyed construction cores.



## 2.4 MECHANICAL LOCKS AND LATCHING DEVICES

- A. Cylindrical Locksets, Grade 1 (Heavy Duty): ANSI/BHMA A156.2, Series 4000, Grade 1 certified.
1. Furnish with solid cast levers, standard 2 3/4" backset, and 1/2" (3/4" at rated paired openings) throw brass or stainless steel latchbolt.
  2. Locks are to be non-handed and fully field reversible.
  3. Extended cycle test: Locks to have been cycle tested in ordinance with ANSI/BHMA 156.2 requirements to 9 million cycles.
  4. See Drawings for Acceptable Manufacturers

## 2.5 LOCK AND LATCH STRIKES

- A. Strikes: Provide manufacturer's standard strike with strike box for each latch or lock bolt, with curved lip extended to protect frame, finished to match door hardware set, unless otherwise indicated, and as follows:
1. Flat-Lip Strikes: For locks with three-piece antifriction latchbolts, as recommended by manufacturer.
  2. Extra-Long-Lip Strikes: For locks used on frames with applied wood casing trim.
  3. Aluminum-Frame Strike Box: Provide manufacturer's special strike box fabricated for aluminum framing.
  4. Double-lipped strikes: For locks at double acting doors. Furnish with retractable stop for rescue hardware applications.
- B. Standards: Comply with the following:
1. Strikes for Bored Locks and Latches: BHMA A156.2.
  2. Strikes for Auxiliary Deadlocks: BHMA A156.36.
  3. Dustproof Strikes: BHMA A156.16.

## 2.6 DOOR CLOSERS

- A. All door closers specified herein shall meet or exceed the following criteria:
1. General: Door closers to be from one manufacturer, matching in design and style, with the same type door preparations and templates regardless of application or spring size. Closers to be non-handed with full sized covers including installation and adjusting information on inside of cover.
  2. Cycle Testing: Provide closers which have surpassed 15 million cycles in a test witnessed and verified by UL.
  3. Size of Units: Comply with manufacturer's written recommendations for sizing of door closers depending on size of door, exposure to weather, and anticipated frequency of use.

Where closers are indicated for doors required to be accessible to the physically handicapped, provide units complying with ANSI ICC/A117.1.

4. Closer Arms: Provide heavy duty, forged steel closer arms unless otherwise indicated in Hardware Sets.
  5. Closers shall not be installed on interior side of exterior doors; where possible install closers on door for optimum aesthetics.
  6. Closer Accessories: Provide door closer accessories including custom templates, special mounting brackets, spacers and drop plates as required for proper installation. Provide through-bolt and security type fasteners as specified in the hardware sets.
- B. Door Closers, Surface Mounted (Heavy Duty): ANSI/BHMA A156.4, Grade 1 surface mounted, heavy duty door closers with complete spring power adjustment, sizes 1 thru 6; and fully operational adjustable according to door size, frequency of use, and opening force. Closers to be rack and pinion type, one piece cast iron or aluminum alloy body construction, with adjustable backcheck and separate non-critical valves for closing sweep and latch speed control. Provide non-handed units standard.
1. See Drawings for Acceptable Manufacturers

## 2.7 ARCHITECTURAL SEALS

- A. General: Thresholds, weatherstripping, and gasket seals to be of type and design as specified below or in the Hardware Sets. Provide continuous weatherstrip gasketing on exterior doors and provide smoke, light, or sound gasketing on interior doors where indicated. At exterior applications provide non-corrosive fasteners and elsewhere where indicated.
- B. Replaceable Seal Strips: Provide only those units where resilient or flexible seal strips are easily replaceable and readily available from stocks maintained by manufacturer.
- C. Acceptable Manufacturers:
  1. See Drawings for Acceptable Manufacturers

## 2.8 FABRICATION

- A. Fasteners: Provide door hardware manufactured to comply with published templates generally prepared for machine, wood, and sheet metal screws. Provide screws according to manufacturers recognized installation standards for application intended.

## 2.9 FINISHES

- A. Standard: Designations used in the Hardware Sets and elsewhere indicate hardware finishes complying with ANSI/BHMA A156.18, including coordination with traditional U.S. finishes indicated by certain manufacturers for their products.

- B. Provide quality of finish, including thickness of plating or coating (if any), composition, hardness, and other qualities complying with manufacturer's standards, but in no case less than specified by referenced standards for the applicable units of hardware
- C. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.
- D. Typical finishes and materials, unless otherwise specified.
  - 1. US 26D

### PART 3 - EXECUTION

#### 3.1 EXAMINATION

- A. Examine scheduled openings, with Installer present, for compliance with requirements for installation tolerances, labeled fire door assembly construction, wall and floor construction, and other conditions affecting performance.
- B. Notify architect of any discrepancies or conflicts between the door schedule, door types, drawings and scheduled hardware. Proceed only after such discrepancies or conflicts have been resolved in writing.

#### 3.2 PREPARATION

- A. Hollow Metal Doors and Frames: Comply with ANSI/DHI A115 series.

#### 3.3 INSTALLATION

- A. Install each item of mechanical and electromechanical hardware and access control equipment to comply with manufacturer's written instructions and according to specifications.
  - 1. Installers are to be trained and certified by the manufacturer on the proper installation and adjustment of fire, life safety, and security products including: hanging devices; locking devices; closing devices; and seals.
- B. Mounting Heights: Mount door hardware units at heights indicated in following applicable publications, unless specifically indicated or required to comply with governing regulations:
  - 1. Standard Steel Doors and Frames: DHI's "Recommended Locations for Architectural Hardware for Standard Steel Doors and Frames."
  - 2. Where indicated to comply with accessibility requirements, comply with ANSI A117.1 "Accessibility Guidelines for Buildings and Facilities."
- C. Retrofitting: Install door hardware to comply with manufacturer's published templates and written instructions. Where cutting and fitting are required to install door hardware onto or into

surfaces that are later to be painted or finished in another way, coordinate removal, storage, and reinstallation of surface protective trim units with finishing work specified in Division 9 Sections. Do not install surface-mounted items until finishes have been completed on substrates involved.

- D. Thresholds: Set thresholds for exterior and acoustical doors in full bed of sealant complying with requirements specified in Division 7 Section "Joint Sealants."
- E. Storage: Provide a secure lock up for hardware delivered to the project but not yet installed. Control the handling and installation of hardware items so that the completion of the work will not be delayed by hardware losses before and after installation.

### 3.4 FIELD QUALITY CONTROL

- A. Field Inspection: Supplier will perform a final inspection of installed door hardware and state in report whether work complies with or deviates from requirements, including whether door hardware is properly installed, operating and adjusted.

### 3.5 ADJUSTING

- A. Initial Adjustment: Adjust and check each operating item of door hardware and each door to ensure proper operation or function of every unit. Replace units that cannot be adjusted to operate as intended. Adjust door control devices to compensate for final operation of heating and ventilating equipment and to comply with referenced accessibility requirements.

### 3.6 CLEANING AND PROTECTION

- A. Protect all hardware stored on construction site in a covered and dry place. Protect exposed hardware installed on doors during the construction phase. Install any and all hardware at the latest possible time frame.
- B. Clean adjacent surfaces soiled by door hardware installation.
- C. Clean operating items as necessary to restore proper finish. Provide final protection and maintain conditions that ensure door hardware is without damage or deterioration at time of owner occupancy.

### 3.7 DEMONSTRATION

- A. Instruct Owner's maintenance personnel to adjust, operate, and maintain mechanical and electromechanical door hardware.

### 3.8 DOOR HARDWARE GROUPS:

- A. HARDWARE GROUP A

- 6 HEAVY DUTY BUTT HINGES
  - 2 FLUSH BOLTS (TOP AND BOTTOM OF INACTIVE LEAF)
  - 1 CYLINDRICAL LOCKSET WITH ENTRANCE FUNCTION
  - 1 GASKET
  - 2 BRUSH SWEEP
  - 1 RAIN DRIP CAP
  - 1 ALUMINUM SADDLE THRESHOLD
  - 2 SURFACE MOUNTED OVERHEAD CLOSERS WITH HOLD OPEN FEATURE
- ALL COMPONENTS TO BE NON-FERROUS

END OF SECTION 087100

## SECTION 260010 – ELECTRICAL GENERAL REQUIREMENTS

### PART 1 - GENERAL

#### 1.1 GENERAL

- A. Drawings and General Provisions of the Contract, including General and Supplementary Conditions and Division 1 Specifications, apply to all Division 26, 27 & 28 Specification Sections.

#### 1.2 SCOPE OF PROJECT

- A. Provide a complete and operating electrical installation in accordance with these specifications and accompanying contract drawings. This includes all required labor, materials, apparatus, and supervision.

#### 1.3 DESCRIPTIONS OF BASE BID AND ALTERNATE BID

- A. Refer to Section 012300.

#### 1.4 RULES AND REGULATIONS

- A. Perform in accordance with the rules and regulations of the National Electrical Code (NEC), International Building Code (IBC) and other Codes and Standards cited in this specification and the requirements of the utility companies serving the project site.
- B. Certificates of Approval in triplicate, for rough and finished wiring, from a Certified Inspection Service must be delivered to the Engineer before final payment can be authorized.
- C. Perform all work in accordance with the rules and regulations of the Pennsylvania Department of Labor and Industry, Federal Department of Labor (Occupational Safety and Health Administration) and any other national, state, or local authority having jurisdiction.
- D. Perform all Construction, design, fabrication, tests, rating, and installation in compliance with the regulations of all local, state, or national agencies having jurisdiction over the project. Pay all costs involved in work necessary to comply with these regulations.
- E. The Contractor assumes all responsibility and liability for any code violations, damage or injury which occurs as a result of a deviation from or a change to the requirements of these plans and specifications which has not been approved in writing by the Engineer.
- F. Consider the National Electrical Code, and the other codes and standards cited herein as providing the minimum construction standards for this project. Conform to all additional requirements and limitations contained in these plans and specifications as indicated.
- G. The intent of these drawings and specifications is to define the scope-of-work and standards of quality for the project. The Contractor is responsible for understanding and following the

requirements of the codes and standards referenced by these documents. The Contractor shall be responsible for costs associated with changes when a code enforcement official determines that work does not comply with referenced codes and standards.

## 1.5 DEFINITIONS

- A. General - Basic Contract definitions are included in the Conditions of the Contract.
- B. Indicated - The term indicated refers to graphic representations, notes, or schedules on the Drawings, or other Paragraphs or Schedules in the Specifications, and similar requirements in the Contract Documents. Terms such as shown, noted, scheduled, and specified are used to help the reader locate the reference. There is no limitation on location.
- C. Directed - Terms such as directed, requested, authorized, selected, approved, required, and permitted mean directed by the Architect, requested by the Architect, and similar phrases.
- D. Approved - The term approved, when used in conjunction with the Architect's action on the Contractor's submittals, applications, and requests, is limited to the Architect's duties and responsibilities as stated in the Conditions of the Contract.
- E. Regulation - The term regulation includes laws, ordinances, statutes, and lawful orders issued by authorities having jurisdiction, as well as rules, conventions, and agreements within the construction industry that control performance of the Work.
- F. Furnish - The term furnish means supply and deliver to the Project Site, ready for unloading, unpacking, assembly, installation, and similar operations.
- G. Install - The term install describes operations at the Project site including the actual unloading, unpacking, assembly, erection, placing, anchoring, applying, working to dimension, finishing, curing, protecting, cleaning, and similar operations.
- H. Provide - The term provide means to furnish and install, complete and ready for the intended use.
- I. Contractor - The Contractor or Electrical Contractor - The term means the Contractor responsible for all work under this Division.
- J. Installer - An installer is the Contractor, or another entity engaged by the Contractor, either as an employee, subcontractor, or contractor of lower tier, to perform a particular construction activity, including installation, erection, application, and similar operations. Installers are required to be experienced in the operations they are engaged to perform.
  - 1. The term experienced, when used with the term installer, means having a minimum of five previous projects similar in size and scope to this Project, being familiar with the special requirements indicated, and having complied with requirements of the authority having jurisdiction.
  - 2. Trades - Using terms such as carpentry is not intended to imply that certain construction activities must be performed by accredited or unionized individuals of a corresponding generic name, such as carpenter. It also does not imply that requirements specified apply exclusively to tradespersons of the corresponding generic name.
  - 3. Assigning Specialists - Certain Sections of the Specifications require that specific construction activities be performed by specialists who are recognized experts in those operations. The specialists must be engaged for those activities, and their assignments are

requirements over which the Contractor has no choice or option. However, the ultimate responsibility for fulfilling Contract requirements remains with the Contractor.

- a. This requirement is not to be interpreted to conflict with enforcing building codes and similar regulations governing the Work. It is also not intended to interfere with local trade union jurisdictional settlements and similar conventions.
- K. Project Site is the space available to the Contractor for performing construction activities either exclusively or in conjunction with others performing other work as part of the Project. The extent of the Project site is shown on the drawings and may or may not be identical with the description of the land on which the Project is to be built.
- L. Testing Agencies - A testing agency is an independent entity engaged to perform specific inspections or tests, either at the Project Site or elsewhere, and to report on and, if required, to interpret results of those inspections or tests.
- M. AHJ – Authority(ies) Having Jurisdiction
- N. Abbreviations and Names - Trade association names and titles of general standards are frequently abbreviated. The following acronyms or abbreviations, as referenced in Contract Documents, are defined to mean the associated names.
1. AAHTO American Association of State Highway and Transportation Officials
  2. ACI American Concrete Institute
  3. AISC American Institute of Steel Construction
  4. AISI American Iron and Steel Institute
  5. ANSI American National Standards Institute
  6. ASTM American Society for Testing and Materials
  7. AWS American Welding Society
  8. CBM Certified Ballast Manufacturers Assoc.
  9. CRSI Concrete Reinforcing Steel Institute
  10. EIA Electronic Industries Assoc.
  11. ETL ETL Testing Laboratories Inc.
  12. FM Factory Mutual Research Organization
  13. ICEA Insulated Cable Engineers Association, Inc.
  14. IEC International Electrotechnical Commission
  15. IEEE Institute of Electrical and Electronic Engineers
  16. IESNA Illuminating Engineering Society of North America
  17. IMSA International Municipal Signal Association
  18. ISA Instrument Society of America
  19. LPI Lighting Protection Institute
  20. NEC National Electrical Code
  21. NECA National Electrical Contractors Assoc.
  22. NEMA National Electrical Manufacturers Assoc.
  23. NETA International Electrical Testing Assoc.
  24. NFPA National Fire Protection Assoc.
  25. UL Underwriters Laboratories, Inc.
- O. Federal Government Agencies - Names and titles of federal government standard- or Specification-producing agencies are often abbreviated. The following acronyms or abbreviations referenced in the Contract Documents indicate names of standard- or Specification-producing agencies of the federal government. Names and addresses are subject to change but are believed to be, but are not assured to be, accurate and up to date as of the date of the Contract Documents.



1. CFR Code of Federal Regulations
2. EPA Environmental Protection Agency
3. FAA Federal Aviation Administration (US Department of Transportation)
4. FCC Federal Communications Commission
5. FS Federal Specification (from GSA); Specifications Unit (WFSIS)
6. MIL Military Standardization Documents (US Department of Defense)
7. Naval Publications and Forms Center
8. OSHA Occupational Safety and Health Administration (US Department of Labor)
9. REA Rural Electrification Administration (US Department of Agriculture)

## 1.6 DRAWINGS

- A. The accompanying drawings are a part of the contract documents and are intended to show approximate and relative locations of services and equipment. Do not scale drawings to determine exact positions, locations, and clearances.
- B. Due to the diagrammatic layout and small scale of the drawings exact dimensions are not shown. Coordinate location and position of equipment with all other trades and the Engineer. Bring any discrepancies or interferences to the attention of the Architect and/or Engineer for clarification.
- C. All drawings and specifications pertaining to general construction, plumbing, HVAC, kitchen, electrical and other work shall be carefully examined. Where physical interferences with his work occur because of his failure to coordinate with other trade, this Contractor shall rearrange his work at his own expense.
- D. The following electrical abbreviations may or may not be used on this project:

A	Amperes
AC	Ceiling/Rooftop Air Conditioner
AF	Amp Fuse
AFC	Above Finished Ceiling
AFF	Above Finished Floor
AFG	Above Finished Grade
AH	Air Handler
AHAP	As High As Possible
AIC	Asymmetric Interrupting Current
APMP	Area Protection Monitor Panel
ARCH	Architect
AT	Amp Trip
ATS	Automatic Transfer Switch
B	Boiler
BD	Bus Duct
BFC	Below Finished Ceiling
BH	Baseboard Heater
C	Conduit
CH	Cabinet Heater / Chiller
CHL	Chiller
CP	Circulating Pump
CT	Cooling Tower
CU	Condensing Unit
DB	Direct Burial

DEH	Dehumidifier
DH	Duct Heater
DWG	Drawing
DWGS	Drawings
EC	Electrical Contractor
ECB	Enclosed Circuit Breaker
ECH	Electric Cabinet Heater
EDH	Electric Duct Heater
EL	Elevation
ELEV	Elevator
EM	Emergency
EMT	Electrical Metallic Tubing
ETR	Existing To Remain
EWC	Electric Water Cooler
EX	Existing or Existing To Remain, U.O.N.
EXR	Existing To Be Removed, U.O.N.
FA	Fire Alarm
FAAP	Fire Alarm Annunciator Panel
FACP	Fire Alarm Control Panel
FAEP	Fire Alarm Extender Panel
FC	Fan Coil
FD	Fire Damper
FPV	Fan Powered Variable Air Volume
FDS	Fused Disconnect Switch
FIN. FL.	Finished Floor
FIN.GR.	Finished Grade
FPC	Fire Protection Contractor
GALV	Galvanized
GC	General Trades Contractor
GEN	Generator
GND	Ground
GRC	Galvanized Rigid Steel Conduit
GRD	Ground
HH	Handhole
HP	Heat Pump
HRU	Heat Recovery Unit
HWH	Hot Water Heater
IDF	Intermediate Distribution Frame (Data) / Floor Distributor
IMC	Intermediate Steel Conduit
JB	Junction Box
KEC	Kitchen Equipment Contractor
KVA	Kilovolt Amperes
KW	Kilowatts
MC	Mechanical Contractor
MCB	Main Circuit Breaker
MDF	Main Distribution Frame (Data) / Building Distributor
MDP	Main Distribution Panel
MH	Manhole
MFS	Main Fused Switch
MLP	Main Lug Only
MTGB	Main Telecommunication Grounding Busbar

MTD	Mounted
MTS	Manual Transfer Switch
N	Neutral / Grounded Conductor
NATS	Non-automatic Transfer Switch
N/E	Normal-Emergency
NEC	NFPA 70 – National Electrical Code
NIC	Not In Contract
NFDS	Non-fused Disconnect Switch
NL	Nightlight
PB	Pull Box
PC	Plumbing Contractor
PH	Phase
PNL	Panelboard
PTAC	Packaged Through-the-wall Air Conditioner
RC	Rigging Contractor (Theatrical)
(REF)	Item Shown For Reference Purposes Only, Not Provided by EC, U.O.N.
REF.	Refrigerator
REFRIG	Refrigerator
RFG	Refrigerator
RTU	Roof Top Unit
SD	Smoke Damper
SF	Supply Fan
SWB	Switchboard
TBB	Telecommunication Backbone
TC	Telecommunication/Low Voltage/Systems Contractor
TGB	Telecommunication Ground Busbar
TVSS	Transient Voltage Surge Suppression
TYP	Typical
UH	Unit Heater
UG	Underground
U.O.N.	Unless Otherwise Noted
UON	Unless Otherwise Noted
UV	Unit Ventilator
V	Volts
VA	Variable Air Volume Box
VAV	Fan-powered Variable Air Volume Box
VS	Ventilating and Supply Unit
W	Wire
WC	Water Cooler
WG	Wire Guard
WH	Wall Heater
WP	Weatherproof / Weather Protected
XFMR	Transformer

#### 1.7 SUBMITTAL OF SHOP DRAWINGS FOR REVIEW

- A. Submit shop drawings with a letter of transmittal to the Architect per requirements of the General Conditions and Architects instructions.
- B. Properly prepare submittals before transmitting to the designated reviewer.

1. Prepare an individual submittal package for each related group of materials.
  2. Refer to individual 260000 Sections for materials to be submitted for review and approval.
  3. Collate all items to be submitted as required by Division 1 consisting of one copy of each item. Permanently bind together by staples or other means all pages in each set.
  4. Bind with each set a typed cover sheet showing the date, project name, project location, Engineer's name, Contractor's name, Specification Section, and an index of all items included.
  5. Provide space on the cover sheet for the approval stamps of the Subcontractor, Contractor, Engineer, and Architect. Apply Contractor's stamp, signed or initialed certifying that review, approval, verification of Products required, field dimensions, adjacent construction work, and coordination of information is in accordance with the requirements of the Work and Contract Documents.
  6. Clearly mark each page in the submittal set to show the manufacturer's name.
  7. When a page shows more than one item or catalog number, mark the item and catalog number which is proposed for use. Show all accessories, options and appurtenances which are required or which the Contractor desires to use.
  8. Improperly prepared submissions will be returned without action.
- C. All disapproved submittals shall be corrected as directed by the Architect/Engineer and resubmit the same quantity as originally submitted until approved. No work involving any materials or equipment covered by shop drawings shall be started until the respective shop drawings are approved.
- D. All items requiring shop drawing review shall not be installed until final approval has been given by the Architect/Engineer.

## 1.8 SUBSTITUTIONS

- A. All substitutions must be submitted in accordance with Division 1 requirements.
- B. Substitutions submitted not in accordance with Division 1 requirements will be returned without review.
- C. All costs involved in changes in the building, to the equipment, to the arrangement of equipment, or to the work performed or to be performed under other sections of the specifications, due to the substitution of equipment in lieu of that shown on the drawings or specified, shall be borne by the Contractor making such substitutions, and shall include, but not necessarily be limited to, costs or fees in connection with resubmission of drawings for approval, if required, by the Commonwealth of Pennsylvania, local authorities or insuring agencies having jurisdiction over the work.

## 1.9 SUBMITTALS FOR CLOSEOUT

- A. Record Drawings: 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 mark-up before enclosing concealed installations.
  2. Content: Types of items requiring marking include, but are not limited to, the following:
    - a. Addendum Changes
    - b. Dimensional changes to Drawings.
    - c. Revisions to details shown on Drawings.
    - d. Depths of foundations below first floor.
    - e. Locations and depths of underground utilities.
    - f. Revisions to routing of cable tray and conduits.
    - g. Revisions to electrical circuitry.
    - h. Actual equipment locations.
    - i. Locations of concealed internal utilities.
    - j. Changes made by Change Order or Construction Change Directive.
    - k. Changes made following Architect'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 sets 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.
  7. Provide one (1) hard copy and one (1) PDF electronic file on digital media acceptable to Architect/Engineer for Owner. Provide one (1) additional PDF electronic file for the Engineer.
- B. O&M 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: Enable bookmarking of individual documents based upon 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 upon opening file.
  3. Provide two (2) copies of the PDF electronic files on digital media acceptable to Architect/Engineer. One copy shall be for the Owner and the other shall be for the Engineer.
- C. O&M Manuals, Paper Copy: Submit manuals in the form of hard copy, bound and labeled volumes.

1. Binders: Heavy-duty, three-ring, vinyl-covered, loose-leaf binders, in thickness necessary to accommodate contents, sized to hold 8-1/2" x 11" paper; with clear plastic sleeve on spine to hold label describing contents and with pockets inside covers to hold folded oversize sheets.
  - a. If two or more binders are necessary to accommodate data of a system, organize data in each binder into groupings by subsystem and related components. Cross-reference other binders, if necessary, to provide essential information for proper operation or maintenance of equipment or system.
  - b. Identify each binder on front and spine, with printed title "OPERATION AND MAINTENANCE MANUAL", Project title or name, and subject matter of contents. Indicate volume number for multiple-volume sets.
2. Dividers: Heavy-paper dividers with plastic-covered tabs for each section of the manual. Mark each tab to indicate contents. Include typed list of products and major components of equipment included in the section on each divider, cross-referenced to Specification Section number and title of Project Manual.
3. Protective Plastic Sleeves: Transparent plastic sleeves designed to enclose diagnostic software storage media for computerized electronic equipment.
4. Supplementary Text: Prepared on 8-1/2" x 11" white bond paper.
5. Drawings: Attach reinforced, punched binder tabs on drawings and bind with text.
  - a. If oversize drawings are necessary, fold drawings to same size as text pages and use as foldouts.
  - b. If drawings are too large to be used as foldouts, fold and place drawings in labeled envelopes and bind envelopes in rear of manual. At appropriate locations in manual, insert typewritten pages indicating drawing titles, descriptions of contents, and drawing locations.
6. Provide three (3) hard copies for Owner. Submit to Architect/Engineer for review and approval.

D. The Contractor shall submit 3 copies of the final wiring certificates.

E. The Contractor shall submit a copy of the Project Warranty

#### 1.10 WARRANTY

- A. The Contractor shall submit the following guarantee:
  1. Written one (1) year full warranty guarantees shall be submitted for the entire electrical installation installed under this project (except lamps). The warranty shall begin at substantial completion of the project. If the manufacturer's warranty begins when the equipment ships or is ordered, then the Contractor shall extend the warranty to cover the construction period plus the warranty specified under substantial completion. If the manufacturer's standard guarantee provides for a longer period, the longer period shall apply.
  2. Where defects in the material, equipment and/or workmanship become evident within this guarantee period, the Contractor shall be responsible for providing new manufacturer approved material and equipment, and/or correcting the defective workmanship without any costs to the Owner.

#### 1.11 INSPECTION

- A. Inspections of electrical work will be made by an agency hired by the Contractor.

- B. Contractor shall pay all inspection fees and submit 3 copies of final wiring certificates to Architect.

#### 1.12 VISIT TO THE SITE

- A. Prior to submission of bid, the Contractor is required to visit the site to become acquainted with existing conditions. Bids as submitted will be interpreted to include all costs and changes made necessary by such conditions. Refer to the pre-bid meeting schedule in invitation to bid.

#### 1.13 COORDINATION OF WORK

- A. Coordination and meetings: Coordinate the installation of all interior and exterior products and systems specified for this construction project including those specified under multiple prime contracts in accordance with Division 1.
- B. Coordination with Various Trades: Contractor shall coordinate space and installation requirements of all work, including underground utilities, which is indicated diagrammatically on drawings, with the project manager, respective contractors, and Utility Company's prior to starting any work. In case of interference or problems, the Architect shall decide which work is to be relocated, regardless of which work is installed first, at no additional cost. See Division 1 General Requirements.
- C. The Contractor shall prepare dimensioned arrangement drawings at a scale of (1/4" - 1") to be utilized by all contractors for coordination. Each contractor shall be required to, and responsible for, adding their respective work to those coordination drawings. Each contractor shall coordinate with all other trades to fit all equipment and materials in allocated space. Completed coordination drawings shall be submitted to Architect/Engineer for review.

#### 1.14 UTILITY COMPANY CONTACTS & COORDINATION

- A. PPL Utilities – Eric McCardell [emccardell@roussey.com](mailto:emccardell@roussey.com), (215) 970-4312
- B. Coordinate with each utility which serves the facility being constructed under this contract.
  1. Verify the utility company requirements indicated on Contract Drawings and in the Specifications and adjust as required.
  2. Notify the utility company of the date of completion of those portions of the work which are provided for utility company use.
  3. Make all other notifications requested by the utility.
  4. Provide equipment submittals as necessary for Utility review and approval.
- C. The Owner will pay all utility company service costs.
- D. Contractor to verify with the various Utility Company's exact location of their facilities and exact location for terminating the service conduits before starting any work and adjust as required.

#### 1.15 LOCATION OF EQUIPMENT AND OUTLETS

- A. Request detailed and specific information regarding the locations of all equipment as the final location may differ from that indicated on the drawings.

#### 1.16 MATERIAL QUALITY

- A. Use the best grade and quality items in commercial practice. Provide the manufacturer's name, address, and catalog number on a plate securely affixed in a convenient place. All electrical equipment or apparatus of any one system must be the product of one manufacturer, or equivalent products of a number of manufacturers, which are suitable for use in a unified system.
- B. Furnish products listed and classified by Underwriters Laboratories, Inc., or other testing firms acceptable to the authority having jurisdiction.

#### 1.17 WORKMANSHIP

- A. Execute all work utilizing qualified and competent employees in a manner consistent with good workmanship. Install all equipment in accordance with Engineer's approved shop drawings and manufacturer's recommendations.
- B. Firmly support and secure to the building construction all materials and equipment. Use only approved hardware and methods as described in these Specifications.

#### 1.18 PROTECTION OF EQUIPMENT AND MATERIALS

- A. Responsibility for care and protection of electrical work rests with Contractor until it has been tested and accepted. Refer also to specific requirements in each section of this specification.

#### 1.19 SCAFFOLDING AND HOISTING

- A. The Contractor shall furnish and erect all scaffolding, hoists, shoring, platforms, railings, ladders, and other devices required by local, state, and federal laws to install all systems and equipment. Scaffolding and all other equipment shall be removed at completion of the work.
- B. Contractor shall hoist or rig his own material and equipment into place or arrange for the rigging of it by others at his expense.

#### 1.20 FOREMAN

- A. Contractor must provide a competent foreman, subject to approval of the Architect. The foreman shall be deemed the agent of the Contractor and must be on duty at the building during all working hours.
- B. Any instructions or notices given to the foreman shall have the same force as if given to the Contractor in person.

#### 1.21 EXCAVATION AND BACKFILL

- A. The Electrical Contractor shall provide all excavation and backfilling and all shoring, sheeting, pumping, and other work incidental to excavating as required for the installation of electrical work. Refer to Division 31 & 32.



- B. All repair of macadam or concrete paving made necessary by work done under this contract shall be performed by the Electrical Contractor at the expense of this Contractor as required by the specifications. All such repairs shall match surrounding paving in materials and workmanship. Work shall comply with the appropriate sections of the General Specification.
- C. All grading and seeding made necessary by work done under this contract shall be performed by the Electrical Contractor as required by the specifications. Work shall comply with the appropriate sections of the General Specifications.
- D. All excavation is unclassified unless otherwise noted on the drawings or in Division 31 of the Specifications.
- E. Provide warning tape above all underground services, properly identifying each type of service.

#### 1.22 PAINTING

- A. All painting of electrical components and materials in finished area will be done under the general construction contract. If electrical components are installed after the area is painted or if no painting is scheduled by the General Contractor, the Electrical Contractor shall be responsible to paint the electrical components.
- B. Factory painted and galvanized finishes which are damaged before the Owner occupies the building shall be repaired with matching paint or cold galvanizing compound respectively. Touch-up of factory finishes shall be done by the Electrical Contractor.

#### 1.23 CUTTING AND PATCHING

- A. This Contractor shall be responsible for all cutting and patching required for installation of work on this project. Cutting and patching methods shall conform to the requirements for new construction contained in other sections of this specification.
  - 1. Patching in surfaces that will remain visible when the project is finished shall be identical in appearance to the undisturbed surface.
  - 2. Patches in fire rated walls, ceilings and floors shall maintain the fire rating of these barriers by use of approved materials including special fire rated sealing compounds or materials identical to the barrier materials. Refer to the Architectural Specifications for approved methods and materials.
  - 3. Refer to Division 1 for additional requirements.

#### 1.24 WORK SEQUENCE

- A. Refer to Architectural Drawings and Specifications for Phasing Requirements for this Project and the approved Contractors Phasing Schedule. This Contractor shall plan and coordinate his work in accordance with those requirements. Provide any and all temporary electrical lighting, power and system modifications to keep the occupied areas in service and maintained by the respective contractor.

1.25 CLEANING AND FINISHING

- A. After all tests have been made and the system proven satisfactory to the Architect, the Contractor shall go over the entire project, clean all equipment and material installed by him, and leave in a clean and working condition.

1.26 PERFORMANCE OF EQUIPMENT

- A. Provide materials, equipment, and appurtenances of any kind, shown on the drawings, hereinafter specified, or required for the completion of the work in accordance with the intent of these specifications, which are completely satisfactory and acceptable in operation, performance, and capacity. Approval, either written or verbal, of any drawings, descriptive data or samples of such material, equipment, and/or appurtenance does not relieve the Contractor of his responsibility to turn over the same to the Owner in perfect working order at the completion of the work.
- B. Replace any materials, equipment, or appurtenances, the operation, capacity, or performance of which does not comply with the drawings and/or specification requirements or which is damaged prior to acceptance by the Owner with proper and acceptable items in working order, satisfactory to the Engineer and Architect without additional cost to the Owner.

1.27 ACCESS

- A. Furnish and erect all scaffolding and ladders required in the installation of wiring, equipment, and fixtures.

1.28 ANCHOR BOLTS

- A. Provide and set in place, at the time of pouring of concrete foundations, all necessary anchor bolts as required for the equipment called for under these specifications. Provide anchor bolts of the hook type, of proper size and length to suit the equipment. The Contractor is responsible for proper emplacement of the bolts and must have representative present at the time foundations are poured.

1.29 INSERTS

- A. Where desired in cast in place concrete, provide and install inserts of an approved type. Where two or more parallel conduits are installed, continuous inserts may be used. Where required to distribute the load on the inserts, install a piece of reinforcing steel of sufficient length through the inserts.

1.30 CONCRETE BASES

- A. Construct concrete bases of dimensions indicated, but not less than 4" larger, in both directions, than supporting unit. Follow supported equipment manufacturer's anchorage recommendations and setting templates for anchor-bolt and tie locations, unless otherwise indicated. Use 3000-psi, 28-day compressive-strength concrete and reinforcement as specified in Division 3.
- B. Provide minimum 4" high bases for all floor mounted equipment unless noted otherwise.

### 1.31 ACCESS PANELS

- A. Provide panels with fire ratings equal to the surface in which they are installed and be 12" x 12" or 4" larger than each dimension of the enclosed box, whichever is greater.

### 1.32 TESTING, ADJUSTING, AND BALANCING

- A. Make all connections at panels and switches; make all splices and taps. Install fuses in all fuse holders. Complete all circuits from power sources to loads at the time of final inspection.
- B. Upon completion of the work, test all parts of the electrical installation to ensure that it is free of unwanted grounds and other defects. Preliminary testing with continuity meters will be permitted but will not be accepted in obtaining final results. Make final tests with a megger.
- C. Check load balance and rearrange connections so that the KW demand on each of the phase conductors does not vary by more than 10%.
- D. Set all overload devices, including equipment furnished under other contracts, and adjust to suit the load conditions. Make selections in accordance with NEC requirements and manufacturer's instructions.
- E. Ensure that all covers, closures, doors, and plates are in place.
- F. Ensure that all trims and covers are adjusted to be parallel or perpendicular to building lines, tight against surrounding architectural finishes, and devices are set flush.
- G. Check devices and controls for proper mechanical and electrical operation and set to normal or appropriate positions at the time of contract closeout.

### 1.33 EXAMINATION OF CONTRACT DOCUMENTS

- A. Carefully examine the architectural, civil, structural, heat-ventilating - air conditioning, plumbing and sprinkler drawings. If any discrepancies occur between the drawings or between the drawings and the specifications, report such discrepancies to the Engineer and the Architect in writing in a Request For Information (RFI) form and obtain written instructions as to the manner in which to proceed. Make no departures from the contract drawings without prior written approval of the Architect/Engineer.
- B. Report any discrepancies prior to the submission of bid. In the event such discrepancies are not reported and claims for extra charges to the contract result, such claims will be allocated to and paid for by the Contractor, who, in the opinion of the Engineer and the Architect, is the responsible party.

### 1.34 EQUIPMENT WIRING - GENERAL

- A. Unless otherwise mentioned herein or shown on the drawings, provide power wiring to all equipment, associated controls, and appurtenances. Refer to Specifications Section 260180 for further information on equipment provided under the electrical and other contracts.

### 1.35 TEMPORARY FACILITIES

- A. Provide temporary electric and lighting as required by Division 1.

## PART 2 - PRODUCTS – NOT USED

## PART 3 - EXECUTION

### 3.1 MOUNTING HEIGHTS AND LOCATION

- A. Outlets, controls, and system components shall be mounted at the heights listed below unless otherwise indicated. Heights shall be measured to the centerline of the box from the finished floor unless otherwise noted.
  - 1. Wall Switches: 42"
  - 2. Receptacle Outlet (General): 1'-6" unless indicated otherwise
  - 3. Receptacle Outlet (Mechanical, Storage, Electrical, Unfinished Rooms): 42"
  - 4. Telephone Outlet: 1'-6" unless indicated otherwise
  - 5. Data Outlet: 1'-6" unless indicated otherwise
  - 6. Fire Alarm Devices: Refer to Fire Alarm Section.
  - 7. Television Outlet: 1'-6" unless indicated otherwise.
  - 8. Receptacles above counters or benches with full height or no backsplashes: 0'-8" above countertop.
- B. Equipment shall be mounted as follows:
  - 1. Safety Switches: 5'-0" to top of enclosure.
  - 2. Enclosed Circuit Breakers: 5'-0" to top of enclosure.
  - 3. Enclosed Motor Controllers: 5'-0" to top of enclosure.
  - 4. Enclosed Contactors: 5'-0" to top of enclosure.
  - 5. Time Controls: 5'-0" to top of enclosure.
  - 6. Combination Starters: 5'-6" – 6'-0" to top of enclosure.
  - 7. Panelboards: 6'-6" to top of enclosure.
- C. When specifically detailed in the Architectural or Electrical drawings, mounting heights are to be as indicated. Consult architectural plans and elevations for individual areas where device locations may conflict with other work.
- D. In general, coordinate all device locations with approved Casework Drawings, Architectural Elevation, and Drawings, Mechanical, Plumbing, approved Kitchen and Room Equipment Drawings and other applicable drawings.
- E. Locate outlets in commercial kitchens in accordance with approved Food Service Drawings or shop drawings.
- F. In lavatories or rooms with casework or fixed cabinets, coordinate mounting heights and locations in the field with architectural elevations and adjust as required to avoid conflicts with mirrors, back splashes, fixtures, and hardware items.
- G. Field verify the final rough-in location for the actual equipment to be connected.
- H. Lighting Fixtures: As scheduled or indicated.

- I. Throughout new installation, all raceways and boxes shall be installed so that they are concealed in new construction. Any exceptions shall be approved by Architect before installation.

### 3.2 CEILING TILE REMOVAL

- A. The Contractor shall remove and replace ceiling tile and grid work as required for the installation of electrical work. Damaged tile and grid shall be replaced by the Contractor and shall match the existing ceiling system.

### 3.3 LINTEL COORDINATION

- A. All electrical sleeves and lintels that need to penetrate NEW walls are to be provided by Electrical Contractor for their work as detailed on the Masonry Lintel Schedule on the Structural Drawings provided to the General Contractor and installed by the General Contractor during construction of walls. If Electrical Contractor does not coordinate prior to construction of walls with the General Contractor, the Contractor is responsible to cut, install, and patch walls for the installation of their sleeves, lintels, and work. Electrical Contractor is also responsible for their own cutting and patching of existing walls and installation of sleeves, lintels to allow for their work.

END OF SECTION 260010

## SECTION 260060 – ELECTRICAL DEMOLITION

### PART 1 - GENERAL

#### 1.1 SECTION INCLUDES

- A. Electrical Demolition

#### 1.2 RELATED WORK/DIVISIONS

- A. Division 2

#### 1.3 SCOPE

- A. Refer to Drawings for Scope-of-Work

### PART 2 - PRODUCTS

#### 2.1 MATERIALS AND EQUIPMENT

- A. Provide materials and equipment for patching and extending work approved by Architect/Engineer.

### PART 3 - EXECUTION

#### 3.1 EXAMINATION

- A. Verify that building conditions are as shown on Drawings. Report discrepancies to Architect/Engineer before disturbing existing installation.
- B. Verify that abandoned wiring and equipment serve only abandoned facilities.
- C. Demolition Drawings are based on casual field observation. Report discrepancies to Architect/Engineer before disturbing existing installation.
- D. Beginning of demolition means installer accepts existing conditions.

#### 3.2 COORDINATION

- A. All electrical removals shall be coordinated with the removal and construction schedules of the other contractors working on this project so that the construction schedule may proceed without delays and interferences. Removals shall be complete before new work is started except portions of the removal which are designated for temporary use.

- B. Coordinate with the Mechanical and Plumbing Contractors for exact quantities and location of equipment to be disconnected and removed. The Electrical Contractor is responsible for removal of all electrical items serving mechanical equipment that is to be removed.
- C. Coordinate with the Mechanical and Plumbing Contractors for exact quantities and location of equipment to remain and/or to be relocated. Provide new disconnects, wire and conduits, same size as existing, and reconnect equipment as required.
- D. Maintain electrical service and emergency power system as required during phasing. Provide rework of systems as required.
- E. Removals of system specific equipment shall be performed by installer of such equipment so that a phased switchover of systems is facilitated.

### 3.3 PREPARATION

- A. Disconnect and remove electrical systems in walls, floors, and ceilings scheduled for removal.
- B. Coordinate utility service outages with Utility Company and Owner.
- C. Provide temporary wiring, supporting devices and connections to maintain existing systems in service during construction. When work must be performed on energized equipment or circuits, use personnel experienced in such operations.
- D. Maintain the following systems in service until new service is complete and ready for service. When system is to remain provide all rework required to maintain system operational. Systems shall only be disabled to make switchovers and connections. Provide temporary connections to maintain service in areas adjacent to work area. Obtain permission from Architect/Engineer at least 72 hours before partially or completely disabling systems, minimizing outage duration.
  - 1. Electrical Service
  - 2. Telephone Service
  - 3. CATV Service
  - 4. Fiber Service
  - 5. Fire Alarm System
  - 6. Telephone System
  - 7. Television System
  - 8. Computer Network System
  - 9. Security/Card Access Systems
  - 10. Sound Systems
  - 11. Program/Master Clock Systems
  - 12. Generator Systems

### 3.4 DEMOLITION AND EXTENSION OF EXISTING ELECTRICAL WORK

- A. Demolish and extend existing electrical work under provisions of Division 2 and Division 26.
- B. In areas where existing surfaces and structures are to remain, all electrical equipment and materials designated for removal shall be disassembled where possible and neatly cut where necessary to avoid damaging surfaces and structures. Where damage to existing surfaces and

structures occurs, the contractor shall be responsible for repairs using proper materials as specified in other sections of this specification and as directed by the Architect/Engineer.

- C. Where items of equipment or materials are designated to be turned over to the Owner, such equipment and material shall be carefully removed and reassembled or packaged in order to avoid damage and loss of parts. The Contractor shall be responsible for repair of damage and replacement of lost parts.
- D. Demolished equipment and materials shall be removed from the work area by the end of each workday and more frequently when necessary to avoid congestion and hazardous conditions. Demolished equipment and materials shall be removed from the site at least once a week and more frequently when necessary to avoid congestion and hazardous conditions. Materials shall be carefully stacked or boxed as they are removed to avoid the safety hazards associated with cluttered work areas and unstable stacks and piles.
- E. All demolished materials and equipment not designated to be turned over to the Owner shall become the property of the Contractor. The contractor shall dispose of these materials and equipment in accordance with the applicable requirements of local, state, and federal authorities having jurisdiction.
- F. Removals shall be complete and shall include all attachments, brackets, hangers, cables, clamps, hardware, bolts, and screws. Cast in place and expanded anchors do not need to be removed where they are flush with the surface, but protruding studs shall be cut off flush.
- G. Where removals disrupt service to existing circuits and equipment which is to remain, the Contractor shall restore service to the remaining equipment and outlets using the construction methods and materials permitted or required by the appropriate sections of this specification.
- H. Remove, relocate, and extend existing installations as required to accommodate new construction.
- I. Remove abandoned wiring to source of supply.
- J. Remove exposed abandoned conduit, including abandoned conduit and cables above accessible ceiling finishes. Cut conduit to 1" below surface of walls and floors, and patch surfaces.
- K. Disconnect abandoned outlets and remove devices. Remove abandoned outlets if conduit and cables servicing them is abandoned and removed. Remove the backbox and patch/paint the wall to match the existing surfaces.
- L. Disconnect and remove abandoned panelboards and distribution equipment.
- M. Disconnect and remove electrical devices and equipment serving utilization equipment that has been removed.
- N. Disconnect and remove abandoned luminaires. Remove brackets, stems, hangers, and other accessories.
- O. Repair adjacent construction and finishes damaged during demolition and extension work.
- P. Maintain access to existing electrical installations which remain active. Modify installation or provide access panel as appropriate.



- Q. Extend existing installations using materials and methods as specified.
- R. Remove any acoustical tile or ceiling material not removed by other trades, as required for the removal of existing and/or the installation of new electrical equipment. Contractor shall replace all ceiling tiles damaged by him that are to remain. New ceiling tiles shall match existing type. Verify type with Architect before installing.
- S. Repair fire and smoke rated partitions surrounding electrical work as specified. Refer to the Architectural Plans for locations of smoke and fire partitions.
- T. Remove abandoned telecommunications and low voltage cables from terminal to outlet. Remove abandoned outlets and terminal cabinets.
- U. Where demolition of electrical equipment damages existing surfaces that are to remain, restore those surfaces to the same condition as the adjacent surfaces. All patches and repairs shall be subject to review and approval by the Architect. When the Room Finish Schedule shows that a room will be painted under another contract, prime the wall and ceiling patches ready for finish painting. Where room finishes are not part of another contract, prime and paint wall and ceiling patches to match existing surfaces. Blank plates will not be acceptable for removed equipment including flush panelboards.

### 3.5 POLYCHLORINATED BIPHENYL MATERIAL

- A. Testing:
  - 1. The Contractor shall be responsible for the proper testing of all waste and expendable materials, including PCB fluid in accordance with local, state, federal regulations, ASTM D923 and D4059.
  - 2. All PCB fluids and PCB contained materials shall be transported by an approved hazardous materials company. Receipts and certificates of testing for each container of fluid and contaminated waste shall be provided to the Owner.
- B. Disposal:
  - 1. All ballasts containing PCB's and batteries shall be treated as hazardous waste and be disposed of as regulated by the Environmental protection Agency's Universal Waste Rule. Any state regulations more stringent shall take precedence.
  - 2. All fluorescent and HID lamps shall be treated as hazardous waste and be recycled as regulated by the Environmental Protection Agency's Universal Waste Rule. Any state regulations more stringent shall take precedence.
  - 3. All transformers containing PCB's shall be treated as hazardous waste and be recycled as regulated by the Environmental Protection Agency's Universal Waste Rule. Any state regulations more stringent shall take precedence.
- C. Guarantee: The Contractor shall guarantee that all hazardous materials have been removed from the Owner's property and disposed of properly and that the existing structure is free of contamination by any hazardous materials removed for this project.

### 3.6 SALVAGE

- A. The items indicated on the drawings shall be carefully removed, protected, and turned over to the Owner in the condition which existed before their removal. The Contractor shall transport the

salvaged items with his own manpower to the Owner designated place located on site or re-install the items as shown on the drawings.

### 3.7 CLEANING AND REPAIR

- A. Clean and repair existing materials and equipment which remain or are to be reused.
- B. Reused Luminaires: Provide new lamps, ballasts, lenses and replace all broken electrical parts. Clean entire luminaire as recommended by manufacturer.
- C. Panelboards: Clean exposed surfaces and check tightness of electrical connections. Replace damaged circuit breakers and provide closure plates for vacant positions. Provide typed circuit directory showing revised circuiting arrangement.

### 3.8 INSTALLATION

- A. Install relocated materials and equipment under the provisions of Division 2.

END OF SECTION 260060

## SECTION 260519 – ELECTRICAL POWER CONDUCTORS AND CABLES

### PART 1 - GENERAL

#### 1.1 SECTION INCLUDES

- A. Conductors and Cables
- B. Metal Clad Cable
- C. Wiring Connectors and Connections

#### 1.2 REFERENCES

- A. ANSI/NFPA 70 - National Electrical Code.
- B. NETA - ATS - Acceptance Testing Specifications for Electrical Power Distribution Equipment (International Electrical Testing Association).

#### 1.3 SUBMITTALS FOR REVIEW

- A. Submit a letter on company letterhead stating that all equipment is in compliance with the specifications.

#### 1.4 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing products specified in this Section with minimum three years documented experience.

#### 1.5 REGULATORY REQUIREMENTS

- A. Conform to requirements of ANSI/NFPA 70.
- B. Furnish products listed and classified by Underwriters Laboratories, Inc., or a testing firm acceptable to authority having jurisdiction as suitable for purpose specified and shown.

#### 1.6 PROJECT CONDITIONS

- A. Verify that field measurements are as shown on Drawings.
- B. Conductor sizes are based on copper. Substitution of aluminum for conductors specified as copper is not permitted.
- C. Conductor sizes are based upon 75°C insulation temperature ratings. When the contractor furnishes equipment that is listed for use with conductors having temperature ratings of less than 75°C, he shall furnish conductors sized in accordance with the 60°C column of NEC Tables 310-16 or 310-17 and the appropriate conduit size.

- D. Wire and cable routing shown on Drawings is approximate unless dimensioned. Route wire and cable as required to meet Project Conditions. Include wire and cable lengths within 10' of length shown.
- E. Where wire and cable routing are not shown, and destination only is indicated, determine exact routing and lengths required.

#### 1.7 WARRANTY

- A. Provide the warranty specified in Section 260010.

### PART 2 - PRODUCTS

#### 2.1 POWER CONDUCTORS

- A. Description: Single conductor insulated wire.
- B. Conductor: Copper, 98% conductivity minimum.
- C. Insulation Voltage Rating: 600 volts.
- D. Insulation: ANSI/NFPA 70; Type THHN/THWN or XHHW insulation for feeders and branch circuits.

#### 2.2 METAL CLAD CABLE (See Wiring Methods, Paragraph 3.3 of this Section for Restrictions)

- A. Description: ANSI/NFPA 70, Type MC.
- B. Conductor: Copper
- C. Insulation Voltage Rating: 600 volts.
- D. Insulation Temperature Rating: 75°C.
- E. Insulation Material: Thermoplastic
- F. Armor Material: Steel or Aluminum
- G. Armor Design: Interlocked metal tape
- H. Jacket: None

#### 2.3 POWER & CONTROL SIGNAL METAL CLAD CABLE (See Wiring Methods, Paragraph 3.3 of this Section for Restrictions)

- A. Description: ANSI/NFPA 70, Type THHN/THWN power and ground conductors along with a control conductor assembly composed of a 30 mil PVC jacket covering two 16 AWG CU Type TFN control conductors.

- B. Conductor: Copper
- C. Insulation Voltage Rating: 600 volts.
- D. Insulation Temperature Rating: 75°C.
- E. Insulation Material: Thermoplastic
- F. Armor Material: Steel or Aluminum
- G. Armor Design: Interlocked metal tape
- H. Jacket: None
- I. Usage: LED lighting with 0-10V dimming

#### 2.4 WIRING CONNECTORS AND SPLICES

- A. UL-listed, factory-fabricated wiring connectors of size, ampacity rating, material and type and class for application and for service indicated.
- B. All wire connectors shall be manufactured in full compliance with UL 486A.

### PART 3 - EXECUTION

#### 3.1 EXAMINATION

- A. Verify that interior of building has been protected from weather.
- B. Verify that mechanical work likely to damage wire and cable has been completed.

#### 3.2 PREPARATION

- A. Completely and thoroughly swab raceway before installing wire.

#### 3.3 WIRING METHODS

- A. Concealed Dry Interior Locations: Use only power conductors, type THHN/THWN or XHHW insulation, in raceway.
- B. Exposed Dry Interior Locations: Use only power conductor types THHN/THWN or XHHW insulation, in raceway.
- C. Above Accessible Ceilings:
  - 1. Home Runs: Use only power conductors, Type THHN/THWN or XHHW insulation, in raceway.
  - 2. In Corridors and for Circuits which extend to other rooms: Use only power conductors, type THHN/THWN or XHHW insulation in raceway.

3. Branch Circuits which do not extend beyond the walls of the room: Use power conductors, type THHN/THWN or XHHW insulation in raceway or metal clad cable.
- D. Wet or Damp Interior Locations: Use only power conductors, type THHN/THWN or XHHW insulation, in raceway.
- E. Underground Installations: Use only power conductors, type XHHW in raceway.
- F. Exterior Locations: Use only power conductors, type THHN/THWN or XHHW insulation, in raceway.
- G. Wiring methods indicated on Drawings supersede the General Statements in this Section.
- H. MC Cable is to be used for lighting circuit only. MC Cable is specifically prohibited to penetrate walls to other spaces and prohibited above corridor ceilings other than short (10' or less) connections from raceway junction boxes to light fixtures and equipment.
- I. In underslab branch circuit raceways, there should be no less than one raceway extension installed from electrical device to an above accessible ceiling location terminated in a junction box per room. The intent of this requirement is to give future access to this raceway and circuits.

#### 3.4 INSTALLATION

- A. Install products in accordance with manufacturers' instructions.
- B. Use solid conductor for feeders and branch circuits 10 AWG and smaller.
- C. Use stranded conductors for control circuits.
- D. Use conductor not smaller than 12 AWG for power and lighting circuits.
- E. Use conductor not smaller than 16 AWG for control circuits.
- F. Pull all conductors into raceway at same time.
- G. Use suitable wire pulling lubricant for all building wire.
- H. Protect exposed cable from damage.
- I. Support cables above accessible ceiling, using spring metal clips or metal or plastic cable ties to support cables from structure. Do not support cables from ceiling suspension system. Do not rest cable on ceiling panels.
- J. Modify as required for the installation of lug adapters, crimp on reducers and hardware, as necessary, to terminate conductors on equipment.
- K. Neatly train and lace wiring inside boxes, equipment, and panelboards.
- L. Clean conductor surfaces before installing lugs and connectors.

- M. Make splices, taps, and terminations to carry full ampacity of conductors with no perceptible temperature rise.
- N. Use split bolt connectors for copper conductor splices and taps No. 6 AWG and larger. Tape uninsulated conductors and connector with electrical tape to 150% of insulation rating of conductor.
- O. Use gutter taps for taps from parallel feeder cables.
- P. Use solderless pressure connectors with insulating covers for copper conductor splices and taps, 8 AWG and smaller.
- Q. Use insulated spring wire connectors with plastic caps for copper conductor splices and taps, 10 AWG and smaller.
- R. Cover ends of spare conductors with electrical tape.
- S. Conductor Splices: Keep to minimum.
  - 1. Install splices and tapes that possess equivalent or better mechanical strength and insulation ratings than conductors being spliced.
  - 2. Use splice and tap connectors that are compatible with conductor material.
- T. Voltage Drop: All feeders on the project have been sized to limit voltage drop to 2% or less. It shall be the Contractor's responsibility to size branch circuits as necessary, based on their actual lengths, to limit branch circuit voltage drop to 3% or less. This will limit the overall voltage drop at each outlet to the 5% maximum allowed by the National Electrical Code.

### 3.5 INTERFACE WITH OTHER PRODUCTS

- A. Identify wire and cable under provisions of Section 260553.
- B. Identify each conductor with its circuit number or other designation indicated on Drawings.

### 3.6 FIELD QUALITY CONTROL

- A. Perform field inspection and testing. Provide a written report of all test results to the Engineer.
- B. Inspect wire and cable for physical damage and proper connection. Replace all conductors and cables with damaged, insulation, sheaths, or jackets.
- C. Measure tightness of bolted connections and compare torque measurements with manufacturer's recommended values.
- D. Verify continuity of each branch circuit conductor. Provide a written report of all test results to the Engineer.

END OF SECTION 260519

## SECTION 260526 – GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS

### PART 1 - GENERAL

#### 1.1 SECTION INCLUDES

- A. Grounding Electrodes and Conductors
- B. Equipment Grounding Conductors
- C. Bonding

#### 1.2 REFERENCES

- A. ANSI/NFPA 70 - National Electrical Code
- B. NPFA 99 - Health Care Facilities
- C. NETA-ATS - Acceptance Testing Specifications for Electrical Power Distribution Equipment (International Electrical Testing Association)

#### 1.3 GROUNDING ELECTRODE SYSTEM

- A. Metal underground water pipe if present
- B. Metal frame of the building
- C. Rod electrode
- D. Reinforcing steel in foundation footing when being installed,

#### 1.4 PERFORMANCE REQUIREMENTS

- A. Grounding System Resistance: 5 ohms for equipment operation at 601 volts or higher, 25 ohms for equipment operating at 600 volts or less.

#### 1.5 SUBMITTALS FOR REVIEW

- A. Submit a letter on Company letterhead stating that all equipment will be in compliance with the specifications.
- B. Test Report: Indicate overall resistance to ground.

#### 1.6 SUBMITTALS FOR CLOSEOUT

- A. Submit under provisions of Section 260010.
- B. Accurately record actual locations of grounding electrodes.



## 1.7 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing Products specified in this Section with minimum three years documented experience.

## 1.8 REGULATORY REQUIREMENTS

- A. Conform to requirements of ANSI/NFPA 70.
- B. Provide products listed and classified by Underwriters Laboratories, Inc., or a testing firm acceptable to authority having jurisdiction as suitable for purpose specified and shown.

## 1.9 WARRANTY

- A. Provide the warranty specified in Section 260010.

## PART 2 - PRODUCTS

### 2.1 ROD ELECTRODE

- A. Material: Copper-clad steel.
- B. Diameter: 3/4"
- C. Length: 10'

### 2.2 MECHANICAL CONNECTORS

- A. Material: Bronze.

### 2.3 EXOTHERMIC CONNECTIONS

- A. Material: Copper alloy or copper

### 2.4 WIRE

- A. Material: Stranded copper.
- B. Foundation Electrodes: 2/0 AWG.
- C. Grounding Electrode Conductor: Size to meet NFPA 70 requirements.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Verify that final backfill and compaction has been completed before driving rod electrodes.

### 3.2 INSTALLATION

- A. Grounding counterpoise: Grounding counterpoise shall consist of three (3) ground rods spaced 8' minimum on center. Rods shall be installed with top of rod 12" below finished grade. Rods shall be interconnected with a #4/0 bare copper electrode with cadweld connections at each ground rod. Provide dedicated 2" conduit for #4/0 bare copper electrode conductor to switchgear ground bus. Locate grounding electrode in a grassy area as close to the building as possible.
- B. Grounding Conductors: Route along shortest and straightest paths possible, unless otherwise indicated. Avoid obstructing access or placing conductors where they may be subjected to strain, impact, or damage.
- C. Bonding Straps and Jumpers: install so vibration by equipment mounted on vibration isolation hangers and supports is not transmitted to rigidly mounted equipment. Use exothermic-welded connectors for outdoor locations, unless a disconnect-type connection is required; then, use a bolted clamp. Bond straps directly to the basic structure taking care not to penetrate any adjacent parts. Install straps only in locations accessible for maintenance.
- D. Metal Water Service Pipe: Provide insulated copper grounding conductor in 2" conduit from the electrical main service entrance equipment grounding bus to the main metal water service entrances to building. Connect ground bonding conductors to main metal water service pipes by grounding clamp connectors where a dielectric main water fitting is installed, connect ground bonding conductor to street side of fitting. Bond grounding conductor to conduit or sleeve at each end.
- E. Generator Grounding: Provide generator ground per manufacturer and National Electric Code.
- F. Water Meter Piping: Use braided-type bonding jumpers to electrically bypass water meters. Connect to pipe with grounding clamp connectors.
- G. Bond each aboveground portion of gas piping system upstream from equipment shutoff valve.
- H. Install Products in accordance with manufacturer's instructions.
- I. Install rod electrodes at locations indicated. Install additional rod electrodes as required to achieve specified resistance to ground.
- J. Provide grounding electrode conductor and connect to reinforcing steel in foundation footing.
- K. Provide bonding to meet Regulatory Requirements.
- L. Provide a grounding bushing and equipment grounding conductor on the terminal end of metallic conduit systems where any of the following conditions occur:
  - 1. A conduit carrying circuit conductors protected by an overcurrent device rated 50 amps or larger is connected to a metallic enclosure by concentric knockouts or reducing washers.
  - 2. Concentric knockout rings or bridges are broken.
  - 3. The enclosure is non-metallic and does not have an integral grounding strap.
  - 4. Conduits stub up through floors and foundations into switchboards, transformers, and other equipment without a metallic wall at the point of entrance.

- M. Equipment Grounding Conductor: Provide separate, insulated conductor within each feeder and branch circuit raceway. Terminate each end on suitable lug, bus or bushing or terminal.

### 3.3 CONNECTIONS

- A. General: Make connections so galvanic action or electrolysis possibility is minimized. Select connectors, connection hardware, conductors, and connection methods so metals in direct contact will be galvanically compatible.
  1. Use electroplated or hot-tin-coated materials to ensure high conductivity and to make contact points closer to 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.
- B. Exothermic-Welded Connections: Comply with manufacturer's written instructions. Welds that are puffed up or that show convex surfaces indicating improper cleaning are not acceptable.
- C. All underground bonding connections shall be exothermic-welded connections.
- D. Equipment Grounding Conductor Terminations: For #8 AWG and larger, use pressure-type grounding lugs. #10 AWG and smaller grounding conductors may be terminated with winged pressure-type connectors.
- E. Noncontact Metal Raceway Terminations: If metallic raceways terminate at metal housings without mechanical and electrical connection to housing, terminate each conduit with a grounding bushing. Connect grounding bushings with a bare grounding conductor to grounding bus or terminal in housing. Bond electrically non-continuous conduits at entrances and exits with grounding bushings and bare grounding conductors, unless otherwise indicated.
- F. Tighten screws and bolts for grounding and bonding 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 and UL 486B.
- G. Compression-Type Connections: Use hydraulic compression tools to provide correct circumferential pressure for compression connectors. Use tools and dies recommended by connector manufacturer. Provide embossing die code or other standard method to make a visible indication that a connector has been adequately compressed on grounding conductor.
- H. Moisture Protection. If insulated grounding conductors are connected to ground rods or grounding buses, insulate entire area of connections and seal against moisture penetration of insulation and cable.
- I. Provide #8 ground wire in  $\frac{3}{4}$ " conduit and connect flammable storage cabinets and acid storage cabinets to building steel. Verify and adjust ground wire size to match manufacturers recommended wire size.

- J. Wire Rod Type Cable Tray (Section 260536): Provide #2 bare copper conductor, entire length of cable tray. Bond at 50' intervals.
- K. Identification: Provide tag on each ground conductor at bus to read as follows: "Caution – Ground Wire – Do not Remove". Provide I.D. marking of all conductors as per N.E.C.

### 3.4 FIELD QUALITY CONTROL

- A. Perform NETA-ATS testing and inspection of the grounding and bonding system.
- B. Inspect grounding and bonding system conductors and connections for tightness and proper installation.
- C. Use suitable test instrument to measure resistance to ground of system. Perform testing in accordance with test instrument manufacturer's recommendations using the fall- of-potential method. Provide a report of the results of the test of each grounding system. Where several grounding systems are tied together, test each system separately before making the interconnection.

END OF SECTION 260526

## SECTION 260529 – HANGERS AND SUPPORTS

### PART 1 - GENERAL

#### 1.1 SECTION INCLUDES

- A. Conduit and Equipment Supports
- B. Anchors and Fasteners
- C. Cable Supports

#### 1.2 REFERENCES

- A. ANSI/NFPA 70 - National Electrical Code
- B. NECA - National Electrical Contractors Association

#### 1.3 SUBMITTALS FOR REVIEW

- A. Submit a letter on Company letterhead stating that all equipment will be in compliance with the specifications.

#### 1.4 REGULATORY REQUIREMENTS

- A. Conform to requirements of ANSI/NFPA 70.
- B. Furnish products listed and classified by Underwriters Laboratories, Inc., or a testing firm acceptable to authority having jurisdiction as suitable for purpose specified and shown.

#### 1.5 WARRANTY

- A. Provide the warranty specified in Section 260010.

### PART 2 - PRODUCTS

#### 2.1 GENERAL

- A. Provide supporting devices which comply with manufacturer's standard materials, design, and construction in accordance with published product information, and as required for complete installation; and as herein specified. Where more than one type of supporting device meets indicated requirements, selection is installer's option.

#### 2.2 ANCHORS

- A. Provide anchors of types, sizes and materials indicated, with the following construction features:
  - 1. Toggle Bolts: Springhead; 3/16" x 4".

2. Expansion sleeve anchors by Hilti or Phillips Redhead: 2"

### 2.3 SLEEVES AND SEALS

- A. Provide sleeves and seals, of types, sizes and materials indicated, with the following construction features:
  1. Wall and Floor Seals: Provide factory-assembled watertight wall and floor seals, of types and sizes indicated; suitable for sealing around conduit, pipe, or tubing passing through concrete floors and walls. Construct seals with steel sleeves, malleable iron body, neoprene sealing grommets and rings, metal pressure rings, pressure clamps, and cap screws.
  2. Fire-Rated Walls and Floors: At all locations where conduits or cables penetrate a fire-rated wall or floor, provide firestopping in accordance with Division 7.

### 2.4 U-CHANNEL STRUT SYSTEMS

- A. Provide U-Channel strut system for supporting equipment supplied under this contract, 12-ga hot-dip galvanized steel, or types and sizes indicated with standard green finish, and with the fittings which mate and match with U-Channel.
- B. Auxiliary Steel Supports: Provide all required auxiliary steel to install any equipment supplied under this contract. The design and gauge of steel used shall be as required by the manufacturer's specifications.

### 2.5 NON-CONTINUOUS CABLE SUPPORTS (J-HOOKS)

- A. Non-continuous cable supports shall provide a bearing surface of sufficient width to comply with required bend radii of high-performance cables.
- B. Non-continuous cable supports shall have flared edges to prevent damage while installing cables.
- C. Non-continuous cable supports 1-15/16" and larger shall have a cable retainer strap to provide containment of cables within the hanger.
- D. Non-continuous cable supports shall have an electro-galvanized finish and be rated for indoor use in non-corrosive environments.
- E. Non-continuous cable supports shall be UL listed, with manufacturer's name and part number stamped on.

## PART 3 - EXECUTION

### 3.1 INSTALLATION

- A. Install products in accordance with manufacturer's instructions.
- B. Provide anchors, fasteners, and supports in accordance with NECA "Standard of Installation".
- C. Fasten hanger rods, conduit clamps, and outlet and junction boxes to building structure as required. Do not use spring steel clips and clamps.

- D. Use toggle bolts or hollow wall fasteners in hollow masonry, plaster, or gypsum board partitions and walls; expansion anchors or preset inserts in solid masonry walls; self-drilling anchors or expansion anchor on concrete surfaces; sheet metal screws in sheet metal studs; and wood screws in wood construction.
- E. Do not fasten supports to piping, ductwork, mechanical equipment, and conduit.
- F. Do not use powder-actuated anchors.
- G. Obtain permission from Architect before drilling or cutting structural members.
- H. Fabricate supports from structural steel or steel channel, rigidly welded, or bolted to present neat appearance with adequate strength and rigidity. Use hexagon head bolts with spring lock washers under all nuts.
- I. Install surface-mounted cabinets, enclosures, and panelboards with minimum of four anchors.
- J. In wet and damp locations use steel channel supports to stand cabinets and panelboards 1" off wall.
- K. Use sheet metal channel to bridge studs above and below cabinets and panelboards recessed in hollow partitions.
- L. Square cut and deburr all structural steel, strut, threaded rods, and similar items.
- M. Prime and paint all ferrous metals which are not factory finished.
- N. Strut and Hardware Finishes:
  - 1. Indoor dry locations: painted or pre-galvanized.
  - 2. Outdoor and indoor wet locations: post-galvanized.
  - 3. Corrosive locations: PVC coated or fiber reinforced plastic.
  - 4. Pool Environment: aluminum or stainless steel.
- O. Coordinate with other mechanical, plumbing, sprinkler, and electrical work, including raceway and wiring work, as necessary to interface installation of supporting devices with other work.
- P. Install hangers, supports, clamps and attachments to support piping properly from building structure. Arrange for grouping of parallel runs of horizontal conduits to be supported together on trapeze type hangers where possible. Install supports in compliance with NEC requirements.
- Q. Torque sleeve seal nuts, complying with manufacturer's recommended values. Ensure that sealing grommets expand to form watertight seal.
- R. Remove burrs from ends of pipe sleeves.
- S. Do not use bridle rings or tie-wraps to support cables. J-hooks are the only acceptable support method.

END OF SECTION 260529

## SECTION 260533 – RACEWAYS AND BOXES

### PART 1 - GENERAL

#### 1.1 SECTION INCLUDES

- A. Metal Conduit
- B. Flexible Metal Conduit
- C. Liquidtight Flexible Metal Conduit
- D. Electrical Metallic Tubing
- E. Nonmetallic Conduit
- F. Fittings and Conduit Bodies
- G. Wireways
- H. Boxes
- I. Cabinets
- J. Enclosures

#### 1.2 REFERENCES

- A. ANSI/NFPA 70 - National Electrical Code
- B. ANSI C80.1 - Rigid Steel Conduit, Zinc Coated
- C. ANSI C80.3 - Electrical Metallic Tubing, Zinc Coated
- D. ANSI C80.6 – Intermediate Metal Conduit, Zinc Coated
- E. ANSI/NEMA FB 1 - Fittings, Cast Metal Boxes, and Conduit Bodies for Conduit and Cable Assemblies
- F. NECA “Standard of Installation”
- G. NEMA RN 1 - Polyvinyl Chloride (PVC) Externally Coated Galvanized Rigid Steel Conduit and Intermediate Metal Conduit
- H. NEMA TC 2 - Electrical Plastic Tubing (EPT) and Conduit (EPC-40 and EPC-80)
- I. NEMA TC 3 - PVC Fittings for Use with Rigid PVC Conduit and Tubing
- J. NEMA TC 12 - Corrugated Polyvinyl Chloride Coilable Plastic Utilities Duct



- K. UL 94 - Vertical Flame Test
- L. NEMA FB 1 - Fittings and Supports for Conduit and Cable Assemblies
- M. NEMA OS 1 - Sheet-steel Outlet Boxes, Device Boxes, Covers, and Box Supports
- N. NEMA OS 2 - Nonmetallic Outlet Boxes, Device Boxes
- O. NEMA 250 - Enclosures for Electrical Equipment (1000 Volts Maximum)

### 1.3 DESIGN REQUIREMENTS

- A. Conduit Size: ANSI/NFPA 70.

### 1.4 QUALITY ASSURANCE

- A. Fire rated pathways shall bear the UL Classification marking.
- B. Pathways shall be tested in accordance with ASTM E814 (ANSI/UL1479)

### 1.5 SUBMITTALS FOR REVIEW

- A. Submit a letter on Company letterhead stating that all equipment will be in compliance with the specifications.

### 1.6 SUBMITTALS FOR CLOSEOUT

- A. Submit under provisions of Section 260010.
- B. Accurately record actual routing of conduits larger than 1" which are installed underground or under a slab on grade.

### 1.7 REGULATORY REQUIREMENTS

- A. Conform to requirements of ANSI/NFPA 70.
- B. Furnish products listed and classified by Underwriters Laboratories, Inc., or a testing firm acceptable to authority having jurisdiction as suitable for purpose specified and shown.

### 1.8 DELIVERY, STORAGE, AND HANDLING

- A. Deliver, store, protect, and handle Products to site under provisions of Section 260010.
- B. Accept conduit on site. Inspect for damage.
- C. Protect conduit from corrosion and entrance of debris by storing above grade. Provide appropriate covering.
- D. Protect non-metallic conduit from sunlight.

## 1.9 PROJECT CONDITIONS

- A. Verify that field measurements are as shown on Drawings.
- B. Verify routing and termination locations of conduit prior to rough-in.
- C. Conduit routing is shown on Drawings in approximate locations unless dimensioned. Route as required to complete wiring system.

## 1.10 WARRANTY

- A. Provide the warranty specified in section 260010.

## PART 2 - PRODUCTS

### 2.1 CONDUIT REQUIREMENTS

- A. Minimum Size: 3/4" unless otherwise specified.
- B. Where control devices are provided with 1/2" knockouts or hubs, 3/8" or 1/2" flexible conduit not exceeding 3' in length may be installed between the device and a junction box or conduit fitting.
- C. Underground Installations: Use galvanized rigid steel conduit or nonmetallic conduit as indicated.
  - 1. Minimum Size: 1"
- D. Outdoor Locations, Above Grade: Use galvanized rigid steel conduit or intermediate metal conduit.
- E. Outdoor Locations, Below Grade: Use nonmetallic conduit, concrete encased or stone-dust encased per details on drawings. All elbows shall be long radius steel.
- F. Wet and Damp Locations: Use galvanized rigid steel or intermediate metal conduit.
- G. Dry Locations:
  - 1. Concealed: Use galvanized rigid steel, intermediate metal conduit or electrical metallic tubing.
  - 2. Exposed: Use galvanized rigid steel, intermediate metal conduit or electrical metallic tubing.

### 2.2 METAL CONDUIT

- A. Galvanized Rigid Steel Conduit (GRC): ANSI C80.1.
- B. Intermediate Metal Conduit (IMC): Rigid steel.
- C. Fittings and Conduit Bodies: ANSI/NEMA FB 1; material to match conduit.

### 2.3 FLEXIBLE METAL CONDUIT

- A. Description: Interlocked steel construction.
- B. Fittings: ANSI/NEMA FB 1.

### 2.4 LIQUIDTIGHT FLEXIBLE METAL CONDUIT

- A. Description: Interlocked steel construction with PVC jacket.
- B. Fittings: ANSI/NEMA FB 1.

### 2.5 ELECTRICAL METALLIC TUBING (EMT)

- A. Description: ANSI C80.3; galvanized tubing.
- B. Fittings and Conduit Bodies: ANSI/NEMA FB 1; steel or malleable iron, compression type. Indenter type may be substituted for 3/4" size tubing installed in dry locations.

### 2.6 NONMETALLIC CONDUIT

- A. Description: NEMA TC 2; Schedule 40 PVC.
- B. Fittings and Conduit Bodies: NEMA TC 3.

### 2.7 WIREWAY

- A. Description:
  - 1. Indoor Use: General Purpose
  - 2. Where Indicated: Oil-tight and Dust-tight
  - 3. Outdoor Use: Rain-tight
- B. Knockouts: Manufacturer's Standard
- C. Size: Size and length as indicated or required for installation.
- D. Cover: Hinged or screw covers. Provide full gasketing on oil-tight wireways.
- E. Connector: Slip-in or flanged.
- F. Fittings: Lay-in type with removable top, bottom, and sides.
- G. Finish: Rust inhibiting primer coating with gray enamel finish or pre-galvanized.

### 2.8 OUTLET BOXES

- A. Sheet Metal Outlet Boxes: NEMA OS 1, galvanized steel.

1. Luminaire and Equipment Supporting Boxes: Shape and size shall suit the type of fixture or canopy and be rated for weight of equipment supported; include 1/2" male fixture studs where required.
2. Minimum Depth – 2-1/8"
3. Concrete Ceiling Boxes: Concrete type.
4. Provide 4" square boxes for fire alarm signaling devices and similar devices.

B. Nonmetallic Outlet Boxes: NEMA OS 2.

C. Cast Boxes: NEMA FB 1, Type FD, aluminum or cast ferrous alloy. Provide gasketed cover by box manufacturer. Provide boxes with threaded hubs.

D. Use cast outlet boxes in exterior and wet locations.

## 2.9 PULL AND JUNCTION BOXES

A. Sheet Metal Boxes: NEMA OS 1, galvanized steel.

1. Cover: Furnish with machine screws.

B. Surface Mounted Cast Metal Box: NEMA 250, Type 4; flat-flanged, surface mounted junction box:

1. Material: Galvanized cast iron or Cast aluminum.
2. Cover: Furnish with ground flange, neoprene gasket, and stainless-steel cover screws.

## 2.10 HINGED COVER ENCLOSURES

A. Manufacturers:

1. Square D
2. Hoffman Engineering
3. Hammond Manufacturing

B. Construction: NEMA 250, galvanized steel.

C. Covers: Continuous hinge, held closed by perimeter clamps operated by screws.

D. Provide interior metal panel for mounting terminal blocks and electrical components finish with white enamel.

E. Enclosure Finish: Manufacturer's standard enamel.

F. Provide accessory feet for free standing enclosures.

G. Enclosure:

1. Interior Dry Locations: Type 1
2. Interior Wet Locations: Type 4
3. Exterior Locations: Type 3R
4. Kitchen: Stainless Steel
5. Dishwashing Rooms/Areas: Stainless Steel

## 2.11 CABINETS

- A. Manufacturers:
  - 1. Square D Company
  - 2. Hoffman Engineering
  - 3. Hennesy Enclosures
- B. Boxes: Galvanized Steel
- C. Box Size: As indicated or as required to house the indicated quantity of cables and connections plus 20% spare.
- D. Backboard: Provide 3/4" thick plywood backboard for mounting terminal blocks. Paint matte white.
- E. Fronts: Steel, flush or surface type as indicated with concealed trim clamps, concealed hinge, and flush lock keyed to match branch circuit panelboard. Finish with gray baked enamel.
- F. Knockouts: As required.
- G. Provide metal barriers to separate compartments containing control wiring operating at less than 50 volts from power wiring.
- H. Provide accessory feet for free standing equipment.
- I. Enclosure:
  - 1. Interior Dry Locations: Type 1
  - 2. Interior Wet Locations: Type 4
  - 3. Exterior Locations: Type 3R
  - 4. Kitchen: Stainless Steel
  - 5. Dishwashing Rooms/Areas: Stainless Steel

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Verify locations of floor boxes and outlets prior to rough-in.

### 3.2 CONDUIT INSTALLATION

- A. Install conduit in accordance with NECA "Standard of Installation" except paragraphs on "Mounting Height".
- B. Install nonmetallic conduit in accordance with manufacturer's instructions.
- C. Arrange supports to prevent misalignment during wiring installation.
- D. Support conduit using coated steel or malleable iron straps, lay-in adjustable hangers, clevis hangers, and split hangers.

- E. Group related conduits; support using conduit rack. Construct rack using steel channel; provide space on each for 25% additional conduits.
- F. Fasten conduit supports to building structure and surfaces under provisions of Section 260010.
- G. Do not support conduit with wire or perforated pipe straps. Remove wire used for temporary supports
- H. Do not attach conduit to suspended ceiling support wires.
- I. Arrange conduit to maintain headroom and present neat appearance.
- J. Route conduit parallel and perpendicular to walls.
- K. Route conduit installed above accessible ceilings parallel and perpendicular to walls.
- L. Route conduit in stone/gravel fill under slab from point-to-point.
- M. In underslab branch circuit raceways, there should be no less than one raceway extension installed from electrical device to an above accessible ceiling location terminated in a junction box per room. The intent of this requirement is to give future access to this raceway and circuits.
- N. Provide raceways for all low voltage wiring in open structure ceiling spaces.
- O. Maintain adequate clearance between conduit and piping.
- P. Maintain 12" clearance between conduit and surfaces with temperatures exceeding 104°F.
- Q. Cut conduit square using saw or pipe-cutter; de-burr cut ends.
- R. Bring conduit to shoulder of fittings; fasten securely.
- S. Join nonmetallic conduit using cement as recommended by manufacturer. Wipe nonmetallic conduit dry and clean before joining. Apply full even coat of cement to entire area inserted in fitting. Allow joint to cure for 20 minutes, minimum.
- T. Use conduit hubs or sealing locknuts to fasten conduit to sheet metal boxes in damp and wet locations and to cast boxes.
- U. Install no more than equivalent of three 90° bends between boxes. Use conduit bodies to make sharp changes in direction, as around beams. Use factory elbows for bends in metal conduit larger than 2".
- V. Avoid moisture traps; provide junction box with drain fitting at low points in conduit system.
- W. Provide suitable fittings to accommodate expansion and deflection where conduit crosses control and expansion joints.
- X. Provide suitable pull string in each empty conduit except sleeves and nipples.
- Y. Use suitable caps to protect installed conduit against entrance of dirt and moisture.

- Z. Ground and bond conduit and wireways under provisions of Section 260526.
- AA. Identify conduit under provisions of Section 260553.
- BB. Do not install conduits in the topping on precast floor and roof planks and tees.
- CC. Wireway Supports: provide steel channel supports as required or indicated. Mount directly on suitable walls and structural elements.
- DD. Close ends of wireway.

### 3.3 BOX INSTALLATION

- A. Install in accordance with manufacturer's instructions.
- B. Install boxes in accordance with NECA "Standard of Installation" except for mounting heights.
- C. Install in locations as shown on Drawings, and as required for splices, taps, wire pulling, equipment connections and compliance with regulatory requirements.
- D. Set wall mounted boxes at elevations to accommodate mounting heights indicated.
- E. Electrical boxes are shown on Drawings in approximate locations unless dimensioned. Adjust box location up to 10' if required to accommodate intended purpose.
- F. Orient boxes to accommodate wiring devices oriented as specified in Section 262726.
- G. Maintain headroom and present neat mechanical appearance.
- H. Install pull boxes and junction boxes above accessible ceilings and in unfinished areas only.
- I. Inaccessible Ceiling Areas: Install outlet and junction boxes no more than 6" from ceiling access panel or from removable recessed luminaire.
- J. All raceway/wiring and outlet box installations shall be installed as needed to meet the Architect's Ceiling, Wall, and Floor ratings. Review with Division 7 and Architect as needed to maintain the established and existing Ceiling, Wall, and Floor Ratings.
- K. Coordinate mounting heights and locations of outlets mounted above counters, benches, and backsplashes and beside lavatory partitions, mirrors, lavatory fixtures and changes in architectural finishes.
- L. Locate outlet boxes to allow luminaries positioned as shown on reflected ceiling plan.
- M. Align adjacent wall mounted outlet boxes which are indicated to be mounted at the same height.
- N. Use flush mounting outlet box in finished areas.
- O. Install outlet boxes even with top and bottom of masonry course. Boxes shall be installed flush with no back to back outlet box installations between rooms/areas. Installations shall be coordinated with the GC/Masonry Contractor as needed. Any installation requiring an outlet box

rough-in that does not line up with masonry course shall be reviewed with Architect/Engineer before installing.

- P. Outlet boxes shall not be installed back to back between rooms/areas. Provide a minimum of one stud opening space between outlet boxes installed on opposite sides of walls as needed to meet the acoustical and fire rating requirements. Where wall space is limited, and room layout or equipment requires outlet rough-ins to be installed at a closer dimension, review with Architect/Engineer before installing.
- Q. Secure flush mounting box to interior wall and partition studs. Accurately position to allow for surface finish thickness.
- R. Use stamped steel bridges to fasten flush mounting outlet box between studs.
- S. Install flush mounting box without damaging wall insulation or reducing its effectiveness.
- T. Use adjustable steel channel fasteners for hung ceiling outlet box.
- U. Do not fasten boxes to ceiling support wires.
- V. Support boxes independently of conduit.
- W. Use gang box where more than one device is mounted together. Do not use sectional box.
- X. Use gang box with plaster ring for single device outlets.
- Y. Use cast outlet box in exterior locations and wet locations.
- Z. Large Pull Boxes: Use hinged enclosure in interior dry locations, surface-mounted cast metal box in other locations.
- AA. Install enclosures and boxes plumb. Anchor securely to wall and structural supports at each corner.
- BB. Install cabinet fronts plumb.
- CC. Do not drill or punch cabinets and enclosures except where devices or hardware which have the same NEMA type rating are being installed.
- DD. Mount waterproof enclosures using the holes or brackets furnished by the manufacturer only.
- EE. Provide enclosures for all control devices, pilot devices, timers, starters, contactors, adjustable frequency drives and programmable logic controller.
- FF. Provide cabinets where indicated or as required.

### 3.4 INTERFACE WITH OTHER PRODUCTS

- A. Install conduit to preserve fire resistance rating of partitions and other elements, using materials and methods under the provisions of Division 7.



- B. Route conduit through roof, wall, floor and ceiling openings and repair as specified in Section 260010.
- C. Low Voltage Wiring: Provide raceways for all wiring in all open structure ceiling spaces.
- D. Indoor Dry Type Transformers: Provide flexible conduits not exceeding 3' in length between the transformer enclosure and the end of all rigid conduits and non-flexible tubing. The flexible conduit shall be installed with a minimum 45° bend in its length.
- E. Motors: Provide flexible conduit not exceeding 4' in length between the motor junction box and the end of all rigid conduit and non-flexible tubing. Provide sufficient slack to permit the motor to be moved over the entire range of adjustment in the motor base and sub-base without stressing the flexible conduit or its connectors.
- F. Other Adjustable Devices: Provide flexible conduit at any device which has electrical connections and is adjusted for proper operation by sliding or rotating the mounting of the device. Provide flexible conduit of sufficient length to permit the full range of adjustment allowed by the device mounting.
- G. Prewired Furniture: provide liquid-tight metal conduit not exceeding 4' in length between floor/wall box and furniture connection point for power and telecommunications.
- H. At HVAC equipment on trapeze hangers or vibration isolators, provide sufficient length of flexible conduit to accommodate the full range of normal motion without stressing the conduit or transmitting excessive mechanical forces to rigidly mounted conduit or building structures. Install the flexible conduit in such a manner that a 90° bend is included in the length of flexible conduit.
- I. Provide flexible conduits that are of sufficient length so they allow the full range of movement for adjustment and vibration without stressing the flexible conduit or connectors.
- J. Coordinate installation of outlet box for equipment connected under Section 260180.
- K. Throughout new installation, all raceways and boxes shall be installed so that they are concealed in new construction. Any exceptions shall be approved by Architect before installation.

### 3.5 INTERFACE WITH CONCRETE SLABS

- A. Conduits are not permitted in concrete slabs or elevated slabs for this project.
- B. Concrete Floors on Grade: Install conduits under concrete slabs in stone base.
- C. Concrete Elevated Floors: Install conduits below slab in ceiling plenum of floor below.
- D. Review all underslab conduit interface with Architect/Engineer before installation.

### 3.6 ADJUSTING

- A. Test, adjust, and balance as required.
- B. Adjust floor box flush with finish flooring material.

- C. Adjust flush-mounting outlets to make front flush with finished wall material.
- D. Install knockout closures in unused box openings.

3.7 CLEANING

- A. Clean interior of boxes to remove dust, debris, and other material.
- B. Clean exposed surfaces and restore finish.

END OF SECTION 260533

## SECTION 260553 – IDENTIFICATION

### PART 1 - GENERAL

#### 1.1 SECTION INCLUDES

- A. Labels and Nameplates
- B. Color-Coding

#### 1.2 REFERENCES

- A. ANSI/NFPA 70 - National Electrical Code

#### 1.3 REGULATORY REQUIREMENTS

- A. Conform to requirements of ANSI/NFPA 70.
- B. Furnish products listed and classified by Underwriters Laboratories, Inc., or a testing firm acceptable to authority having jurisdiction as suitable for purpose specified and shown.

#### 1.4 SUBMITTALS FOR REVIEW

- A. Submit a letter on Company letterhead stating that all equipment will be in compliance with the specifications.

#### 1.5 WARRANTY

- A. Provide the warranty specified in Section 260010.

### PART 2 - PRODUCTS

#### 2.1 MANUFACTURERS

- A. Thomas & Betts
- B. Ideal Industries, Inc.
- C. Lem Products, Inc.

#### 2.2 RACEWAY AND CABLE LABELS

- A. Comply with applicable codes for minimum size of letters for legend and for minimum length of color field for each raceway and cable size.
  - 1. Color: Black letters on orange field.
  - 2. Legend: Indicates voltage and service.

- B. Adhesive Labels: Preprinted, flexible, self-adhesive vinyl with legend over-laminated with a clear weather and commercial resistant coating.
- C. Pre-tensioned, Wraparound Plastic Sleeves: Flexible, preprinted, color-coded, acrylic band sized to suit the diameter of the line it identifies and arranged to stay in place by pre-tensioned gripping action when placed in position.
- D. Colored Adhesive Tape: Self-adhesive vinyl tape not less than 3 mils thick by 3/4" to 2" wide.
- E. Tape Markers: Vinyl or vinyl-cloth, self-adhesive, wraparound type with preprinted numbers and letters.
- F. Aluminum, Wraparound Market Bands: Bands cut from 0.014" thick aluminum sheet, with stamped or embossed legend, and fitted with slots or ears for permanently securing around wire or cable jacket or around groups of conductors.
- G. Plasticized Card-Stock Tags: Vinyl cloth with preprinted and field-printed legends. Orange background, unless otherwise indicated, with eyelet for fastener.
- H. Aluminum-Faced, Card-Stock Tags: Weather-resistant, 18-point minimum card stock faced on both sides with embossable aluminum sheet, 0.002" thick, laminated with moisture resistant acrylic adhesive, punched for fasteners, and preprinted with legends to suit each application.
- I. Brass or Aluminum Tags: 2 by 2 by 0.05" metal tags with stamped legend, punched for fastener.
- J. Telecommunication Cable Labels: Self-adhesive vinyl or vinyl-cloth wraparound tape markers, machine printed with alphanumeric cable designations.

## 2.3 NAMEPLATES AND SIGNS

- A. Engraved Plastic Nameplates and Signs: Engraving stock, melamine plastic laminate, minimum 1/16" thick for signs up to 20 sq. in. and 1/8" thick for larger sizes.
  - 1. Engraved legend with black letters on white face.
  - 2. Punched or drilled for mechanical fasteners.
  - 3. Provide outdoor rated plastic with UV Protection for outdoor or wet locations.
- B. Baked-Enamel Signs for Interior Use: Preprinted aluminum signs, punched or drilled for fasteners, with colors, legend and size required for the application. 1/4" grommets in corners for mounting.
- C. Fasteners for Nameplates and Signs: Self-tapping, stainless-steel screws or No. 10/32, stainless-steel machine screws with nuts and flat and lock washers.

## 2.4 MISCELLANEOUS IDENTIFICATION PRODUCTS

- A. Cable Ties: Fungus-inert, self-extinguishing, one-piece, self-locking, Type 6/6 nylon cable ties.
  - 1. Minimum Width: 3/16"
  - 2. Tensile Strength: 50 lb minimum.
  - 3. Temperature Range: Minus 40 to plus 185° F.

## 2.5 COLOR CODING OF SECONDARY CONDUCTORS

- A. Use the following colors for feeder and branch circuit phase conductors:
  - 1. 120/208 or 120/240 Volt Systems:
    - Black – A-Phase
    - Red – B-Phase
    - Blue – C-Phase
    - White (Neutral)
  - 2. Factory apply color the entire length of conductors, except the following field-applied, color-coding methods may be used instead of factory-coded wire for sizes larger than No. 10 AWG:
    - a. Colored, pressure-sensitive plastic tape in half-lapped turns for a distance of 3" from terminal points and in boxes where splices or taps are made. Apply last two turns of tape with no tension to prevent possible unwinding. Use 3/4" wide tape in colors specified. Adjust tape bands to avoid obscuring cable identification markings.

## PART 3 - EXECUTION

### 3.1 INSTALLATION

- A. Use Owner-furnished room numbers on all identifications. Room numbers on drawings are for reference only.
- B. Verify colors for color coding with Owner before proceeding and match existing color coding when applicable.
- C. Identification Materials and Devices: Install at locations for most convenient viewing without interference with operation and maintenance of equipment.
- D. Lettering, Colors, and Graphics: Coordinate names, abbreviations, colors, and other designations with corresponding designations in the Contract Documents or with those required by codes and standards. Use consistent designations throughout Project.
- E. Sequence of Work: If identification is applied to surfaces that require finish, install identification after completing finish work.
- F. Self-Adhesive Identification Products: Clean surfaces before applying.
- G. Circuits More Than 600V: Paint entire raceway orange and identify raceway with "DANGER—HIGH VOLTAGE" in black letters 2" high, stenciled with paint at 10' intervals over entire raceway.
- H. Color Junction Boxes and Coverplates: Paint all boxes and covers above accessible ceilings colors as listed below:
  - 1. Fire Alarm System: Red
  - 2. Security System: Blue
  - 3. Normal/Emergency and Emergency Only Distribution Systems: Yellow

- I. Caution Labels for Indoor Boxes and Enclosures for Power and Lighting: Install pressure-sensitive self-adhesive labels identifying system voltage with black letters on orange background. Install on exterior of door or cover.
- J. Circuit Identification on Junction Boxes and Coverplates: Mark ID externally on junction box, coverplates and on the back of each coverplate for receptacles and switches.
  1. Boxes: Finished Areas – Inside, Permanent Marker
  2. Boxes: Non-Finished Areas – Outside, Permanent Marker
  3. ID Legend: Permanent, waterproof listing of panel and circuit number or equivalent. (IE Panel HA cct. 1, 3, 5)
- K. Paths of Underground Electrical Lines: During trench backfilling, for exterior underground power, control, signal, and communication lines, install continuous underground plastic line marker located directly above line at 6 to 8" below finished grade. Where width of multiple lines installed in a common trench or concrete envelope does not exceed 16" overall, use a single line marker. For trenches wider than 16" install parallel tapes at 2'-0" intervals across the width of the trench.
- L. Power-Circuit Identification: Metal tags or aluminum, wraparound marker bands for cables, feeders, and power circuits in vaults, pull and junction boxes, manholes and switchboard rooms.
  1. Legend: 1/4" steel letter and number stamping or embossing with legend corresponding to indicated circuit designations.
  2. Tag Fasteners: Nylon cable ties.
  3. Band Fasteners: Integral ears.
- M. Apply identification to conductors as follows:
  1. Conductors to be extended in the future: Indicate source and circuit numbers.
  2. Multiple Power or Lighting Circuits in the Same Enclosure: Identify each conductor's source and circuit number using permanent marking and using color-coding to identify circuits' voltage and phase.
  3. Multiple Control and Communication Circuits in the Same Enclosure: Identify each conductor by its system and circuit designation. Use a consistent system of tags, color-coding or cable marking tape.
- N. Apply warning, caution and instruction signs as follows:
  1. Warnings, Cautions, and Instructions: Install to ensure safe operation and maintenance of electrical systems and of items to which they connect. Install engraved plastic-laminated instruction signs with approved legend where instructions are needed for system or equipment operation. Install metal-backed butyrate signs for outdoor items.
  2. Emergency Operation: Install engraved laminated signs with white legend on red background with minimum 3/8" high lettering for emergency instructions on power transfer, load shedding and other emergency operations.
- O. Equipment Identification Labels: Engraved plastic laminate. Install on each unit of equipment, including central or master unit of each system. This includes power, lighting, communication, signal, and alarm systems, unless units are specified with their own self-explanatory identification. Unless otherwise indicated, provide a single line of text with 1/2" high lettering on 1-1/2" high label; where two lines of text are required, use labels 2" high. Use black letters on a white face. Apply labels for each unit of the following categories of equipment using punched or drilled mechanical fasteners.
  1. Transformers

2. Switchboards (3/8" high letters)
3. Panelboards
4. Load Centers
5. Enclosed Switches
6. Enclosed Circuit Breakers
7. Elevator Enclosed Switches
8. Enclosed Contactors
9. Enclosed Controllers
10. Engine Generators (3/8" high letters)
11. Fixed and Automatic Power Factor Equipment
12. Transfer Switches (3/8" high letters)
13. Area Protection Panels

END OF SECTION 260553

## SECTION 260573 – OVERCURRENT PROTECTIVE DEVICE COORDINATION STUDY

### PART 1 - GENERAL

#### 1.1 SUMMARY

- A. This section includes performing fault-current study, coordination study and overcurrent protective device setting by manufacturers representative.

#### 1.2 SUBMITTALS FOR REVIEW

- A. Submit under provisions of Section 260010.
- B. Shop Drawings: The following items shall be submitted for review and approval:
  - 1. Submittal booklet to include the following:
    - a. Reference to Specification Section
    - b. A list of all computer software programs to be used for all studies
    - c. Coordination-Study input data
    - d. Coordination-Study Report
    - e. Fault Current-Study Report
    - f. Equipment Evaluation Report
    - g. Manufacturers Setting Report
    - h. Professional Engineers stamp/signature for the state the project is located.

#### 1.3 SUBMITTALS FOR CLOSEOUT

- A. Submit under provisions of Section 260010.
- B. Manufacturers field service to notify Engineer in writing that all overcurrent protective device settings were correctly adjusted with Electrical Contractor to the values listed in the study results.

#### 1.4 QUALIFICATIONS

- A. Software Qualifications: Software algorithms shall comply with requirements of industry standards and shall be as recommended by switchgear and panelboard manufacturer. 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 all overcurrent protective devices. Manual calculations are not acceptable.
- B. Studies Specialist Qualifications: An organization experienced in the application of computer software used for studies, having performed successful studies of similar magnitude on electrical distribution systems using similar devices. Engineer to have at least 5 years of experience performing short circuit and coordination studies.
- C. Testing Agency Qualifications: Member of the International Electrical Testing Association.
- D. Testing Agency's Field Supervisor: Person currently certified by the International Electrical Testing Association to supervise testing specified in this section.



## PART 2 - PRODUCTS

### 2.1 UTILITY INFORMATION

- A. Refer to Section 260583.

### 2.2 STUDIES

- A. The contractor shall furnish an Arc Flash Hazard Analysis Study per NFPA 70E - Standard for Electrical Safety in the Workplace, reference Article 130.3 and Annex D. This study shall also include short-circuit and protective device coordination studies.
- B. Study shall include a Professional Engineers stamp/signature for the state the project is located.

### 2.3 DATA

- A. Contractor shall furnish all data as required for the power system studies. The Engineer performing the short-circuit, protective device coordination and arc flash hazard analysis studies shall furnish the Contractor with a listing of required data immediately after award of the contract. The Contractor shall expedite collection of the data to assure completion of the studies as required for final approval of the distribution equipment shop drawings and/or prior to the release of the equipment for manufacturing.
- B. Source combination may include present and future motors and generators.
- C. Load data utilized may include existing and proposed loads obtained from Contract Documents provided by Owner, or Contractor.
- D. If applicable, include fault contribution of existing motors in the study. The Contractor shall obtain required existing equipment data, if necessary, to satisfy the study requirements.

### 2.4 SHORT CIRCUIT ANALYSIS

- A. Transformer design impedances shall be used when test impedances are not available.
- B. Provide the following:
  - 1. Calculation methods and assumptions
  - 2. Selected base per unit quantities
  - 3. One-line diagram of the system being evaluated that clearly identifies individual equipment buses, bus numbers used in the short-circuit analysis, cable and bus connections between the equipment, calculated maximum short-circuit current at each bus location and other information pertinent to the computer analysis
  - 4. The study shall include input circuit data including electric utility system characteristics, source impedance data, conductor lengths, number of conductors per phase, conductor impedance values, insulation types, transformer impedances and X/R ratios, motor contributions, and other circuit information as related to the short-circuit calculations.
  - 5. Tabulations of calculated quantities including short-circuit currents, X/R ratios, equipment short-circuit interrupting or withstand current ratings and notes regarding adequacy or inadequacy of the equipment rating.

6. Results, conclusions, and recommendations. A comprehensive discussion section evaluating the adequacy or inadequacy of the equipment must be provided and include recommendations as appropriate for improvements to the system
  7. The Contractor shall be responsible for supplying conductor information (lengths, types, number per phase, etc.) in a timely manner to allow the short-circuit analysis to be completed prior to final installation.
- C. For solidly grounded systems, provide a bolted line-to-ground fault current study for applicable buses as determined by the engineer performing the study.
- D. 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. The manufacturers study specialist shall notify Owner in writing, of any circuit protective devices improperly rated for the calculated available fault current.

## 2.5 PROTECTIVE DEVICE TIME-CURRENT COORDINATION ANALYSIS

- A. Protective device coordination time-current curves (TCC) shall be displayed on log-log scale graphs.
- B. Include on each TCC graph, a complete title with descriptive device names.
- C. Terminate device characteristic curves at a point reflecting maximum symmetrical or asymmetrical fault current to which the device is exposed.
- D. Identify the device associated with each curve by manufacturer type, function, and, if applicable, tap, time delay, and instantaneous settings recommended.
- E. Plot the following characteristics on the TCC graphs, where applicable:
1. Electric utility's overcurrent protective device
  2. Medium voltage equipment overcurrent relays
  3. Medium and low voltage fuses including manufacturer's minimum melt, total clearing, tolerance, and damage bands
  4. Low voltage equipment circuit breaker trip devices, including manufacturer's tolerance bands
  5. Transformer full-load current, magnetizing inrush current, and ANSI through-fault protection curves
  6. Medium voltage conductor damage curves
  7. Ground fault protective devices, as applicable
  8. Pertinent motor starting characteristics and motor damage points, where applicable
  9. Pertinent generator short circuit decrement curve and generator damage point
  10. The largest feeder circuit breaker in each motor control center and applicable panelboard
- F. Provide adequate time margins between device characteristics such that selective operation is provided, while providing proper protection.
- G. Provide the following:

1. A One-line diagram shall be provided which clearly identifies individual equipment buses, bus numbers, device identification numbers and the maximum available short-circuit current at each bus when known.
2. A sufficient number of log-log plots shall be provided to indicate the degree of system protection and coordination by displaying the time-current characteristics of series connected overcurrent devices and other pertinent system parameters.
3. Computer printouts shall accompany the log-log plots and will contain descriptions for each of the devices shown, settings of the adjustable devices, and device identification numbers to aid in locating the devices on the log-log plots and the system one-line diagram.
4. The study shall include a separate, tabular printout containing the recommended settings of all adjustable overcurrent protective devices, the equipment designation where the device is located, and the device number corresponding to the device on the system one-line diagram.
5. A discussion section which evaluates the degree of system protection and service continuity with overcurrent devices, along with recommendations as required for addressing system protection or device coordination deficiencies.

## 2.6 ARC FLASH HAZARD ANALYSIS

- A. The arc flash hazard analysis shall be performed according to the IEEE 1584 equations that are presented in NFPA 70E, Annex D. The arc flash hazard analysis shall be performed in conjunction with the short-circuit analysis (Section 2.3) and the protective device time-current coordination analysis (Section 2.4)
- B. The flash protection boundary and the incident energy shall be calculated at significant locations in the electrical distribution system (switchboards, switchgear, motor-control centers, panelboards, busway, and splitters) where work could be performed on energized parts.
- C. Circuits 240V or less fed by single transformer rated less than 125 kVA may be omitted from the computer model and will be assumed to have a hazard risk category 0 per NFPA 70E.
- D. Working distances shall be based on IEEE 1584. The calculated arc flash protection boundary shall be determined using those working distances.
- E. When appropriate, the short circuit calculations and the clearing times of the phase overcurrent devices will be retrieved from the short-circuit and coordination study model. Ground overcurrent relays should not be taken into consideration when determining the clearing time when performing incident energy calculations.
- F. The short-circuit calculations and the corresponding incident energy calculations for multiple system scenarios must be compared and the greatest incident energy must be uniquely reported for each equipment location in a single table. Calculations must be performed to represent the maximum and minimum contributions of fault current magnitude for normal and emergency operating conditions. The minimum calculation will assume that the utility contribution is at a minimum. Conversely, the maximum calculation will assume a maximum contribution from the utility. Calculations shall take into consideration the parallel operation of synchronous generators with the electric utility, where applicable as well as any stand-by generator applications.
  1. The Arc-Flash Hazard Analysis shall be performed utilizing mutually agreed upon facility operational conditions, and the final report shall describe, when applicable, how these conditions differ from worst-case bolted fault conditions.

- G. The incident energy calculations must consider the accumulation of energy over time when performing arc flash calculations on buses with multiple sources. Iterative calculations must take into account the changing current contributions, as the sources are interrupted or decremented with time. Fault contribution from motors should be decremented as follows:
  - 1. Fault contribution from induction motors should not be considered beyond 5 cycles.
- H. For each piece of ANSI rated equipment with an enclosed main device, two calculations shall be made. A calculation shall be made for the main cubicle, sides, or rear; and shall be based on a device located upstream of the equipment to clear the arcing fault. A second calculation shall be made for the front cubicles and shall be based on the equipment's main device to clear the arcing fault. For all other non-ANSI rated equipment, only one calculation shall be required, and it shall be based on a device located upstream of the equipment to clear the arcing fault.
- I. When performing incident energy calculations on the line side of a main breaker (as required per above), the line side and load side contributions must be included in the fault calculation.
- J. Miss-coordination should be checked amongst all devices within the branch containing the immediate protective device upstream of the calculation location and the calculation should utilize the fastest device to compute the incident energy for the corresponding location.
- K. Arc Flash calculations shall be based on actual overcurrent protective device clearing time. A maximum clearing time of 2 seconds will be used based on IEEE 1584. Where it is not physically possible to move outside of the flash protection boundary in less than 2 seconds during an arc flash event, a maximum clearing time based on the specific location shall be utilized.
- L. Provide the following:
  - 1. Results of the Arc-Flash Hazard Analysis shall be submitted in tabular form, and shall include device or bus name, bolted fault and arcing fault current levels, flash protection boundary distances, working distances, personal-protective equipment classes and AFIE (Arc Flash Incident Energy) levels.
  - 2. The Arc-Flash Hazard Analysis shall report incident energy values based on recommended device settings for equipment within the scope of the study.
  - 3. The Arc-Flash Hazard Analysis may include recommendations to reduce AFIE levels and enhance worker safety.

## 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.
- B. Proceed with coordination study only after relevant equipment submittals have been assembled. Overcurrent protective devices not submitted for approval with coordination study may not be used in study.

### 3.2 OVERCURRENT PROTECTIVE DEVICE SETTING

- A. Manufacturer's Field Service: Engage a factory-authorized service representative, of electrical distribution equipment being set and adjusted, to assist in setting of adjustable overcurrent protective devices within equipment.
- B. Testing: Perform the following device setting and prepare reports:
  - 1. After installing overcurrent protective devices and during energizing process of electrical distribution system, perform the following:
    - a. Verify that overcurrent protective devices meet parameters used in studies.
    - b. Adjust devices to values listed in study results.

### 3.3 GROUND FAULT PROTECTIVE DEVICE SETTING/TESTING

- A. Manufacturer's Field Service: Engage a factory-authorized service representative, of electrical distribution equipment being set and adjusted, to assist in setting of ground-fault protective devices within equipment.
- B. Testing: perform the following device setting and prepare reports:
  - 1. After installing ground-fault protective devices and during energizing process of electrical distribution system, perform the following:
    - a. Service ground-fault protective device setting in accordance with Article 230 of the NEC.
    - b. Service ground-fault protective device performance testing and written record in accordance with Article 230 of the NEC.
    - c. Other ground fault devices in accordance with the fault current study.

### 3.4 ARC FLASH LABELS

- A. Provide a 4" x 4" Brady thermal transfer type label of high adhesion polyester for each work location analyzed.
- B. The labels shall be designed according to the following standards:
  - 1. UL969 – Standard for Marking and Labeling Systems
  - 2. ANSI Z535.4 – Product Safety Signs and Labels
  - 3. NFPA 70 (National Electric Code) – Article 110.16
- C. The label shall include the following information:
  - 1. System Voltage
  - 2. Flash protection boundary
  - 3. Personal Protective Equipment category
  - 4. Arc Flash Incident energy value (cal/cm<sup>2</sup>)
  - 5. Limited, restricted, and prohibited Approach Boundaries
  - 6. Study report number and issue date
- D. Labels shall be printed by a thermal transfer type printer with no field markings.
- E. Arc flash labels shall be provided for equipment as identified in the study and the respective equipment access areas per the following:

1. Floor Standing Equipment - Labels shall be provided on the front of each individual section. Equipment requiring rear and/or side access shall have labels provided on each individual section access area. Equipment line-ups containing sections with multiple incident energy and flash protection boundaries shall be labeled as identified in the Arc Flash Analysis table.
2. Wall Mounted Equipment – Labels shall be provided on the front cover or a nearby adjacent surface, depending upon equipment configuration.
3. General Use Safety labels shall be installed on equipment in coordination with the Arc Flash labels. The General Use Safety labels shall warn of general electrical hazards associated with shock, arc flash, and explosions, and instruct workers to turn off power prior to work.

END OF SECTION 260573

## SECTION 260620 – SCHEDULES FOR ELECTRICAL DISTRIBUTION EQUIPMENT

### PART 1 - GENERAL

#### 1.1 SUMMARY

- A. This section includes the schedules for electrical distribution equipment.

#### 1.2 SUBMITTALS FOR REVIEW

- A. Refer to the specific equipment section for submittals required.

#### 1.3 EXTRA MATERIALS

- A. Refer to the specific equipment section for extra materials required.

#### 1.4 MAINTENANCE MATERIALS

- A. Refer to the specific equipment section for maintenance materials required.

### PART 2 - PRODUCTS

#### 2.1 SCHEDULES FOR ELECTRICAL DISTRIBUTION EQUIPMENT

- A. Refer to Schedules attached to the following pages.

PART 3 - EXECUTION

3.1 STANDARD BRANCH CIRCUIT WIRE SIZING TABLE

A. Sizing Table:

STANDARD BRANCH CIRCUIT WIRE SIZING TABLE			
BREAKER TRIP RATING	1-POLE BREAKER	2-POLE BREAKER	3-POLE BREAKER
15-20A	2#12 + 1#12 GND IN 3/4" CONDUIT	3#12 + 1#12 GND IN 3/4" CONDUIT	4#12 + 1#12 GND IN 3/4" CONDUIT
25-30A	2#10 + 1#10 GND IN 3/4" CONDUIT	3#10 + 1#10 GND IN 3/4" CONDUIT	4#10 + 1#10 GND IN 3/4" CONDUIT
35-40A	2#8 + 1#10 GND IN 3/4" CONDUIT	3#8 + 1#10 GND IN 3/4" CONDUIT	4#8 + 1#10 GND IN 3/4" CONDUIT
45-50A	2#6 + 1#10 GND IN 3/4" CONDUIT	3#6 + 1#10 GND IN 3/4" CONDUIT	4#6 + 1#10 GND IN 1" CONDUIT
60-70A	2#4 + 1#8 GND IN 1" CONDUIT	3#4 + 1#8 GND IN 1-1/4" CONDUIT	4#4 + 1#8 GND IN 1-1/4" CONDUIT
80A	2#3 + 1#8 GND IN 1" CONDUIT	3#3 + 1#8 GND IN 1-1/4" CONDUIT	4#3 + 1#8 GND IN 1-1/4" CONDUIT
90A	N/A	3#2 + 1#8 GND IN 1-1/4" CONDUIT	4#2 + 1#8 GND IN 1-1/4" CONDUIT
100-110A	N/A	3#1 + 1#6 GND IN 1-1/2" CONDUIT	4#1 + 1#6 GND IN 1-1/2" CONDUIT

B. Table Notes:

1. Unless otherwise indicated, refer to this schedule for wire and conduit size for all circuits with identified breaker trip ratings.
2. Provide neutral conductor for 2 and 3 pole circuits as indicated above if the equipment requires a neutral.



SWITCHBOARD			Bus:	3000 Amp	Additional Notes	
<b>MDP</b>	Main Type:		3000 A Main Breaker	100% Neutral with Ground Bus		
	Features:		E	Customer Meter		
	Volts:		120/208V, 3PH, 4W	TVSS-L1		
	Space:		As Shown	Provide with ERMS and Indicator Light		
	AIC:		65,000			
	Mounting:		Free Standing			
CKT.	Breaker		Type	Description	KVA	Notes
	Amp	Pole				
1	60	3	T	TVSS L1	0.0	1
2	175	3	T	Apartment Panels		3
3	175	3	T	Apartment Panels		3
4	175	3	T	Apartment Panels		3
5	200	3	E	ATS		2
6	400	3	T	VAU-1		2
7	600	3	T	Backfeed to Existing 800A Panelboards		2
8	600	3	T	Temp Backfeed to Exis Switchboard Fused Switches		2
9	600	3	T	Spare/Panel DP1		2
10	400	3	T	Spare/ Future HVAC Panel		
11	400	3	T	Spare/ Future HVAC Panel		
12						
13						
14						
15						
16						
17						
18						
19						
20						
21	225	3	T	Spare		
22	150	3	T	Spare		
23						
24	225	3		Prepared Space		
25	225	3		Prepared Space		
Total Connected Load KVA:					0.0	

<b>SWITCHBOARD</b>			Bus:	3000 Amp	Additional Notes	
<b>MDP(2)</b>			Main Type:	3000 A Main Breaker	100% Neutral with Ground Bus	
			Features:	E		
			Volts:	120/208V, 3PH, 4W	TVSS-L1	
			Space:	As Shown	Provide with ERMS and Indicator Light	
			AIC:	65,000		
			Mounting:	Free Standing		
CKT.	Breaker		Type	Description	KVA	Notes
	Amp	Pole				
1	175	3	T	Apartment Panels	0.0	3
2	175	3	T	Apartment Panels		3
3	175	3	T	Apartment Panels		3
4	175	3	T	Apartment Panels		3
5	175	3	T	Apartment Panels		3
6	175	3	T	Apartment Panels		3
7	175	3	T	Apartment Panels		3
8	175	3	T	Apartment Panels		3
9	175	3	T	Apartment Panels		3
10	175	3	T	Apartment Panels		3
11	175	3	T	Apartment Panels		3
12	175	3	T	Apartment Panels		3
13	175	3	T	Apartment Panels		3
14	175	3	T	Apartment Panels		3
15	175	3	T	Apartment Panels		3
16	175	3	T	Apartment Panels		3
17	175	3	T	Apartment Panels		3
18	175	3	T	Apartment Panels		3
19	175	3	T	Spare		
20						
21						
22						
23						
24						
25						
Total Connected Load KVA:					0.0	

DISTRIBUTION PANEL			Bus:	600 Amp	Additional Notes	
			Main Type:	Main Lugs Only	100% Neutral with Ground Bus	
DP1 (Alt Bid)			Features:			
			Volts:	120/208V, 3PH, 4W	Integral TVSS L2	
			Space:	As Shown		
			AIC:	65,000	Provide Panel under Alternate Bid EC-1	
			Mounting:	Surface		
CKT.	Breaker		Type	Description	KVA	Notes
	Amp	Pole				
1	60	3	T	TVSS		1
2	30	2	T	Existing Storage Building (23)		6,7
3	20	3	T	Existing Heat Pump Boiler Rm (22)		6,7
4	30	3	T	Existing Load (24)		6,7
5	60	3	T	Existing CP1, EH1 (29)		6,7
6	40	3	T	Existing Pump Set (25)		6,7
7	60	3	T	Existing Panel BR Boiler Rm (28)		6,7
8	150	3	T	Existing Panel HPA (26)		2,7
9	150	3	T	Existing Panel HPB (27)		2,7
10	150	3	T	Existing Load (30)		2,7
11						
12						
13						
14						
15						
16						
17						
18						
19						
20						
21	150	3		Spare		
22	225	3		Spare		
23						
24	400	3		Prepared Space		
25	225	3		Prepared Space		
Total Connected Load KVA:					0.0	

PANEL NOTES	
1	Provide conductors, overcurrent device and exact placement as recommended by the TVSS manufacturer.
2	Refer to Power Riser Diagram for wire and conduit sizes.
3	Rework/Extend Panel Feeder from Existing Switchboard. Refer to Power Riser Dwg E2.0
4	Provide groundfault breaker for personal protection.
5	Provide a permanently fastened pad lockable breaker accessory for servicing.
6	Refer to Specifications 260620(1) for branch circuit wire and conduit information.
7	Rework/Extend Feeder/Branch circuits from Existing 800A D'n Panels.

SWITCHBOARD/DISTRIBUTION PANEL BREAKER TYPES	
T	Thermal Magnetic
E	Electronic Trip with Long Time, Short Time, Instantaneous Setting Adjustments
ZSI	Zone-Selective Interlocking
EP	Energy/Power Trip Unit with Long Time, Short Time, Instantaneous Setting Adjustments, Zone Selective
GF	Ground Fault Protection
ST	Shunt Trip Breaker Accessory
HC	Permanently fastened pad lockable breaker accessory for servicing

## SECTION 260650 – LUMINAIRE SCHEDULE

### PART 1 - GENERAL

#### 1.1 SUMMARY

- A. This section includes the Luminaire Schedule.
- B. The luminaire manufacturers' catalog numbers scheduled hereinafter in the Luminaire Schedule may not include all the required accessories or hardware that is necessary for a complete installation. Provide all the required accessories or hardware that is necessary for a complete installation.
- C. Furnish luminaries with all associated appurtenances including, but not necessarily limited to, lamps, ballasts, drivers, reflectors, lenses and/or louvers, sockets, holders, suspension accessories, pendants, canopies, recessing boxes, plaster frames, and similar items completely wired, assembled, installed, and tested as specified and in the manner indicated.
- D. Every luminaire symbol shall have a luminaire number unless otherwise directed. In instances where a specific luminaire symbol has not been assigned a luminaire number, provide a complete luminaire of the type and wattage designated for a luminaire symbol of similar function and/or as directed by the Engineer.

#### 1.2 LUMINAIRE SCHEDULE INTERPRETATION

- A. The first name luminaire manufacturer and catalog number is the Basis of Design for the intended usage. Additional luminaire manufacturers and catalog series of luminaries listed in the Luminaire Scheduled or added thru addenda are approved equals and may be subject to sample review, footcandle layout for rooms utilizing luminaire and/or a mock-up for Engineer review before final approval will be given.

#### 1.3 MAINTENANCE MATERIALS

- A. Provide 2 of each special tool required for maintenance.

### PART 2 - PRODUCTS

#### 2.1 LUMINAIRE SCHEDULE

- A. Refer to Luminaire Schedule attached to the following pages.

### PART 3 - EXECUTION – NOT USED

SECTION 260650

LUMINAIRE SCHEDULE

Mark	Manufacturer	Catalog Number	Description	Volts	Lamps			Driver		Mtg.	Mtg. Height	Notes
					No.	Watts	Type/Lumens	No.	Type			
CH1	Day-Brite Columbia Lithonia Metalux	FSS440L835-UNV-DIM-FKR-126 CSL series CLX series SNLED series	4' LED industrial	UNV	1	31	LED 4000	1	DLD	CH	8'-0" min	1
EX1	DualLite Evenlite Cooper Lighting Barron	EVE-U-R-W-E-I TLX-EM series LPX-7-SD series VEX-R series	LED exit with emergency battery and self diagnostics	3.6	1	2	LED	1	LD	SW/SC	Above height of door	2,3,6
ELU	Evenlite Sure-Lites DualLite	TCL4-W-SD SEL Series LZ Series	LED emergency battery pack with self diagnostics and remote capacity	UNV	4	1	LED	-	-	SW	7'-0" AFF	
REM	DualLite Sure-Lites	OCR-D-03L APWR	outdoor rated dual remote heads	UNV	2	1	LED	-	-	SC/ SW	7'-0" AFF	
OW1	Williams	WPCS-L30-8-40-BZ-PC	Wal Pak with photocell	120	1	28	LED 3000	1	DLD	SW		

Driver & Ballast Legend	
Symbol	Description
DLD	Dimming LED Driver, 0-10 volts.
LD	LED driver.
1LE	One lamp electronic
2LE	Two lamp electronic
3LE	Three lamp electronic
4LE	Four lamp electronic
FD	Fluorescent dimming as specified.
SD	Step Dimming

Mounting Legend			
Symbol	Description	Symbol	Description
RC	Recessed Ceiling	S	Suspended
RW	Recessed Wall	UC	Under Cabinet
SC	Surface Ceiling	PD	Per Detail on Drawings
SW	Surface Wall	PM	Pole Mounted
CH	Chain Hung	IG	Recessed In-Ground
AH	Aircraft Cable Hung	PT	Pole Top Mounted
P	Pendant	G	Ground Mounted
WB	Wall Bracket	B	Bollard

<b>General Notes</b>	
G1	Check descriptions against catalog numbers. Report any discrepancies prior to submitting a proposal for this work.
G2	Where the listed manufacturer of acceptable substitutes makes more than one grade of the fixture, provide the grade of fixture with equal or better construction, materials and performance as determined by the manufacturer.
G3	Engineer must approve all substitutes prior to bid.
G4	All Recessed 1x4, 2x2 and 2x4 fixtures shall have spring-loaded latches. Cam action (friction) latches are not acceptable.
G5	All drivers/ballasts shall be Universal 120-277 voltage. If universal driver is unavailable, furnish ___ volt type.
G6	Refer to Specifications Sections 265100 and 265600 for additional requirements.
G7	All approved equal pendant manufacturers will be required to submit footcandle layouts to verify they meet the basis of design.

<b>Luminaire Notes</b>	
1	Provide stem/chain size as required.
2	Provide single or double faces as required.
3	Provide all additional mounting accessories for each application.
4	Coordinate exact location of under counter lighting with casework. Review all field locations with Architect before rough-in.
5	Provide quantity as needed for the cove areas shown on the drawings.
6	Architect to select finish of luminaire. Provide color samples with submittals to Architect for review and selection.
7	Locations/Heights shown on Electrical Drawings are approximate. Coordinate exact mounting height and location with Architectural Elevations. Review with Architect before rough-in.
8	Basis of Design – Building and Parking Lot fixtures meet the township ordinance requirements. Approved equal manufacturers will be required to submit Approval Drawings to the Township and Engineer showing building and site layout, point by point calculation results and catalog cuts verifying photometric properties of luminaires. Final approval will only be given after these items are submitted.
9	Center luminaire in canopy. Review all field locations with Architect before rough-in.
10	Provide ___' aluminum round tapered pole with individual bolt covers. Provide pole base per Detail _____ on the Drawings to mount pole and luminaires.

END OF SECTION 265200

## SECTION 262412 – EXISTING SWITCHBOARDS

### PART 1 - GENERAL

#### 1.1 SECTION INCLUDES

- A. Existing Switchboards Equipment

#### 1.2 REFERENCES

- A. ANSI/NFPA 70 – National Electrical Code
- B. ANSI/NFPA 70B – Electrical Equipment Maintenance
- C. ANSI/NFPA 70E – Standard for Electrical Safety in the Workplace
- D. NECA 400 – Standard for Installing and Maintaining Switchboards
- E. ANSI/IEEE C12.6 – Solid State for Electricity Metering
- F. ANSI C57.13 – Standard Requirements for Instrument Transformers
- G. NEMA AB 1 – Molded Case Circuit Breakers and Molded Case Switches
- H. NEMA EI 21.1 – Instrument Transformers for Revenue Metering (110 kV BIL and Less)
- I. NEMA KS 1 – Enclosed and Miscellaneous Distribution Equipment Switches
- J. NEMA PB 2 – Deadfront Distribution Switchboards, File E8681
- K. NEMA PB 2.1 – General Instructions for Proper Handling, Installation, Operation, and Maintenance of Deadfront Switchboards Rated 600 Volts or Less
- L. NEMA PB 2.2 – Application Guide for Ground Fault Protective Devices for Equipment
- M. UL 50 – Cabinets and Boxes
- N. UL 98 – Standard for Enclosed and Dead Front Switches
- O. UL 489 – Standard for Molded Case Circuit Breakers and Circuit Breaker Enclosures
- P. UL 891 – Standard for Dead-Front Switchboards
- Q. UL 943 – Standard for Ground Fault Circuit Interrupters
- R. UL 977 – Standard for Fused Power Circuit Devices
- S. UL 1283 – Standard for Safety for Electro Magnetic Interference Filters
- T. UL 1449 – Standard for Surge Protective Devices



- U. Federal Specification W-C-375B/Gen – Circuit Breakers, Molded Case, Branch Circuit, and Service
- V. Federal Specification W-C-870 – Fuseholders (for plug and enclosed cartridge fuses)
- W. Federal Specification W-S-865 – Enclosed Knife Switch

### 1.3 SUBMITTALS FOR REVIEW

- A. Submit under provisions of Section 260010.
- B. Shop Drawings: The following items shall be submitted for review and approval:
  - 1. Submittal booklet to include the following:
    - a. Reference to Specification Section.
    - b. A list of all equipment to be provided and installed.
    - c. Data sheets to indicate circuit breakers and short circuit rating, with specific items or model numbers highlighted.

### 1.4 SUBMITTALS FOR CLOSEOUT

- A. Submit under provisions of Section 260010.
- B. Record actual branch circuit arrangement.
- C. Submit record copy of all testing performed.

### 1.5 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing the Products specified in this section with minimum three years documented experience.

### 1.6 REGULATORY REQUIREMENTS

- A. Conform to requirements of ANSI/NFPA 70.
- B. Furnish products listed and classified by UL or testing firm acceptable to authority having jurisdiction as suitable for purpose specified and indicated.

### 1.7 DELIVERY, STORAGE, AND HANDLING

- A. Deliver, store, protect and handle products in conformance with manufacturer's recommended practices as outlined in applicable Installation and Maintenance manuals.

### 1.8 WARRANTY

- A. Provide the warranty specified in Section 260010.

## PART 2 - PRODUCTS

### 2.1 MANUFACTURERS

- A. Match existing manufacturer

### 2.2 GENERAL REQUIREMENTS FOR ADDITIONAL SWITCHBOARDS DISTRIBUTION SECTIONS

- A. Nominal System Voltage: Match existing.
- B. Main Bus: Refer to the Switchboard Schedules or Power Riser Diagram.
- C. Short Circuit Current Rating: Match existing.
- D. Enclosure: Provide steel enclosure, in compliance with UL 891.
  - 1. Type 1 – Indoor:
    - a. Sections shall be aligned front and rear.
    - b. Switchboard height shall be 91.5" including 1.5" floor sills and excluding lifting members and pull boxes.
    - c. The switchboard shall be of a deadfront construction.
    - d. The switchboard shall have front access only.
    - e. The switchboard frame shall be of formed steel rigidly bolted together to support all cover plates, bussing and component devices during shipment and installation.
    - f. Steel base channels shall be bolted to the frame to rigidly support the entire shipping section for moving on rollers and floor mounting.
    - g. Each switchboard section shall have an open bottom and an individually removable top plate for installation and termination of conduit.
    - h. The switchboard enclosure shall be painted on all exterior surfaces. The paint shall be a medium gray, ANSI #49, applied by the electro-deposition process over an iron phosphate pre-treatment.
    - i. All front covers shall be screw removable with a single tool and all doors shall be hinged with removable hinge pins.
    - j. Top and bottom conduit areas shall be clearly indicated on shop drawings.
  - 2. Type 3R – Exterior:
    - a. Sections shall be aligned front and rear.
    - b. Switchboard height shall be 91.5" including 1.5" floor sills and excluding lifting members and pull boxes.
    - c. The switchboard shall be of a deadfront construction.
    - d. The switchboard shall have front access only.
    - e. The switchboard frame shall be of formed steel rigidly bolted together to support all cover plates, bussing and component devices during shipment and installation.
    - f. Steel base channels shall be bolted to the frame to rigidly support the entire shipping section for moving on rollers and floor mounting.
    - g. Each switchboard section shall have an open bottom and an individually removable top plate for installation and termination of conduit.
    - h. The switchboard enclosure shall be painted on all exterior surfaces. The paint shall be a medium gray, ANSI #49, applied by the electro-deposition process over an iron phosphate pre-treatment.

- i. All front covers shall be screw removable with a single tool and all doors shall be hinged with removable hinge pins.
- j. Top and bottom conduit areas shall be clearly indicated on shop drawings.
- k. Strip Heaters: Provide factory installed electric strip heaters of sufficient wattage in each vertical section to maintain enclosure temperature above expected dew point.
  - 1) Strip Heater Control: Provide thermostats to maintain temperature of each section above expected dew point. Provide humidistat to control humidity of each section.
  - 2) Strip Heater Power Source: Provide transformer with primary and secondary fire protection factory installed in switchboard.
- E. Barriers: Provide barriers between adjacent switchboard sections.
- F. Auxiliary Sections: Auxiliary sections shall be matched and aligned with switchboard.
- G. Bus Transition and Incoming Pull Sections: Match and align with switchboard.
- H. Front Covers and Doors:
  - 1. Front covers shall be screw removable with a single tool.
  - 2. All doors shall be hinged with removable hinge pins.
- I. Buses and Connections: Three phase, four wire, unless otherwise indicated. Provide hard-drawn plated copper of 98 percent conductivity.
  - 1. Group-Mounted Feeder Vertical Bus Stack:
    - a. Bus stack shall be capable of mounting feeder breakers with different frame sizes and number of poles across from one another on the bus stack.
    - b. Non-conducting surface films shall be removed during circuit breaker installation by a wiping action of the circuit breaker jaws.
    - c. The design of the circuit breaker jaws and bus stack shall create blow-on forces under fault conditions.
    - d. Bolted lap joint connections for feeder breakers shall not be allowed for group-mounted feeders.
  - 2. Ground Bus: Size per current NEC and UL 891 Tables 28.1 and 28.2, hard-drawn copper of 98 percent conductivity, equipped with pressure connectors for feeder and branch circuit ground conductors. For busway feeders, extend insulated equipment grounding cable to busway ground connection and support cable at intervals in vertical run.
  - 3. Bus Composition: Tin plated copper. Plating shall be applied continuously to bus work. The switchboard bussing shall be of sufficient cross-sectional area to meet UL 891 temperature rise requirements. The phase and neutral through-bus shall have an ampacity as shown on the Drawings. For four-wire systems, the neutral shall be of equivalent ampacity as the phase bus bar. Tapered bus is not permitted. Full provisions for the addition of future sections shall be provided. Bussing shall include, but shall not be limited to, necessary hardware to accommodate splicing for future additions.
- J. Future Provisions: All unused spaces provided, unless otherwise specified, shall be fully equipped for future devices, including all appropriate connectors and mounting hardware.
- K. Accessibility: Accessible from the front only of the switchboard.
- L. Provide manufacture start-up and training when required for the equipment provided.

## 2.3 DISTRIBUTION SECTION DEVICES FOR SWITCHBOARDS & ADDITIONAL BREAKERS

- A. Minimum integrated short circuit rating: Match existing.
- B. General:
  - 1. Circuit breakers shall be UL Listed with amperage ratings, interrupting ratings, and number of poles as indicated on the associated Switchboard Schedules.
  - 2. Circuit breaker(s) shall be a group mounted plug-on with mechanical restraint on a common pan or rail assembly.
  - 3. The interior shall have 3 flat bus bars stacked and aligned vertically with glass reinforced polyester insulators laminated between phases. The molded polyester insulators shall support and provide phase isolation to the entire length of bus.
  - 4. Circuit breaker(s) equipped with line terminal jaws shall not require additional external mounting hardware. Circuit breaker(s) shall be held in mounted position by a self-contained bracket secured to the mounting pan by fasteners. Circuit breaker(s) of different frame sizes shall be capable of being mounted across from each other.
  - 5. Line-side circuit breaker connections are to be jaw type.
  - 6. All unused spaces provided, unless otherwise specified, shall be fully equipped for future devices, including all appropriate connectors and mounting hardware.
  - 7. Molded Case Circuit Breakers: NEMA AB 1, bolt-on type thermal magnetic trip circuit breakers, with a common trip handle for each pole.
  - 8. Provide circuit breakers with integral thermal and instantaneous magnetic trip in each pole.
  - 9. Provide circuit breakers UL listed as Type SWD for lighting circuits.
  - 10. Provide circuit breakers UL listed as Type HACR for heating, air conditioning and refrigeration equipment branch circuits.
  - 11. Circuit breakers shall have an overcenter toggle mechanism which will provide quick-make, quick-break contact action. Circuit breakers shall have thermal and magnetic trip elements in each pole. Two- and three-pole circuit breakers shall have common tripping of all poles.
  - 12. There shall be two forms of visible trip indication.
  - 13. The exposed faceplates of all branch circuit breakers shall be flush with one another.
  - 14. Lugs shall be UL Listed to accept solid or stranded conductors.
  - 15. Breaker Accessories: Provide when indicated on the Panel Schedules.
    - a. Shunt Trip
    - b. Auxiliary Switch
    - c. Alarm Switch
    - d. Ground Fault – Personal Protection (6-mA trip)
    - e. Ground Fault – Equipment Protection (30-mA trip)
    - f. Handle lock
    - g. Zone Selective Interlocking
- C. Breaker Types:
  - 1. Thermal Magnetic Circuit Breaker (TM)
    - a. Molded case circuit breakers shall have integral thermal and instantaneous magnetic trip in each pole.
    - b. Circuit breakers shall be high interrupting or extra high interrupting.
  - 2. Electronic Trip Circuit Breaker with Long Time, Short Time, Instantaneous Setting Adjustments (E)

- a. All electronic circuit breakers shall have the following time/current response adjustments: Long Time Pickup, Long Time Delay, and Instantaneous settings. Each adjustment shall have discrete settings (fully adjustable).
  - b. Circuit breaker trip system shall be a microprocessor-based true rms sensing designed with sensing accuracy through the 13th harmonic.
  - c. Long time pickup indication to signal when loading approaches or exceeds the adjustable ampere rating of the circuit breaker shall be provided.
  3. Electronic Trip Circuit Breakers with real time metering (EP)
    - a. Current (phases, neutral, average, maximum)
    - b. Voltage (phase-to-phase, phase-to-neutral, average, unbalance)
    - c. Power (active kW, reactive kVAR, apparent kVA, power factor)
    - d. Energy (active kWh, reactive kVAR, apparent kVA)
    - e. Frequency
    - f. Total harmonic distortion (current, voltage)
    - g. Metering accuracy shall be 1.5% current (above 600 amperes), 1.0% current (600 amperes and below), 0.5% voltage, and 2% energy. This accuracy shall be total system, including, but not limited to, CT and meter.
  4. Provide electronic trip type if not indicated on the Switchboard Schedules, Power Riser Diagram, or other drawings.
- D. Provide appropriate connectors and mounting hardware as required for the added breakers.

## 2.4 IDENTIFICATION

- A. Feeder overcurrent device engraved plastic nameplates: Engraving stock, melamine plastic laminate, minimum 1/16" thick for nameplates up to 20 sq. in. and 1/8" thick for larger sizes.
  1. Engraved legend shall match existing or be black letters on white face.
  2. Punched or drilled for mechanical fasteners.
- B. Fasteners for Nameplates: Self-tapping, stainless-steel screws or No. 10/32, stainless-steel machine screws with nuts and flat and lock washers.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Verify that surface is suitable for the additional switchboard section installation.
- B. All manufactures must verify that the equipment will fit in the space provided.

### 3.2 PREPARATION

- A. Provide 4" concrete housekeeping pad for each additional switchboard section.

### 3.3 INSTALLATION

- A. Install additional switchboard sections in accordance with NEMA PB 2.1, NEC Standards, Local Codes and manufacturer's instructions.

- B. Torque all bolted connections and mechanical fasteners after placing switchboard per manufacturer's specifications.
- C. Provide seismic restraints when Section 260125 is included in the specification.
- D. Provide appropriate connectors and mounting hardware as required for the added breakers and install breakers per manufacturers requirements.
- E. Provide breaker closures for removed breakers and unused spaces in switchboards.
- F. Provide engraved plastic nameplates for each feeder overcurrent device showing name of load, each spare size and each available space size with 1/2" high lettering.
- G. Provide accessories which prevent circuit breaker handles from being manually moved from the ON position for the handles of all circuit breaker which transformers.
- H. Ground and bond switchboard enclosure in accordance with Section 260526.
- I. Provide category 6 cable in 3/4" conduit from each meter to nearest MDF/IDF and terminate on both ends unless otherwise noted.
- J. Provide a dedicated 3-pole branch circuit breaker to feed TVSS unit (only when required by manufacturer). Circuit breaker size and wire size shall be per manufacturer recommendation. Connect leads to load side of the circuit breaker.
- K. Where replacing existing switchboards and existing conductors are to be connected to new CB's, provide extensions of conductors as needed using same color and size of wire using a butt-splice.
- L. Contractor shall trace all circuits listed as "Existing Circuits" and provide the correct description for the circuit. Existing Circuit will not be acceptable on the Final Switchboard labels.
- M. Contractor is responsible for any equipment that needs to be disassembled and reassembled to get into the location specified on the drawings.
- N. Contractor is responsible for any door frames that need to be removed and reinstalled to get into the location specified on the drawings.

### 3.4 FIELD QUALITY CONTROL

- A. Perform field inspection and testing.
- B. Inspect for physical damage, proper alignment, anchorage, and grounding. Check proper installation and tightness of connections.
- C. Check tightness of accessible bolted bus joints using calibrated torque wrench per manufacturer's recommended torque values.
- D. Apply ANSI 61 (or other appropriate color paint) as needed.

### 3.5 ADJUSTING

- A. Adjust all operating mechanisms for free mechanical movement per manufacturer's specifications.
- B. Tighten bolted bus connections in accordance with manufacturer's instructions.
- C. Provide Coordination Study to achieve required settings for adjustment. Verify equipment can be adjusted to meet the study requirements before releasing for production.
- D. Provide Fault Current Study to achieve AIC ratings for panelboards. Verify equipment meets the requirements of the study before releasing for production.
- E. Adjust circuit breaker trip and time delay settings to values indicated in the Coordination Study.

### 3.6 CLEANING

- A. Upon completion of installation, inspect interior and exterior of switchboards. Remove paint splatters and other spots, dirt, and debris from interior and exterior of switchboards.
- B. Touch up scratched or marred surfaces to match original finish.

### 3.7 SETUP/TRAINING

- A. Manufacturers Setup: Provide and pay for the services of a factory-authorized service representative to start-up, set-up, and train the Owner for the equipment provided.

END OF SECTION 262412

## SECTION 262413 – SWITCHBOARDS

### PART 1 - GENERAL

#### 1.1 SECTION INCLUDES

- A. Main Switchboard
- B. Distribution Switchboard

#### 1.2 REFERENCES

- A. ANSI/NFPA 70 – National Electrical Code
- B. ANSI/NFPA 70B – Electrical Equipment Maintenance
- C. ANSI/NFPA 70E – Standard for Electrical Safety in the Workplace
- D. NECA 400 – Standard for Installing and Maintaining Switchboards
- E. ANSI/IEEE C12.6 – Solid State for Electricity Metering
- F. ANSI C57.13 – Standard Requirements for Instrument Transformers
- G. NEMA AB 1 – Molded Case Circuit Breakers and Molded Case Switches
- H. NEMA EI 21.1 – Instrument Transformers for Revenue Metering (110 kV BIL and Less)
- I. NEMA KS 1 – Enclosed and Miscellaneous Distribution Equipment Switches
- J. NEMA PB 2 – Deadfront Distribution Switchboards, File E8681
- K. NEMA PB 2.1 – General Instructions for Proper Handling, Installation, Operation, and Maintenance of Deadfront Switchboards Rated 600 Volts or Less
- L. NEMA PB 2.2 – Application Guide for Ground Fault Protective Devices for Equipment
- M. UL 50 – Cabinets and Boxes
- N. UL 98 – Standard for Enclosed and Dead Front Switches
- O. UL 489 – Standard for Molded Case Circuit Breakers and Circuit Breaker Enclosures
- P. UL 891 – Standard for Dead-Front Switchboards
- Q. UL 943 – Standard for Ground Fault Circuit Interrupters
- R. UL 977 – Standard for Fused Power Circuit Devices



- S. UL 1283 – Standard for Safety for Electro Magnetic Interference Filters
- T. UL 1449 – Standard for Surge Protective Devices
- U. Federal Specification W-C-375B/Gen – Circuit Breakers, Molded Case, Branch Circuit, and Service
- V. Federal Specification W-C-870 – Fuseholders (for plug and enclosed cartridge fuses)
- W. Federal Specification W-S-865 – Enclosed Knife Switch

### 1.3 SUBMITTALS FOR REVIEW

- A. Submit under provisions of Section 260010.
- B. Shop Drawings: The following items shall be submitted for review and approval:
  - 1. Submittal booklet to include the following:
    - a. Reference to Specification Section.
    - b. A list of all equipment to be provided and installed.
    - c. Data sheets to indicate front and side elevations with overall dimensions, conduit entrance locations and requirements, nameplate legends, one-line diagrams, equipment schedule and switchboard instrument details.
    - d. Wiring diagrams detailing power, signal, and control systems, clearly differentiating between manufacturer installed wiring and field installed wiring, and between components provided by the manufacturer and those provided by others.
    - e. Utility Company approval letter for metering sections.

### 1.4 SUBMITTALS FOR CLOSEOUT

- A. Submit under provisions of Section 260010.
- B. Record actual location of switchboards, indicate actual branch circuit arrangements.
- C. Operation Data: Include instructions for operating power monitoring and other accessories.
- D. Maintenance Data: Include spare parts data listing recommended maintenance procedures and intervals.
- E. Submit record copy of all testing performed.

### 1.5 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing switchgear specified in this Section with minimum three years documented experience.

### 1.6 REGULATORY REQUIREMENTS

- A. Conform to requirements of ANSI/NFPA 70.

- B. Furnish products listed and classified by Underwriters Laboratories, Inc., or a testing firm acceptable to authority having jurisdiction as suitable for purpose specified and shown.
- C. Provide UL Service Entrance Equipment label on all units used as service entrance equipment.

#### 1.7 DELIVERY, STORAGE, AND HANDLING

- A. Deliver, store, protect and handle products in conformance with manufacturer's recommended practices as outlined in applicable Installation and Maintenance manuals.
- B. Each switchboard sections shall be delivered in individual shipping splits for ease of handling. They shall be individually wrapped for protection and mounted on shipping skids.
- C. Inspect and report concealed damage to carrier within their required time-period.
- D. Store in a clean, dry space. Maintain factory protection and/or provide an additional heavy canvas or heavy plastic cover to protect structure from dirt, water, construction debris, and traffic.
- E. For switchboards installed outdoor or temporary stored in an unheated space, provide temporary electric heaters to prevent condensation in each section.
- F. Handle in accordance with NEMA PB 2.1 and manufacturer's written instructions. Lift only by lifting means provided for this express purpose. Handle carefully to avoid damage to switchboard internal components, enclosure, and finish.

#### 1.8 FIELD MEASUREMENTS

- A. Verify that field measurements are as indicated on shop drawings.

#### 1.9 MAINTENANCE MATERIALS

- A. Provide an accessory tool set and miscellaneous items required for overcurrent protective device test, inspection, maintenance, and operation.
- B. Provide two of each key.

#### 1.10 EXTRA MATERIALS

- A. Furnish extra materials described below that match products installed, are packaged with protective covering for storage and are identified with labels describing contents.
  - 1. Fuses: Provide 3 of each size and type of fuse installed.

#### 1.11 WARRANTY

- A. Provide the warranty specified in Section 260010.

### PART 2 - PRODUCTS

## 2.1 MANUFACTURERS

- A. Basis of Design: Square D Company
- B. Alternate manufacturers as listed below:
  - 1. Eaton
  - 2. Siemens
- C. Alternate manufacturers subject to compliance with the following requirements:
  - 1. The dimensions of the alternate manufacturer will fit in the proposed location and that all required clearances per NEC, Access and Maintenance are maintained.
    - a. The performance and operating characteristics meet or exceed the Basis of Design.
    - b. The alternate manufacturer shall include all features, accessories and additional equipment required for a complete installation.

## 2.2 GENERAL REQUIREMENTS FOR SWITCHBOARDS

- A. Utility Metering Compartment: Provide fabricated compartment and section complying with utility company's requirements. If separate vertical section is required for utility metering, match and align with basic switchboard.
- B. Nominal System Voltage: Refer to the Switchboard Schedules.
- C. Main Bus: Refer to the Switchboard Schedules.
- D. Short Circuit Current Rating: Refer to the Switchboard Schedules. Provide 65,000 rms symmetrical amperes if not noted on the Switchboard Schedules.
- E. Enclosure: Provide steel enclosure, in compliance with UL 891.
  - 1. Type 1 – Indoor:
    - a. Sections shall be aligned front and rear.
    - b. Switchboard height shall be 91.5" including 1.5" floor sills and excluding lifting members and pull boxes.
    - c. The switchboard shall be of a deadfront construction.
    - d. The switchboard shall have front access only.
    - e. The switchboard frame shall be of formed steel rigidly bolted together to support all cover plates, bussing and component devices during shipment and installation.
    - f. Steel base channels shall be bolted to the frame to rigidly support the entire shipping section for moving on rollers and floor mounting.
    - g. Each switchboard section shall have an open bottom and an individually removable top plate for installation and termination of conduit.
    - h. The switchboard enclosure shall be painted on all exterior surfaces. The paint shall be a medium gray, ANSI #49, applied by the electro-deposition process over an iron phosphate pre-treatment.
    - i. All front covers shall be screw removable with a single tool and all doors shall be hinged with removable hinge pins.
    - j. Top and bottom conduit areas shall be clearly indicated on shop drawings.
  - 2. Type 3R – Exterior:
    - a. Sections shall be aligned front and rear.
    - b. Switchboard height shall be 91.5" including 1.5" floor sills and excluding lifting members and pull boxes.

- c. The switchboard shall be of a deadfront construction.
  - d. The switchboard shall have front access only.
  - e. The switchboard frame shall be of formed steel rigidly bolted together to support all cover plates, bussing and component devices during shipment and installation.
  - f. Steel base channels shall be bolted to the frame to rigidly support the entire shipping section for moving on rollers and floor mounting.
  - g. Each switchboard section shall have an open bottom and an individually removable top plate for installation and termination of conduit.
  - h. The switchboard enclosure shall be painted on all exterior surfaces. The paint shall be a medium gray, ANSI #49, applied by the electro-deposition process over an iron phosphate pre-treatment.
  - i. All front covers shall be screw removable with a single tool and all doors shall be hinged with removable hinge pins.
  - j. Top and bottom conduit areas shall be clearly indicated on shop drawings.
  - k. Strip Heaters: Provide factory installed electric strip heaters of sufficient wattage in each vertical section to maintain enclosure temperature above expected dew point.
    - 1) Strip Heater Control: Provide thermostats to maintain temperature of each section above expected dew point. Provide humidistat to control humidity of each section.
    - 2) Strip Heater Power Source: Provide transformer with primary and secondary fuse protection factory installed in switchboard.
- F. Barriers: Provide barriers between adjacent switchboard sections.
- G. Auxiliary Sections: Auxiliary sections shall be matched and aligned with switchboard.
- H. Bus Transition and Incoming Pull Sections: Match and align with switchboard.
- I. Front Covers and Doors:
- 1. Front covers shall be screw removable with a single tool.
  - 2. All doors shall be hinged with removable hinge pins.
- J. Buses and Connections: Three phase, four wire, unless otherwise indicated. Provide hard-drawn plated copper of 98 percent conductivity.
- 1. Group-Mounted Feeder Vertical Bus Stack:
    - a. Bus stack shall be capable of mounting feeder breakers with different frame sizes and number of poles across from one another on the bus stack.
    - b. Non-conducting surface films shall be removed during circuit breaker installation by a wiping action of the circuit breaker jaws.
    - c. The design of the circuit breaker jaws and bus stack shall create blow-on forces under fault conditions.
    - d. Bolted lap joint connections for feeder breakers shall not be allowed for group-mounted feeders.
  - 2. Ground Bus: Size per current NEC and UL 891 Tables 28.1 and 28.2, hard-drawn copper of 98 percent conductivity, equipped with pressure connectors for feeder and branch circuit ground conductors. For busway feeders, extend insulated equipment grounding cable to busway ground connection and support cable at intervals in vertical run.
  - 3. Bus Composition: Tin plated copper. Plating shall be applied continuously to bus work. The switchboard bussing shall be of sufficient cross-sectional area to meet UL 891 temperature rise requirements. The phase and neutral through-bus shall have an ampacity as shown on the Drawings. For four-wire systems, the neutral shall be of equivalent

ampacity as the phase bus bar. Tapered bus is not permitted. Full provisions for the addition of future sections shall be provided. Bussing shall include, but shall not be limited to, necessary hardware to accommodate splicing for future additions.

- K. Future Provisions: All unused spaces provided, unless otherwise specified, shall be fully equipped for future devices, including all appropriate connectors and mounting hardware.
- L. Accessibility: Accessible from the front only of the switchboard.
- M. Provide manufacture start-up and training when required for the equipment provided.

### 2.3 INCOMING MAIN SECTION DEVICES FOR SWITCHBOARDS

- A. Provide main type as indicated on the Switchboard Schedule or Power Riser Diagram.
- B. Main Circuit Breaker:
  - 1. Electronic trip molded case standard function 80% rated circuit breakers through 5000A. Provide 100% when indicated on the Switchboard Schedules.
    - a. All electronic circuit breakers shall have the following time/current response adjustments: Long Time Pickup, Long Time Delay, Short Time Pickup, Short Time Delay, and Instantaneous settings. Each adjustment shall have discrete settings (fully adjustable) and shall be independent of all other adjustments. Provide Ground Fault Pickup and Ground Fault Delay when indicated on the Panel Schedules.
    - b. Circuit breaker trip system shall be a microprocessor-based true rms sensing designed with sensing accuracy through the 13<sup>th</sup> harmonic.
    - c. Long Time Pickup indication to signal when loading approaches or exceeds the adjustable ampere rating of the circuit breaker shall be provided.
    - d. Breaker handle and faceplate shall indicate rated ampacity. Standard construction circuit breakers shall be UL Listed for reverse connection without restrictive line or load markings.
    - e. Circuit breaker escutcheon shall have international I/O markings, in addition to standard ON/OFF markings. Circuit breaker handle accessories shall provide provisions for locking handle in the ON or OFF position.
    - f. Lugs shall be UL Listed to accept solid or stranded conductors.
    - g. Breaker Accessories: Provide when indicated on the Switchboard Schedules.
      - 1) Mechanical Lug Kits
      - 2) Zone Selective Interlocking

### 2.4 DISTRIBUTION SECTION DEVICES FOR SWITCHBOARDS

- A. General:
  - 1. Circuit breakers shall be 80% rated unless otherwise indicated on the Switchboard Schedules.
  - 2. Circuit breakers shall be UL Listed with amperage ratings, interrupting ratings, and number of poles as indicated on the associated Switchboard Schedules.
  - 3. Circuit breaker(s) shall be a group mounted plug-on with mechanical restraint on a common pan or rail assembly.
  - 4. The interior shall have 3 flat bus bars stacked and aligned vertically with glass reinforced polyester insulators laminated between phases. The molded polyester insulators shall support and provide phase isolation to the entire length of bus.

5. Circuit breaker(s) equipped with line terminal jaws shall not require additional external mounting hardware. Circuit breaker(s) shall be held in mounted position by a self-contained bracket secured to the mounting pan by fasteners. Circuit breaker(s) of different frame sizes shall be capable of being mounted across from each other.
6. Line-side circuit breaker connections are to be jaw type.
7. All unused spaces provided, unless otherwise specified, shall be fully equipped for future devices, including all appropriate connectors and mounting hardware.
8. Molded Case Circuit Breakers: NEMA AB 1, bolt-on type thermal magnetic trip circuit breakers, with a common trip handle for each pole.
9. Provide circuit breakers UL listed as Type SWD for lighting circuits.
10. Provide circuit breakers UL listed as Type HACR for heating, air conditioning and refrigeration equipment branch circuits.
11. Circuit breakers shall have an overcenter toggle mechanism which will provide quick-make, quick-break contact action. Circuit breakers shall have thermal and magnetic trip elements in each pole. Two- and three-pole circuit breakers shall have common tripping of all poles.
12. There shall be two forms of visible trip indication.
13. The exposed faceplates of all branch circuit breakers shall be flush with one another.
14. Lugs shall be UL Listed to accept solid or stranded conductors.
15. Breaker Accessories: Provide when indicated on the Switchboard Schedules.
  - a. Shunt Trip
  - b. Auxiliary Switch
  - c. Alarm Switch
  - d. Ground Fault – Personal Protection (6-mA trip)
  - e. Ground Fault – Equipment Protection (30-mA trip)
  - f. Handle lock
  - g. Zone Selective Interlocking

B. Breaker Types:

1. Thermal Magnetic Circuit Breaker (TM)
  - a. Molded case circuit breakers shall have integral thermal and instantaneous magnetic trip in each pole.
2. Electronic Trip Circuit Breaker with Long Time, Short Time, Instantaneous Setting Adjustments (E)
  - a. All electronic circuit breakers shall have the following time/current response adjustments: Long Time Pickup, Long Time Delay, and Instantaneous settings. Each adjustment shall have discrete settings (fully adjustable).
  - b. Circuit breaker trip system shall be a microprocessor-based true rms sensing designed with sensing accuracy through the 13th harmonic.
  - c. Long time pickup indication to signal when loading approaches or exceeds the adjustable ampere rating of the circuit breaker shall be provided.
3. Electronic Trip Circuit Breakers with real time metering (EP)
  - a. Current (phases, neutral, average, maximum)
  - b. Voltage (phase-to-phase, phase-to-neutral, average, unbalance)
  - c. Power (active kW, reactive kVAR, apparent kVA, power factor)
  - d. Energy (active kWh, reactive kVAR, apparent kVA)
  - e. Frequency
  - f. Total harmonic distortion (current, voltage)
  - g. Metering accuracy shall be 1.5% current (above 600 amperes), 1.0% current (600 amperes and below), 0.5% voltage, and 2% energy. This accuracy shall be total system, including, but not limited to, CT and meter.

4. Provide electronic trip type if not indicated on the Switchboard Schedules.

## 2.5 CUSTOMER METERING

- A. Power Monitoring: Provide one power and energy meter in each switchboard and any additional shown on the Power Riser Diagram.
  1. Manufacturers:
    - a. Square D Company Model PM5563
    - b. Eaton Model PXM 9410 Series
    - c. Siemens Model 9410 Series
  2. Digital Power Meter with 0.25% accuracy with the following features: A, V, kW, kVAR, kVA, PF, F kWh, kVARh, kVAh, KYZ, RS-485 Communications, Ethernet Communications THD, Demand, kWd kVARd, kVAd, date/time stamping, predicted power demand, onboard alarms, min/max readings, data log, and event log.
    - a. Onboard WEB pages to view real-time and logged information.
    - b. Connection point for Energy Management System.
  3. Circuit Monitor Installation:
    - a. Electronic Circuit Monitors shall be installed by the switchboard manufacturer for all circuits as indicated by the project drawings. Mount no lower than 48" and no higher than 72".
    - b. All control power, CT, PT, and communications wire shall be factory wired and harnessed within the switchboard lineup.
    - c. Where external circuit connections are required, terminal blocks shall be provided, and the manufacturer's drawings must clearly identify the interconnection requirements including wire type to be used.
  4. Certification Description:
    - a. All equipment included as part of the power and trip history metering shall be UL listed.
      - 1) IEC 62053-23
      - 2) IEC 62052-11
- B. Provide necessary hardware to support monitoring of real-time operational data from trip units and customer meters in Switchboards.
  1. Hardware shall support protocol conversion from Modbus →BACNET/IP to support monitoring of data by customer BMS System.
  2. Hardware shall have the capability to monitor a minimum of 50 parameters from each installed trip unit via Modbus protocol and mapping these points to a common register map compatible with BACNET/IP protocol.
  3. Hardware shall have the capability to monitor a minimum of 20 Modbus devices concurrently.
  4. Hardware should be as manufactured by Sierra Montiro Protonode or approved equal.
- C. Provide manufacturers field service to start-up, set-up, and train the Owner for all meters.

## 2.6 MULTI-CIRCUIT POWER METER

- A. Provide multi-circuit power meter when indicated on the Panel Schedules or Power Riser Diagram.
  1. Manufacturers:
    - a. Square D Company Model HDPM6000 Series

- b. Eaton
  - 2. General Provisions: The meter shall be a microprocessor-based branch monitoring system supporting direct reading metered or calculated values for up to one hundred ninety-two (192) branch circuits or a combination of panelboards and sub-feed breakers.
  - 3. Measured Values:
    - a. The meter shall be able to support 1, 2, and 3 pole breakers
    - b. All the meter measured values shall be available through the HDPM Modbus interface
    - c. The meter shall provide at a minimum the following current values:
      - 1) Current per branch channel
      - 2) Current total per circuit
    - d. The meter shall provide at a minimum the following power values:
      - 1) Real power (per channel, circuit total)
      - 2) Reactive power (per channel, circuit total)
      - 3) Apparent power (per channel, circuit total)
      - 4) Power factor – true (per channel, circuit total)
      - 5) Maximum real power (per channel, circuit total)
    - e. The meter shall provide at a minimum the following energy values:
      - 1) Accumulated real kWh energy (per channel, circuit total)
  - B. Provide enclosure with step down transformer powered by panelboard.
  - C. Provide Manufacturers Field Service to start-up, set-up, and train the Owner for all meters.
- 2.1 ARC ENERGY REDUCTION SWITCH
- A. Provide for 1200A and above switchboards.
  - B. An ARC Energy Reduction switch shall be made available mounted internally to the panelboard for breakers required per the National Electrical Code 240.87.
  - C. Shall provide a Modbus TCP/IP connection to the breaker. Breaker data connection shall be available for connection to external monitoring software. Shall also provide a web page providing historical information, breaker status, breaker metering and maintenance data. Device shall be capable of sending breaker alarms via email and smart phone application.
- 2.2 INTEGRATED SURGE SUPPRESSION DEVICE
- A. Provide integrated surge suppression device when indicated on the Switchboard Schedule or Power Riser Diagram.
  - B. Integral Surge Suppressor:
    - 1. SPD shall be component recognized in accordance with UL 1449 Fourth Edition. SPD shall be installed by and shipped from the electrical distribution equipment manufacturer's factory.
    - 2. The surge protection devices shall be bus mounted. If a breaker is needed to feed the integrally mounted SPDs, provide the breaker and wiring required.
    - 3. SPD shall provide surge current diversion paths for all modes of protection; L-N, L-G, N-G in WYE Systems.



4. SPD shall be constructed as a per phase or single system module design. Each mode including N-G shall be protected by internal overcurrent and thermal overtemperature controls.
5. SPD shall be UL 1449 listed and labeled with 200kA Short Circuit Current Rating (SCCR).
6. SPDs shall be equipped with the following diagnostics:
  - a. Visible indication of proper SPD connection and operation shall be provided. The indicator lights shall indicate which phase as well as which module is fully operable. The status of each SPD module shall be monitored on the front cover of the enclosure. A push-to-test button shall be provided to test each phase indicator. Push-to-test button shall activate a state change of dry contacts for testing purposes.
  - b. Audible alarm with on/off silence function and diagnostic test function (excluding branch).
  - c. Form C dry contacts
  - d. Surge Counter
7. SPD shall be complimentary UL 1283 listed for EMI/RFI filtering with minimum attenuation of -50dB at 100kHz.
8. SPD shall have a warranty for a period of 10 years, incorporating unlimited replacement of suppressor parts. Warranty shall be the responsibility of the electrical distribution equipment manufacturer and shall be supported by their respective field service division.

C. Internal Type H1 Unit: Non-Critical Load Applications:

1. Voltage Rating: 480Y/277V, 3-phase, 4-wire
2. Application: Switchboard
3. Minimum modes of protection: Common or Normal: L-N, L-G, L-L & N-G
4. Maximum UL 1449 Voltage Protection Ratings (VPRs) for L-N, L-G, and N-G Modes of Protection: 1200 volts
5. I-nominal Rating: 20kA
6. Minimum acceptable single pulse surge current capacity: 240,000 amps per phase
7. The following Models are acceptable:
  - a. Square D Company Model TVS4IMA24
  - b. Eaton Model SPD250480Y2C
  - c. Siemens Model TPS3E0625X02, TPS3E0525X2

D. Internal Type L1 Unit: Non-Critical Load Applications:

1. Voltage Rating: 208Y/120V, 3-phase, 4-wire
2. Application: Switchboard
3. Minimum Modes of Protection: Common or Normal: L-N, L-G, N-G
4. Maximum UL 1449 Voltage Protection Ratings (VPRs) for L-N, L-G, and N-G Modes of Protection: 700 volts.
5. I-nominal Rating: 20kA
6. Minimum acceptable single pulse surge current capacity: 240,000 amps per phase
7. The following models are acceptable:
  - a. Square D Company Model TVS2IMA24
  - b. Eaton Model SPD250208Y2C
  - c. Siemens Model TPS3C0625X02, TPS3C0525X2

## 2.3 IDENTIFICATION

- A. Engraved plastic nameplates: Engraving stock, melamine plastic laminate, minimum 1/16" thick for nameplates up to 20 sq. in. and 1/8" thick for larger sizes.

1. Engraved legend shall be black letters on white face.
  2. Punched or drilled for mechanical fasteners.
- B. Mimic Bus: The nameplate shall be at least .0625" thick and located at eye level on the front cover of the switchboard incoming service section.
1. Continuously integrated mimic bus factory applied to front of switchboard.
  2. Arrange in single line diagram format using symbols and letter designations consistent with final mimic bus diagram.
  3. Coordinate mimic bus segments with devices in switchboard sections to which applied.
  4. Produce a concise visual presentation of principal switchboard components and connections.
- C. Fasteners for nameplates: Self-tapping, stainless-steel screws or No. 10/32, stainless-steel machine screws with nuts and flat and lock washers.

### PART 3 - EXECUTION

#### 3.1 EXAMINATION

- A. Verify that surface is suitable for switchboard installation.
- B. All manufactures must verify that the equipment will fit in the space provided.

#### 3.2 PREPARATION

- A. Provide 4" concrete housekeeping pad for each switchboard.

#### 3.3 INSTALLATION

- A. Install switchboard in accordance with NEMA PB 2.1, NEC Standards, Local Codes, and manufacturer's instructions.
- B. Torque all bolted connections and mechanical fasteners after placing switchboard per manufacturer's specifications.
- C. Provide seismic restraints when Section 260125 is included in the specification.
- D. Provide breaker closures for unused spaces in switchboards.
- E. Provide engraved plastic nameplates for each switchboard with 3/8" high lettering. Label shall include the following:
  1. Switchboard Name
  2. Voltage, Phase, Wire
  3. Location of source of incoming power which feeds switchboard.
- F. Provide engraved plastic nameplates for each feeder overcurrent device showing name of load, each spare size and each available space size with 1/2" high lettering.
- G. Provide mimic bus to indicate all switchboard components.

- H. Provide accessories which prevent circuit breaker handles from being manually moved from the ON position for the handles of all circuit breaker which transformers.
- I. Ground and bond panelboard enclosure in accordance with Section 260526.
- J. Provide category 6 cable in 3/4" conduit from each meter to nearest MDF/IDF and terminate on both ends unless otherwise noted.
- K. Provide a dedicated 3-pole branch circuit breaker to feed TVSS unit (only when required by manufacturer). Circuit breaker size and wire size shall be per manufacturer recommendation. Connect leads to load side of the circuit breaker.
- L. Where replacing existing switchboards and existing conductors are to be connected to new CB's, provide extensions of conductors as needed using same color and size of wire using a butt-splice.
- M. Contractor shall trace all circuits listed as "Existing Circuits" and provide the correct description for the circuit. Existing Circuit will not be acceptable on the Final Switchboard labels.
- N. Contractor is responsible for any equipment that needs to be disassembled and reassembled to get into the location specified on the drawings.
- O. Contractor is responsible for any door frames that need to be removed and reinstalled to get into the location specified on the drawings.

### 3.4 FIELD QUALITY CONTROL

- A. Perform field inspection and testing.
- B. Inspect for physical damage, proper alignment, anchorage, and grounding. Check proper installation and tightness of connections.
- C. Measure, using a Megger, the insulation resistance of each bus section phase-to-phase and phase-to-ground for 1 minute each, at minimum test voltage of 1000 VDC; minimum acceptable value for insulation resistance is 1 megohms. Refer to manufacturer's literature for specific testing procedures.
- D. Check tightness of accessible bolted bus joints using calibrated torque wrench per manufacturer's recommended torque values.
- E. Test ground fault systems per NEC Article 230.
- F. Apply ANSI 61 (or other appropriate color paint) as needed.

### 3.5 SWITCHBOARD SCHEDULES

- A. As indicated in the Specifications or Drawings.

### 3.6 ADJUSTING

- A. Adjust all operating mechanisms for free mechanical movement per manufacturer's specifications.
- B. Tighten bolted bus connections in accordance with manufacturer's instructions.
- C. Provide Coordination Study to achieve required settings for adjustment. Verify equipment can be adjusted to meet the study requirements before releasing for production.
- D. Provide Fault Current Study to achieve AIC ratings for panelboards. Verify equipment meets the requirements of the study before releasing for production.
- E. Adjust circuit breaker trip and time delay settings to values indicated in the Coordination Study.

### 3.7 FLOOR LINE MARKING

- A. Provide a 2" yellow floor line marking showing clear working distance on the floor in front of the switchboard with wordage within space which shall be: "Do Not Block This Piece of Electrical Equipment". Working clearance shall be as noted in the NEC.

### 3.8 CLEANING

- A. Upon completion of installation, inspect interior and exterior of switchboards. Remove paint splatters and other spots, dirt, and debris from interior and exterior of switchboards.
- B. Touch up scratched or marred surfaces to match original finish.

### 3.9 SETUP/TRAINING

- A. Manufacturers Setup: Provide and pay for the services of a factory-authorized service representative to start-up, set-up, and train the Owner for the equipment provided.

END OF SECTION 262413

## SECTION 262415 – EXISTING PANELBOARDS

### PART 1 - GENERAL

#### 1.1 SECTION INCLUDES

- A. Existing Distribution Panelboards
- B. Existing Branch Circuit Panelboards

#### 1.2 REFERENCES

- A. ANSI/NFPA 70 – National Electrical Code
- B. NEMA PB 1 – Panelboards
- C. NEMA PB 1.1 – General Instructions for Safe Installation, Operation, and Maintenance of Panelboards Rated 600 Volts or Less
- D. NEMA AB 1 – Molded Case Circuit Breakers and Molded Case Switches
- E. NEMA KS 1 – Enclosed and Miscellaneous Distribution Equipment Switches (600 Volts Maximum)
- F. UL 50 – Enclosures for Electrical Equipment
- G. UL 67 – Panelboards
- H. UL 98 – Enclosed and Dead-Front Switches
- I. UL 489 – Molded – Case Circuit Breakers and Circuit Breaker Enclosures
- J. UL 1449, Edition 4 – Standard for Surge Protective Devices
- K. Federal Specification W-P115C – Type 1, Class 1
- L. Federal Specification W-C-375B/Gen – Circuit Breakers, Molded Case, Branch Circuit, and Service
- M. Federal Specification W-C-37B – Molded Case Circuit Breakers
- N. ASTM – American Society of Testing Materials

#### 1.3 SUBMITTALS FOR REVIEW

- A. Submit under provisions of Section 260010.
- B. Shop Drawings: The following items shall be submitted for review and approval:
  - 1. Submittal booklet to include the following:

- a. Reference to Specification Section.
- b. A list of all equipment to be provided and installed.
- c. Data sheets to indicate circuit breakers and short circuit rating, with specific items or model numbers highlighted.

#### 1.4 SUBMITTALS FOR CLOSEOUT

- A. Submit under provisions of Section 260010.
- B. Record actual branch circuit arrangement.
- C. Provide copies of all updated Panel Schedules included in the O&M Manuals.

#### 1.5 QUALITY ASSURANCE

- A. Perform Work in accordance with NECA Standard of Installation except for mounting heights.
- B. Maintain each document on site.

#### 1.6 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing the Products specified in this section with minimum three years documented experience.

#### 1.7 REGULATORY REQUIREMENTS

- A. Conform to requirements of ANSI/NFPA 70.
- B. Furnish products listed and classified by UL or testing firm acceptable to authority having jurisdiction as suitable for purpose specified and indicated.

#### 1.8 DELIVERY, STORAGE, AND HANDLING

- A. Inspect and report concealed damage to carrier within their required time-period.
- B. Handle carefully to avoid damage to panelboard internal components, enclosure, and finish.
- C. Store in a clean, dry environment. Maintain factory packaging and, if required, provide an additional heavy canvas or heavy plastic cover to protect enclosure(s) from dirt, water, construction debris and traffic.

#### 1.9 WARRANTY

- A. Provide the warranty specified in Section 260010.

## PART 2 - PRODUCTS

### 2.1 MANUFACTURERS

- A. Match existing manufacturer.

### 2.2 GENERAL REQUIREMENTS FOR PANELBOARDS

- A. Ground Bus: Provide copper ground bus in enclosures and bond the bus to the enclosure.
- B. Load Side Terminations: Provide lugs on circuit breakers of sufficient size to terminate conductors scheduled or indicated on plans.
- C. Use only Owner assigned room names/numbers in final Panel Schedules.

### 2.3 ADDITIONAL BREAKERS FOR DISTRIBUTION PANELBOARDS (600A AND ABOVE)

- A. Minimum integrated short circuit rating: Match existing.
- B. Branch Circuit Breakers:
  - 1. General:
    - a. Circuit breakers shall be 80% rated unless otherwise indicated on the Panel Schedules
    - b. Circuit breakers shall be UL Listed with amperage ratings, interrupting ratings, and number of poles as indicated on the associated panel schedules.
    - c. Molded Case Circuit Breakers: NEMA AB 1, bolt-on type thermal magnetic trip circuit breakers, with a common trip handle for each pole.
    - d. Provide circuit breakers with integral thermal and instantaneous magnetic trip in each pole.
    - e. Provide circuit breakers UL listed as Type SWD for lighting circuits.
    - f. Provide circuit breakers UL listed as Type HACR for heating, air conditioning and refrigeration equipment branch circuits.
    - g. Circuit breakers shall have an overcenter toggle mechanism which will provide quick-make, quick-break contact action. Circuit breakers shall have thermal and magnetic trip elements in each pole. Two- and three-pole circuit breakers shall have common tripping of all poles.
    - h. There shall be two forms of visible trip indication.
    - i. The exposed faceplates of all branch circuit breakers shall be flush with one another.
    - j. Lugs shall be UL Listed to accept solid or stranded conductors.
    - k. Breaker Accessories: Provide when indicated on the Panel Schedules.
      - 1) Shunt Trip
      - 2) Auxiliary Switch
      - 3) Alarm Switch
      - 4) Ground Fault – Personal Protection (6-mA trip)
      - 5) Ground Fault – Equipment Protection (30-mA trip)
      - 6) Handle lock
      - 7) Zone Selective Interlocking
  - 2. Breaker Types:
    - a. Thermal Magnetic Circuit Breaker (TM)

- 1) Molded case circuit breakers shall have integral thermal and instantaneous magnetic trip in each pole.
- b. Electronic Trip Circuit Breaker with Long Time, Short Time, Instantaneous Setting Adjustments (E)
  - 1) All electronic circuit breakers shall have the following time/current response adjustments: Long Time Pickup, Long Time Delay, and Instantaneous settings. Each adjustment shall have discrete settings (fully adjustable).
  - 2) Circuit breaker trip system shall be a microprocessor-based true rms sensing designed with sensing accuracy through the 13<sup>th</sup> harmonic.
  - 3) Long time pickup indication to signal when loading approaches or exceeds the adjustable ampere rating of the circuit breaker shall be provided.
- c. Electronic Trip Circuit Breakers with real time metering (EP)
  - 1) All electronic trip circuit breaker requirements.
  - 2) Current (phases, neutral, average, maximum)
  - 3) Voltage (phase-to-phase, phase-to-neutral, average, unbalance)
  - 4) Power (active kW, reactive kVAR, apparent kVA, power factor)
  - 5) Energy (active kWh, reactive kVAR, apparent kVA)
  - 6) Frequency
  - 7) Total harmonic distortion (current, voltage)
  - 8) Metering accuracy shall be 1.5% current (above 600 amperes), 1.0% current (600 amperes and below), 0.5% voltage, and 2% energy. This accuracy shall be total system, including, but not limited to, CT and meter.
- d. Mission Critical Circuit Breaker (M)
  - 1) All electronic trip circuit breaker requirements
  - 2) Oversized frame size:
    - a) Minimum frame size of 400A for any breaker below 250A.
    - b) Minimum frame size of 600A for any breaker between 300A-400A.
  - 3) Delivers high levels of selective coordination for overcurrent tripping previously tested combinations of downstream breaker types.
  - 4) Breakers must be listed to coordinate with the provided downstream breaker types installed in the downstream panels.
- e. Provide electronic trip type if not indicated on the Panel Schedules.

## 2.4 ADDITIONAL BREAKERS FOR BRANCH CIRCUIT PANELBOARDS

- A. Minimum integrated short circuit rating: Match existing
- B. Branch Circuit Breakers:
  1. Circuit breakers shall be 80% rated unless otherwise indicated on the Panel Schedules
  2. Circuit breakers shall be UL Listed with amperage ratings, interrupting ratings, and number of poles as indicated on the associated panel schedules.
  3. Molded Case Circuit Breakers: NEMA AB 1, bolt-on type thermal magnetic trip circuit breakers, with a common trip handle for each pole.
  4. Provide circuit breakers with integral thermal and instantaneous magnetic trip in each pole.
  5. Provide circuit breakers UL listed as Type SWD for lighting circuits.
  6. Provide circuit breakers UL listed as Type HACR for heating, air conditioning, and refrigeration equipment branch circuits.
  7. Circuit breakers shall have an overcenter toggle mechanism which will provide quick-make, quick-break contact action. Circuit breakers shall have thermal and magnetic trip



elements in each pole. Two- and three-pole circuit breakers shall have common tripping of all poles.

8. There shall be two forms of visible trip indication.
9. The exposed faceplates of all branch circuit breakers shall be flush with one another.
10. Lugs shall be UL Listed to accept solid or stranded conductors.
11. Breaker Accessories: Provide when indicated on the Panel Schedules.
  - a. Shunt Trip
  - b. Auxiliary Switch
  - c. Alarm Switch
  - d. Ground Fault – Personal Protection (6-mA trip)
  - e. Ground Fault – Equipment Protection (30-mA trip)
  - f. Arc-Fault Circuit Interrupter
  - g. Handle lock

## 2.5 GROUND BUS

- A. Provide a ground bus in the existing panelboard for termination of equipment grounding conductors.
- B. Provide ground bushing and conductor from panelboard feeder conduit to ground bus.

## 2.6 IDENTIFICATION

- A. Panelboard engraved plastic nameplates: Engraving stock, melamine plastic laminate, minimum 1/16" thick for nameplates up to 20 sq. in. and 1/8" thick for larger sizes.
  1. Engraved legend shall be black letters on white face.
  2. Punched or drilled for mechanical fasteners.
- B. Fasteners for Nameplates: Self-tapping, stainless-steel screws or No. 10/32, stainless-steel machine screws with nuts and flat and lock washers.

## PART 3 - EXECUTION

### 3.1 INSTALLATION

- A. Remove existing label.
- B. Provide engraved plastic nameplates for each panelboard with 1/2" high lettering. Label shall include the following:
  1. Panel Name
  2. Voltage, Phase, Wire
  3. Location of the panel, switchboard or disconnect device which feeds the panelboard.
- C. Tighten all bolted connections within all reused panelboards.
- D. Provide breaker closures for removed breakers and unused spaces in panelboards.
- E. Provide a typed circuit directory for each existing branch circuit panelboard.

1. Revise directory to reflect new and “existing to remain” circuits and circuiting changes required to balance phase loads.
  2. Contractor to submit a copy of all panelboard directory schedules to the Owner, showing correct room name and/or number, for his approval. Contractor to make changes recommended by the Owner before final typed directories are installed in panelboards.
- F. Provide accessories which prevent circuit breaker handles from being manually moved from the ON position for the handles of all circuit breaker which feed emergency lighting circuits, public address and intercom systems and uninterruptable power supplies.
- G. Ground and bond panelboard enclosure in accordance with Section 260526.
- H. Where replacing existing panels and existing conductors are to be connected to new CB's, provide extensions of conductors as needed using same color and size of wire using a butt-splice.
- I. Contractor shall trace all circuits listed as “Existing Circuits” and provide the correct description for the circuit. Existing Circuit will not be acceptable in the Final Panel Schedules.

### 3.2 FIELD QUALITY CONTROL

- A. Perform field inspection and testing.
- B. Inspect for physical damage, proper alignment, anchorage, and grounding. Check proper installation and tightness of connections.
- C. Measure steady state load currents at each panelboard feeder; rearrange circuits in the panelboard to balance the phase loads within 10% of each other. Maintain proper phasing for multi-wire branch circuits.
- D. Check tightness of bolted connections, and circuit breaker connections using calibrated torque wrench or torque screwdriver per manufacturer's written specifications.
- E. Apply ANSI 61 (or other appropriate color paint) as needed.

### 3.3 PANEL SCHEDULES

- A. As indicated in the Specifications or Drawings.
- B. Schedules show separate wire and conduit sizes for each individual branch circuit. The Contractor may install more than one circuit in a conduit and eliminate unused conduits. The Contractor is responsible for resizing the conduits and providing derated conductors per the requirements of ANSI/NFPA 70 - National Electrical Code.

### 3.4 ADJUSTING

- A. Relocate/revise circuit arrangement as required to install breakers. Provide extensions of conductors as required for new circuit arrangement.

- B. Measure steady state load currents at each panelboard feeder; rearrange circuits in the panelboard to balance the phase loads to within 20% of each other. Maintain proper phasing for multi-wire branch circuits.

END OF SECTION 262415

## SECTION 262416 – PANELBOARDS

### PART 1 - GENERAL

#### 1.1 SECTION INCLUDES

- A. Distribution Panelboards
- B. Branch Circuit Panelboards
- C. Integral Equipment

#### 1.2 REFERENCES

- A. ANSI/NFPA 70 – National Electrical Code
- B. NEMA PB 1 – Panelboards
- C. NEMA PB 1.1 – General Instructions for Safe Installation, Operation, and Maintenance of Panelboards Rated 600 Volts or Less
- D. NEMA AB 1 – Molded Case Circuit Breakers and Molded Case Switches
- E. NEMA KS 1 – Enclosed and Miscellaneous Distribution Equipment Switches (600 Volts Maximum)
- F. UL 50 – Enclosures for Electrical Equipment
- G. UL 67 – Panelboards
- H. UL 98 – Enclosed and Dead-Front Switches
- I. UL 489 – Molded – Case Circuit Breakers and Circuit Breaker Enclosures
- J. UL 1449, Edition 4 – Standard for Surge Protective Devices
- K. Federal Specification W-P115C – Type 1, Class 1
- L. Federal Specification W-C-375B/Gen – Circuit Breakers, Molded Case, Branch Circuit, and Service
- M. Federal Specification W-C-37B – Molded Case Circuit Breakers
- N. ASTM – American Society of Testing Materials

#### 1.3 SUBMITTALS FOR REVIEW

- A. Submit under provisions of Section 260010.

- B. Shop Drawings: The following items shall be submitted for review and approval:
  - 1. Submittal booklet to include the following:
    - a. Reference to Specification Section.
    - b. A list of all equipment to be provided and installed.
    - c. Data sheets to indicate voltage, main bus ampacity, circuit breakers, short circuit rating with specific items or model numbers highlighted.

#### 1.4 SUBMITTALS FOR CLOSEOUT

- A. Submit under provisions of Section 260010.
- B. Record actual locations of Products; indicate actual branch circuit arrangement.
- C. Submit record copy of all testing performed.
- D. Provide a copy of the approved Panel Schedules included in the O&M Manuals.

#### 1.5 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing of panelboards specified in this section with minimum three years documented experience.

#### 1.6 REGULATORY REQUIREMENTS

- A. Conform to requirements of ANSI/NFPA 70.
- B. Furnish products listed and classified by UL or testing firm acceptable to authority having jurisdiction as suitable for purpose specified and indicated.
- C. Provide UL service entrance equipment on all units used as service entrance equipment.

#### 1.7 DELIVERY, STORAGE, AND HANDLING

- A. Inspect and report concealed damage to carrier within their required time-period.
- B. Handle carefully to avoid damage to panelboard internal components, enclosure, and finish.
- C. Store in a clean, dry environment. Maintain factory packaging and, if required, provide an additional heavy canvas or heavy plastic cover to protect enclosure(s) from dirt, water, construction debris and traffic.

#### 1.8 MAINTENANCE MATERIALS

- A. Provide two keys for each panelboard installed.

#### 1.9 WARRANTY

- A. Provide the warranty specified in Section 260010.

## PART 2 - PRODUCTS

### 2.1 MANUFACTURERS

- A. Basis of Design: Square D Company
- B. Alternate manufacturers as listed below:
  - 1. Eaton
  - 2. Siemens
- C. Alternate manufacturers subject to compliance with the following requirements:
  - 1. The dimensions of the alternate manufacturer will fit in the proposed location and that all required clearances per NEC, Access and Maintenance are maintained.
    - a. The performance and operating characteristics meet or exceed the Basis of Design.
    - b. The alternate manufacturer shall include all features, accessories and additional equipment required for a complete installation.

### 2.2 GENERAL REQUIREMENTS FOR PANELBOARDS

- A. Ground Bus: Provide copper ground bus in enclosures and bond the bus to the enclosure.
- B. Neutral Bus: Provide copper insulated neutral bus in all enclosures where the feeder circuit contains a neutral conductor. Bond the neutral bus to the ground bus or enclosure when the enclosure contains the service main disconnect or the disconnect at a building which receives its power from a service in another building. Provide bus with current carrying capacity of 100% except where otherwise indicated.
- C. Service Equipment Label: UL labeled for use as service equipment for panelboards with main service disconnect switches.
- D. Ground Fault Systems: Provide ground fault systems and on-site testing per NEC Article 230 for panelboards with main service disconnect switch.
- E. Load Side Terminations: Provide lugs on circuit breakers of sufficient size to terminate conductors scheduled or indicated on plans.
- F. Use only Owner-assigned room names/numbers in final Panel Schedules.
- G. For recessed double panels, allow at least 4" between backboxes so that trim does not butt or overlap.
- H. Provide 2 – 100% neutral assemblies in all split bus panelboards.
- I. Provide “Hinged Trim” panelboard covers for all distribution and branch circuit panelboards. The entire trim shall be hinged to swing to one side of the box to access the panel gutter space.
- J. All Panelboards with greater than 42 poles shall have 2 panel backboxes. Single backboxes with more than 42 poles will be unacceptable.
- K. Provide manufacture start-up and training when required for the equipment provided.

## 2.3 PANELBOARD SHORT CIRCUIT RATING

- A. UL label indicating series-connected rating with integral or remote upstream devices. Include size and type of upstream device allowable, branch devices allowable, and UL series-connected short-circuit rating.
- B. Fully rated to interrupt symmetrical short-circuit current available at terminals.
- C. Manufacturers option unless noted otherwise on the Panel Schedules or Power Riser Diagram.

## 2.4 DISTRIBUTION PANELBOARDS (600A AND ABOVE)

- A. Panelboards: NEMA PB 1, circuit breaker type suitable for use as service entrance equipment.
- B. Interior:
  - 1. Panelboard Bus: Copper, (silver plated copper, or tin-plated copper) ratings as indicated.
    - a. Provide copper ground bus in each panelboard.
  - 2. Provide one (1) continuous bus bar per phase.
    - a. Each bus bar shall have sequentially phased branch circuit connectors suitable bolt-on branch circuit breakers.
    - b. The bussing shall be fully rated.
    - c. Panelboard bus current ratings shall be determined by heat-rise tests conducted in accordance with UL 67.
  - 3. Panelboards shall be suitable for use as Service Equipment when application requirements comply with UL 67 and NEC Articles 230-F and -G.
  - 4. All current-carrying parts shall be insulated from ground and phase-to-phase by high dielectric strength thermoplastic.
  - 5. A solidly bonded copper equipment ground bar shall be provided.
  - 6. Interior trim shall be of dead-front construction to shield user from energized parts. Dead-front trim shall have filler plates covering unused mounting spaces.
- C. Minimum Integrated Short Circuit Rating:
  - 1. Amperes Interrupting Current (AIC) Ratings: 120V, 208V, and 240V breaker – minimum AIC 10,000 amps unless otherwise noted on the Panel Schedules.
  - 2. Amperes Interrupting Current (AIC) Ratings: 277V and 480V breaker – minimum AIC 14,000 amps unless otherwise noted on the Panel Schedules.
- D. Main Circuit Breaker:
  - 1. Electronic trip molded case standard function 80% rated circuit breaker. Provide 100% when indicated on the Panel Schedules.
  - 2. All electronic circuit breakers shall have the following time/current response adjustments: Long Time Pickup, Long Time Delay, Short Time Pickup, Short Time Delay, and Instantaneous settings. Each adjustment shall have discrete settings (fully adjustable) and shall be independent of all other adjustments. Provide Ground Fault Pickup and Ground Fault Delay when indicated on the Panel Schedules.
  - 3. Circuit breaker trip system shall be a microprocessor-based true rms sensing designed with sensing accuracy through the 13th harmonic.
  - 4. Long Time Pickup indication to signal when loading approaches or exceeds the adjustable ampere rating of the circuit breaker shall be provided.

5. Breaker handle and faceplate shall indicate rated ampacity. Standard construction circuit breakers shall be UL Listed for reverse connection without restrictive line or load markings.
  6. Circuit breaker escutcheon shall have international I/O markings, in addition to standard ON/OFF markings. Circuit breaker handle accessories shall provide provisions for locking handle in the ON or OFF position.
  7. Lugs shall be UL Listed to accept solid or stranded conductors.
  8. Breaker Accessories: Provide when indicated on the Panel Schedules.
    - a. Shunt Trip
    - b. Under Voltage Trip
    - c. Ground Fault Shunt Trip
    - d. Auxiliary Switch
    - e. Alarm Switch
    - f. Mechanical Lug Kits
    - g. Compression Lug Kits
    - h. Handle Lock
    - i. Zone Selective Interlocking
- E. Branch Circuit Breakers:
1. General:
    - a. Circuit breakers shall be 80% rated unless otherwise indicated on the Panel Schedules.
    - b. Circuit breakers shall be UL Listed with amperage ratings, interrupting ratings, and number of poles as indicated on the associated panel schedules.
    - c. Molded Case Circuit Breakers: NEMA AB 1, bolt-on type thermal magnetic trip circuit breakers, with a common trip handle for each pole.
    - d. Provide circuit breakers UL listed as Type SWD for lighting circuits.
    - e. Provide circuit breakers UL listed as Type HACR for heating, air conditioning and refrigeration equipment branch circuits.
    - f. Circuit breakers shall have an overcenter toggle mechanism which will provide quick-make, quick-break contact action. Circuit breakers shall have thermal and magnetic trip elements in each pole. Two- and three-pole circuit breakers shall have common tripping of all poles.
    - g. There shall be two forms of visible trip indication.
    - h. The exposed faceplates of all branch circuit breakers shall be flush with one another.
    - i. Lugs shall be UL Listed to accept solid or stranded conductors.
    - j. Breaker Accessories: Provide when indicated on the Panel Schedules.
      - 1) Shunt Trip
      - 2) Auxiliary Switch
      - 3) Alarm Switch
      - 4) Ground Fault – Personal Protection (6-mA trip)
      - 5) Ground Fault – Equipment Protection (30-mA trip)
      - 6) Handle lock
      - 7) Zone Selective Interlocking
  2. Breaker Types:
    - a. Thermal Magnetic Circuit Breaker (TM):
      - 1) Molded case circuit breakers shall have integral thermal and instantaneous magnetic trip in each pole.
    - b. Electronic Trip Circuit Breaker with Long Time, Short Time, Instantaneous Setting Adjustments (E)



- 1) All electronic circuit breakers shall have the following time/current response adjustments: Long Time Pickup, Long Time Delay, Short Time Pickup, Short Time Delay and Instantaneous settings. Each adjustment shall have discrete settings (fully adjustable).
  - 2) Circuit breaker trip system shall be a microprocessor-based true rms sensing designed with sensing accuracy through the 13<sup>th</sup> harmonic.
  - 3) Long time pickup indication to signal when loading approaches or exceeds the adjustable ampere rating of the circuit breaker shall be provided.
  - c. Electronic Trip Circuit Breakers with real time metering (EP)
    - 1) All electronic trip circuit breaker requirements.
    - 2) Current (phases, neutral, average, maximum)
    - 3) Voltage (phase-to-phase, phase-to-neutral, average, unbalance)
    - 4) Power (active kW, reactive kVAR, apparent kVA, power factor)
    - 5) Energy (active kWh, reactive kVAR, apparent kVA)
    - 6) Frequency
    - 7) Total harmonic distortion (current, voltage)
    - 8) Metering accuracy shall be 1.5% current (above 600 amperes), 1.0% current (600 amperes and below), 0.5% voltage, and 2% energy. This accuracy shall be total system, including, but not limited to, CT and meter.
  - d. Mission Critical Circuit Breaker (M)
    - 1) All electronic trip circuit breaker requirements.
    - 2) Oversized frame size:
      - a) Minimum frame size of 400A for any breaker below 250A.
      - b) Minimum frame size of 600A for any breaker between 300A-400A.
    - 3) Delivers high levels of selective coordination for overcurrent tripping with previously tested combinations of downstream breaker types.
    - 4) Breakers must be listed to coordinate with the provided downstream breaker types installed in the downstream panels.
  - e. Provide electronic trip type if not indicated on the Panel Schedules.
- F. Enclosure: NEMA PB 1:
1. Interior Locations: Type 1
    - a. Type 1 Boxes:
      - 1) Boxes shall be hot zinc dipped galvanized steel constructed in accordance with UL 50 requirements. Unpainted galvanized steel is not acceptable.
      - 2) Boxes shall have removable blank end walls and interior mounting studs. Interior support bracket shall be provided for ease of interior installation.
    - b. Type 1 Cabinet Front:
      - 1) Front shall meet strength and rigidity requirements per UL 50 Standards. Front shall have ANSI 49 gray enamel electrodeposited over cleaned phosphatized steel.
      - 2) Trim front shall be hinged 1-piece with door or door in door. Mounting shall be flush, or surface as indicated.
      - 3) Trim front door shall have rounded corners and edges free of burrs.
      - 4) A clear plastic directory cardholder shall be mounted on the inside of the door.
      - 5) Locks shall be cylindrical tumbler type with larger enclosures requiring sliding vault locks with 3-point latching. All lock assemblies shall be keyed alike. One (1) key shall be provided with each lock.
      - 6) A clear plastic directory cardholder shall be mounted on the inside of door.
  2. Exterior Locations: Type 3R:

- a. Type 3R Boxes:
    - 1) Enclosures shall be constructed in accordance with UL 50 requirements. Enclosures shall be painted with ANSI 49 gray enamel electrodeposited over cleaned phosphatized steel.
  - b. Type 3R Cabinet Front:
    - 1) All doors shall be gasketed and equipped with a tumbler type vault lock and two (2) additional quarter turn fasteners on enclosures 59" or more in height.
    - 2) All lock assemblies shall be keyed alike.
    - 3) One (1) key shall be provided with each lock.
    - 4) A clear plastic directory cardholder shall be mounted on the inside of door.
- G. Panel Skirts:
- 1. 3-Sided with open back:
    - a. Sheet metal to cover conduits above and/or below a standard panelboard box when the panelboard is located against a wall. Sheet metal shall be same gauge and finish as panelboard and equipped with mounting flanges.
  - 2. 4-Sided:
    - a. Sheet metal to cover conduits above and/or below a standard panelboard box when the panelboard is located at the center of the room/area. Sheet metal shall be same gauge and finish as panelboard and equipped with mounting flanges.
  - 3. Provide when indicated on the Panel Schedules.

## 2.5 BRANCH CIRCUIT PANELBOARDS

- A. Lighting and Appliance Branch Circuit Panelboards: NEMA PB1, circuit breaker type.
- B. Interior:
- 1. Panelboard Bus: Copper, ratings as indicated.
    - a. Provide copper ground bus in each panelboard.
  - 2. Provide one (1) continuous bus bar per phase.
    - a. Each bus bar shall have sequentially phased branch circuit connectors suitable for bolt-on branch circuit breakers.
    - b. The bussing shall be fully rated.
    - c. Panelboard bus current ratings shall be determined by heat-rise tests conducted in accordance with UL 67.
  - 3. Panelboards shall be suitable for use as Service Equipment when application requirements comply with UL 67 and NEC Articles 230-F and -G.
  - 4. All current-carrying parts shall be insulated from ground and phase-to-phase by high dielectric strength thermoplastic.
  - 5. A solidly bonded copper equipment ground bar shall be provided.
  - 6. Interior trim shall be of dead-front construction to shield user from energized parts. Dead-front trim shall have filler plates covering unused mounting spaces.
- C. Minimum Integrated Short Circuit Rating:
- 1. Amperes Interrupting Current (AIC) Ratings: 120V, 208V, and 240V breaker – minimum AIC 10,000 amps unless otherwise noted on the Panel Schedules.
  - 2. Amperes Interrupting Current (AIC) Ratings: 277V and 480V breaker – minimum AIC 14,000 amps unless otherwise noted on the Panel Schedules.
- D. Main Circuit Breaker:

1. Electronic trip molded case standard function 80% rated circuit breaker. Provide 100% when indicated on the Panel Schedules.
  2. All electronic circuit breakers shall have the following time/current response adjustments: Long Time Pickup, Long Time Delay, Short Time Pickup, Short Time Delay, and Instantaneous settings. Each adjustment shall have discrete settings (fully adjustable) and shall be independent of all other adjustments. Provide Ground Fault Pickup and Ground Fault Delay when indicated on the Panel Schedules.
  3. Circuit breaker trip system shall be a microprocessor-based true rms sensing designed with sensing accuracy through the 13th harmonic.
  4. Long Time Pickup indication to signal when loading approaches or exceeds the adjustable ampere rating of the circuit breaker shall be provided.
  5. Breaker handle and faceplate shall indicate rated ampacity. Standard construction circuit breakers shall be UL Listed for reverse connection without restrictive line or load markings.
  6. Circuit breaker escutcheon shall have international I/O markings, in addition to standard ON/OFF markings. Circuit breaker handle accessories shall provide provisions for locking handle in the ON or OFF position.
  7. Lugs shall be UL Listed to accept solid or stranded conductors.
  8. Breaker Accessories: Provide when indicated on the Panel Schedules.
    - a. Shunt Trip
    - b. Under Voltage Trip
    - c. Ground Fault Shunt Trip
    - d. Auxiliary Switch
    - e. Alarm Switch
    - f. Mechanical Lug Kits
    - g. Compression Lug Kits
    - h. Handle Lock
    - i. Zone Selective Interlocking
- E. Branch Circuit Breakers:
1. Circuit breakers shall be 80% rated unless otherwise indicated on the Panel Schedules.
  2. Circuit breakers shall be UL Listed with amperage ratings, interrupting ratings, and number of poles as indicated on the associated panel schedules.
  3. Molded Case Circuit Breakers: NEMA AB 1, bolt-on type thermal magnetic trip circuit breakers, with a common trip handle for each pole.
  4. Provide circuit breakers with integral thermal and instantaneous magnetic trip in each pole.
  5. Provide circuit breakers UL listed as Type SWD for lighting circuits.
  6. Provide circuit breakers UL listed as Type HACR for heating, air conditioning, and refrigeration equipment branch circuits.
  7. Circuit breakers shall have an overcenter toggle mechanism which will provide quick-make, quick-break contact action. Circuit breakers shall have thermal and magnetic trip elements in each pole. Two- and three-pole circuit breakers shall have common tripping of all poles.
  8. There shall be two forms of visible trip indication.
  9. The exposed faceplates of all branch circuit breakers shall be flush with one another.
  10. Lugs shall be UL Listed to accept solid or stranded conductors.
  11. Breaker Accessories: Provide when indicated on the Panel Schedules.
    - a. Shunt Trip
    - b. Auxiliary Switch
    - c. Alarm Switch
    - d. Ground Fault – Personal Protection (6-mA trip)

- e. Ground Fault – Equipment Protection (30-mA trip)
  - f. Arc-Fault Circuit Interrupter
  - g. Handle lock
- F. Enclosure: NEMA PB 1:
- 1. Interior Locations: Type 1:
    - a. Type 1 Boxes:
      - 1) Boxes shall be hot zinc dipped galvanized steel constructed in accordance with UL 50 requirements. Unpainted galvanized steel is not acceptable.
      - 2) Boxes shall have removable endwalls with knockouts located on one end. Boxes shall have welded interior mounting studs. Interior mounting brackets are not required.
    - b. Type 1 Cabinet Front:
      - 1) Front shall meet strength and rigidity requirements per UL 50 Standards. Front shall have ANSI 49 gray enamel electrodeposited over cleaned phosphatized steel.
      - 2) Front shall be hinged 1-piece with door. Mounting shall be flush, or surface as indicated.
      - 3) Panelboards shall have MONO-FLAT fronts with concealed door hinges and mounted with trim screws. Front shall not be removable with the door locked. Doors on front shall have rounded corners and edges shall be free of burrs.
      - 4) Front shall have cylindrical tumbler type lock with catch and spring-loaded stainless-steel door pull. All lock assemblies shall be keyed alike. One (1) key shall be provided with each lock.
      - 5) A clear plastic directory cardholder shall be mounted on the inside of door.
  - 2. Stainless Steel Cabinet Front:
    - a. 304 stainless steel hinged 1-piece with door.
  - 3. Exterior Locations: Type 3R:
    - a. Type 3R Boxes:
      - 1) Enclosures shall be constructed in accordance with UL 50 requirements. Enclosures shall be painted with ANSI 49 gray enamel electrodeposited over cleaned phosphatized steel.
    - b. Type 3R Cabinet Front:
      - 1) All doors shall be gasketed and equipped with a tumbler type vault lock and two (2) additional quarter turn fasteners on enclosures 59" or more in height.
      - 2) All lock assemblies shall be keyed alike.
      - 3) One (1) key shall be provided with each lock.
      - 4) A clear plastic directory cardholder shall be mounted on the inside of door.
- G. Panel Skirts:
- 1. 3-Sided with open back:
    - a. Sheet metal to cover conduits above and/or below a standard panelboard box when the panelboard is located against a wall. Sheet metal shall be same gauge and finish as panelboard and equipped with mounting flanges.
  - 2. 4-Sided:
    - a. Sheet metal to cover conduits above and/or below a standard panelboard box when the panelboard is located at the center of the room/area. Sheet metal shall be same gauge and finish as panelboard and equipped with mounting flanges.
  - 3. Provide when indicated on the Panel Schedules.

## 2.6 ARC ENERGY REDUCTION SWITCH (AERS)

- A. Provide for 1200A and above panelboards.
- B. An ARC Energy Reduction Switch shall be made available mounted internally to the panelboard for breakers required per the National Electricals Code 240.87.
- C. Shall provide a Modbus TCP/IP connection to the breaker. Breaker data connection shall be available for connection to external monitoring software. Shall also provide a web page providing historical information, breaker status, breaker metering and maintenance data. Device shall be capable of sending breaker alarms via email and smart phone application.

## 2.7 CUSTOMER METERING

- A. Provide customer metering when indicated on the Panel Schedules or Power Riser Diagram.
  - 1. Manufacturers:
    - a. Square D Company Model PM5563
    - b. Eaton Model PXM 9410 Series
    - c. Siemens Model 9410 Series
  - 2. Digital Power Meter with 0.25% accuracy with the following features: A, V, kW, kVAR, kVA, PF, F kWh, kVARh, kVAh, KYZ, RS-485 Communications, Ethernet Communications THD, Demand, kWd kVARd, kVAd, date/time stamping, predicted power demand, onboard alarms, min/max readings, data log, and event log.
    - a. Onboard WEB pages to view real-time and logged information.
    - b. Connection point for Energy Management System.
  - 3. Circuit Monitor Installation:
    - a. Electronic Circuit Monitors shall be installed by the panelboard manufacturer for all circuits as indicated by the project drawings. Mount no lower than 48" and no higher than 72".
    - b. All control power, CT, PT, and communications wire shall be factory wired and harnessed within the panelboard.
    - c. Where external circuit connections are required, terminal blocks shall be provided, and the manufacturer's drawings must clearly identify the interconnection requirements including wire type to be used.
  - 4. Certification Description:
    - a. All equipment included as part of the power and trip history metering shall be UL listed.
      - 1) IEC 62053-23
      - 2) IEC 62052-11
- B. Provide necessary hardware to support monitoring of real-time operational data from trip units and customer meters in Panelboards.
  - 1. Hardware shall support protocol conversion from Modbus →BACNET/IP to support monitoring of data by customer BMS System.
  - 2. Hardware shall have the capability to monitor a minimum of 50 parameters from each installed trip unit via Modbus protocol and mapping these points to a common register map compatible with BACNET/IP protocol.
  - 3. Hardware shall have the capability to monitor a minimum of 20 Modbus devices concurrently.
  - 4. Hardware should be as manufactured by Sierra Montiro Protonode or approved equal.

- C. Provide Manufacturers Field Service to start-up, set-up, and train the Owner for all meters.

## 2.8 MULTI-CIRCUIT POWER METER

- A. Provide multi-circuit power meter when indicated on the Panel Schedules or Power Riser Diagram.
  - 1. Manufacturers:
    - a. Square D Company Model HDPM6000 Series
    - b. Eaton
  - 2. General Provisions: The meter shall be a microprocessor-based branch monitoring system supporting direct reading metered or calculated values for up to one hundred ninety-two (192) branch circuits or a combination of panelboards and sub-feed breakers.
  - 3. Measured Values:
    - a. The meter shall be able to support 1, 2, and 3 pole breakers
    - b. All the meter measured values shall be available through the HDPM Modbus interface
    - c. The meter shall provide at a minimum the following current values:
      - 1) Current per branch channel
      - 2) Current total per circuit
    - d. The meter shall provide at a minimum the following power values:
      - 1) Real power (per channel, circuit total)
      - 2) Reactive power (per channel, circuit total)
      - 3) Apparent power (per channel, circuit total)
      - 4) Power factor – true (per channel, circuit total)
      - 5) Maximum real power (per channel, circuit total)
    - e. The meter shall provide at a minimum the following energy values:
      - 1) Accumulated real kWh energy (per channel, circuit total)
- B. Provide enclosure with step down transformer powered by panelboard.
- C. Provide Manufacturers Field Service to start-up, set-up, and train the Owner for all meters.

## 2.9 INTEGRATED SURGE SUPPRESSION DEVICE

- A. Provide integrated surge suppression device when indicated on the Panel Schedule or Power Riser Diagram.
- B. Integral Surge Suppressor:
  - 1. SPD shall be component recognized in accordance with UL 1449 Fourth Edition. SPD shall be installed by and shipped from the electrical distribution equipment manufacturer's factory.
  - 2. The surge protection devices shall be bus mounted. If a breaker is needed to feed the integrally mounted SPDs, provide the breaker and wiring required.
  - 3. SPD shall provide surge current diversion paths for all modes of protection; L-N, L-G, N-G in WYE Systems.
  - 4. SPD shall be constructed as a per phase or single system module design. Each mode including N-G shall be protected by internal overcurrent and thermal overtemperature controls.
  - 5. SPD shall be UL 1449 listed and labeled with 200kA Short Circuit Current Rating (SCCR).
  - 6. SPDs shall be equipped with the following diagnostics:

- a. Visible indication of proper SPD connection and operation shall be provided. The indicator lights shall indicate which phase as well as which module is fully operable. The status of each SPD module shall be monitored on the front cover of the enclosure. A push-to-test button shall be provided to test each phase indicator. Push-to-test button shall activate a state change of dry contacts for testing purposes.
  - b. Audible alarm with on/off silence function and diagnostic test function (excluding branch).
  - c. Form C dry contacts
  - d. Surge Counter
7. SPD shall be complimentary UL 1283 listed for EMI/RFI filtering with minimum attenuation of -50dB at 100kHz.
  8. SPD shall have a warranty for a period of 10 years, incorporating unlimited replacement of suppressor parts. Warranty shall be the responsibility of the electrical distribution equipment manufacturer and shall be supported by their respective field service division.
- C. Internal Type H1 Unit: Non-Critical Load Applications:
1. Voltage Rating: 480Y/277V, 3-phase, 4-wire
  2. Application: Distribution Panelboard
  3. Minimum Modes of Protection: Common or Normal: L-N, L-G, L-L & N-G
  4. Maximum UL 1449 Voltage Protection Ratings (VPRs) for L-N, L-G, and N-G Modes of Protection: 1200 volts
  5. I-nominal Rating: 20kA
  6. Minimum Acceptable Single Pulse Surge Current Capacity: 240,000 amps per phase
  7. The following Models are acceptable:
    - a. Square D Company Model TVS4IMA24
    - b. Eaton Model SPD250480Y2A
    - c. Siemens Model TPS3E0525X2, TPS3E0125X002, TPS3E0225X2
- D. Internal Type H2 Unit: Non-Critical Load Applications:
1. Voltage Rating: 480Y/277V, 3-phase, 4-wire
  2. Application: Distribution or Branch Circuit Panelboard
  3. Minimum Modes of Protection: Common or Normal: L-N, L-G, L-L, & N-G
  4. Maximum UL 1449 Voltage Protection Ratings (VPR's) for L-N, L-G, & N-G Modes of Protection: 1200 volts
  5. I-Nominal Rating: 20kA
  6. Minimum Acceptable Single Pulse Surge Current Capacity: 160,000 amps per phase
  7. The following Models are acceptable:
    - a. Square D Company Model TVS4IMA16
    - b. Eaton Model SPD160480Y2A
    - c. Siemens Model TPS3E0520X2, TPS3E0120X002, TPS3E0120X2
- E. Internal Type H3 Unit: Non-Critical Load Applications:
1. Voltage Rating: 480Y/277V, 3-phase, 4-wire
  2. Application: Distribution or Branch Circuit Panelboard
  3. Minimum Modes of Protection: Common or Normal: L-N, L-G, L-L & N-G
  4. Maximum UL 1449 Voltage Protection Ratings (VPRs) for L-N, L-G, and N-G Modes of Protection: 1200 volts
  5. I-nominal Rating: 20kA
  6. Minimum Acceptable Single Pulse Surge Current Capacity: 120,000 amps per phase
  7. The following Models are acceptable:
    - a. Square D Company Model TVS4IMA12

- b. Eaton Model SPD120480Y2A
  - c. Siemens Model TPS3E0515X2, TPS3E0115X002, TPS3E0115X2
- F. Internal Type L1 Unit: Non-Critical Load Applications:
- 1. Voltage Rating: 208Y/120V, 3-phase, 4-wire
  - 2. Application: Distribution Panelboard
  - 3. Minimum Modes of Protection: Common or Normal: L-N, L-G, N-G
  - 4. Maximum UL 1449 Voltage Protection Ratings (VPRs) for L-N, L-G, and N-G Modes of Protection: 700 volts.
  - 5. I-nominal Rating: 20kA
  - 6. Minimum Acceptable Single Pulse Surge Current Capacity: 240,000 amps per phase
  - 7. The following Models are acceptable:
    - a. Square D Company Model TVS2IMA24
    - b. Eaton Model SPD250208Y2A
    - c. Siemens Model TPS3C0525X2, TPS3C0125X002, TPS3C0225X2
- G. Internal Type L2 Unit: Non-Critical Load Applications:
- 1. Voltage Rating: 208Y/120V, 3-phase, 4-wire
  - 2. Application: Distribution or Branch Circuit Panelboard
  - 3. Minimum Modes of Protection: Common or Normal: L-N, L-G, N-G
  - 4. Maximum UL 1449 Voltage Protection Ratings (VPRs) for L-N, L-G, and N-G Modes of Protection: 700 volts.
  - 5. I-nominal Rating: 20kA
  - 6. Minimum acceptable single pulse surge current capacity: 160,000 amps per phase
  - 7. The following models are acceptable:
    - a. Square D Company Model TVS2IMA16
    - b. Eaton Model SPD160208Y2A
    - c. Siemens Model TPS3C0520X2, TPS3C0120X002, TPS3C0220X2
- H. Internal Type L3 Unit: Non-Critical Load Applications:
- 1. Voltage Rating: 208Y/120V, 3-phase, 4-wire
  - 2. Application: Distribution or Branch Circuit Panelboard
  - 3. Minimum Modes of Protection: Common or Normal: L-N, L-G, N-G
  - 4. Maximum UL 1449 Voltage Protection Ratings (VPRs) for L-N, L-G, and N-G Modes of Protection: 700 volts.
  - 5. I-nominal Rating: 20kA
  - 6. Minimum Acceptable Single Pulse Surge Current Capacity: 120,000 amps per phase
  - 7. The following models are acceptable:
    - a. Square D Company Model TVS2IMA12
    - b. Eaton Model SPD120208Y2A
    - c. Siemens Model TPS3C0515X2, TPS3C0115X002, TPS3C0215X2

## 2.10 INTEGRATED CONTACTOR FOR PANELBOARDS

- A. Provide integrated contactor when indicated on the Panel Schedules or Power Riser Diagram.
- B. Contactor Main:
  - 1. The contactor main shall be an ASCO 920 for contactor ratings up to 225A. This remote-controlled switch shall be a single coil, electrically operated, mechanically held contactor. The main contactor shall be UL 67 listed for use in panelboards and rated 22,000 amps rms



symmetrical when used with a molded case breaker and 10,000 amps symmetrical when used with a current limiting fuse.

2. The contactor main shall be an ASCO 911 for contactor ratings between 225A and 400A. This remote-controlled switch shall be a single coil, electrically operated, mechanically held contactor. The main contactor shall be UL 67 listed for use in panelboards and rated 10,000 amps rms symmetrical when used with a 100 to 225-amp molded case breaker and rated 42,000 amps rms symmetrical when used with a 260 to 400-amp molded case breaker.
3. If the contactor is rated above 400A, the contactor shall be remote mounted in an enclosure to match the panelboard.

## 2.11 IDENTIFICATION

- A. Panelboard engraved plastic nameplates: Engraving stock, melamine plastic laminate, minimum 1/16" thick for nameplates up to 20 sq. in. and 1/8" thick for larger sizes.
  1. Engraved legend shall be black letters on white face.
  2. Punched or drilled for mechanical fasteners.
- B. Fasteners for Nameplates: Self-tapping, stainless-steel screws or No. 10/32, stainless-steel machine screws with nuts and flat and lock washers.

## PART 3 - EXECUTION

### 3.1 INSTALLATION

- A. Install panelboards in accordance with NEMA PB 1.1, NEC Standards, Local Codes, and Manufacturer's Instructions.
- B. Install panelboards plumb.
- C. Install recessed panelboards flush with wall finishes.
- D. Provide supports in accordance with Section 260529.
- E. Mount panelboards 6'-6" to the top of enclosure.
- F. Provide breaker closures for unused spaces in panelboards.
- G. Provide typed circuit directory for each branch circuit panelboard.
  1. Revise directory to reflect circuiting changes required to balance phase loads.
  2. Contractor to submit a copy of all panelboard directory schedules to the Owner, showing correct room name and/or number, for his approval. Contractor to make changes recommended by the Owner before final typed directories are installed in panelboards.
- H. Provide engraved plastic nameplates for each panelboard with 1/2" high lettering. Label shall include the following:
  1. Panel Name
  2. Voltage, Phase, Wire
  3. Location of the panel, switchboard or disconnect device which feeds the panelboard.

- I. Provide spare conduits out of each recessed panelboard to an accessible location above ceiling. Minimum spare conduits: 1 empty 1" per 4 poles of spare breakers and spaces. Identify each as SPARE.
- J. Provide accessories which prevent circuit breaker handles from being manually moved from the ON position for the handles of all circuit breaker which feed emergency lighting circuits, public address and intercom systems and uninterruptable power supplies.
- K. Ground and bond panelboard enclosure in accordance with Section 260526.
- L. Provide category 6 cable in 3/4" conduit from each meter to nearest MDF/IDF and terminate on both ends unless otherwise noted.
- M. Provide a dedicated 3-pole branch circuit breaker to feed TVSS unit (only when required by manufacturer). Circuit breaker size and wire size shall be per manufacturer recommendation. Connect leads to load side of the circuit breaker.
- N. Where replacing existing panels and existing conductors are to be connected to new CB's, provide extensions of conductors as needed using same color and size of wire using a butt-splice.
- O. Contractor shall trace all circuits listed as "Existing Circuits" and provide the correct description for the circuit. Existing Circuit will not be acceptable in the Final Panel Schedules.
- P. Provide main lug only and main breaker lugs that are sized to terminate the conductors shown on the plans. Where lug sizes are not available to terminate the scheduled conductors the Electrical Contractor (EC) shall provide compression reducing pin terminals that are rated for the application. Where termination lug quantities are not available for the equipment the EC shall provide insulated termination lug sets with the quantity of conductors as needed to connect to the equipment. Conductor lengths shall be kept to a minimum and sized to meet the largest lug size and quantity available on the equipment. In no case shall the conductors be sized less than the amp rating of the circuit breaker feeding the equipment. All parallel sets of raceways, junction boxes and associated accessories shall be included.

### 3.2 FIELD QUALITY CONTROL

- A. Perform field inspection and testing.
- B. Inspect for physical damage, proper alignment, anchorage, and grounding. Check proper installation and tightness of connections.
- C. Measure steady state load currents at each panelboard feeder; rearrange circuits in the panelboard to balance the phase loads within 10% of each other. Maintain proper phasing for multi-wire branch circuits.
- D. Check tightness of bolted connections, and circuit breaker connections using calibrated torque wrench or torque screwdriver per manufacturer's written specifications.
- E. Test ground fault systems per NEC Article 230.
- F. Apply ANSI 61 (or other appropriate color paint) as needed.

### 3.3 PANEL SCHEDULES

- A. As indicated in the Specifications or Drawings.
- B. Schedules show separate wire and conduit sizes for each individual branch circuit. The Contractor may install more than one circuit in a conduit and eliminate unused conduits. The Contractor is responsible for resizing the conduits and providing derated conductors per the requirements of ANSI/NFPA 70 – National Electrical Code.

### 3.4 ADJUSTING

- A. Adjust all operating mechanisms for free mechanical movement per manufacturer's specifications.
- B. Tighten bolted bus connections in accordance with manufacturer's instructions.
- C. **Provide Coordination Study to achieve required settings for adjustment. Verify equipment can be adjusted to meet the study requirements before releasing for production.**
- D. **Provide Fault Current Study to achieve AIC ratings for panelboards. Verify equipment meets the requirements of the study before releasing for production.**
- E. Measure steady state load currents at each panelboard feeder; rearrange circuits in the panelboard to balance the phase loads to within 10% of each other. Maintain proper phasing for multi-wire branch circuits.
- F. Adjust circuit breaker trip and time delay settings to values indicated in the Coordination Study.

### 3.5 CLEANING

- A. Upon completion of installation, inspect interior and exterior panelboards. Remove paint splatters and other spots, dirt, and debris from interior and exterior of panelboards.
- B. Touch up scratched or marred surfaces to match original finish.

### 3.6 SETUP/TRAINING

- A. Manufacturer's Setup: Provide and pay for the services of a factory-authorized service representative to start-up, set-up, and train the Owner for the equipment provided.

END OF SECTION 262416

## SECTION 262726 – WIRING DEVICES

### PART 1 - GENERAL

#### 1.1 SECTION INCLUDES

- A. Wall Switches
- B. Wall Plates

#### 1.2 REFERENCES

- A. ANSI/NFPA 70 - National Electrical Code
- B. NECA - Standard of Installation
- C. NEMA WD 1 - General Requirements for Wiring Devices
- D. NEMA WD 6 - Wiring Device -- Dimensional Requirements
- E. UL486A & UL486B
- F. WC-596
- G. WC-896

#### 1.3 SUBMITTALS FOR REVIEW

- A. Submit under provisions of Section 260010.
- B. Shop Drawings: The following items shall be submitted for review and approval:
  - 1. Submittal booklet to include the following:
    - a. Reference to Specification Section.
    - b. A list of all equipment to be provided and installed.
    - c. Data sheets to indicate voltage ratings, current rating, color and configuration with specific item and model numbers highlighted.

#### 1.4 SUBMITTALS FOR CLOSEOUT

- A. Submit under provisions of Section 260010.
- B. Submit record copy of all testing performed.

#### 1.5 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing the Products specified in this section with minimum three years documented experience.

## 1.6 REGULATORY REQUIREMENTS

- A. Conform to requirements of ANSI/NFPA 70.
- B. Provide Products listed and classified by Underwriters Laboratories, Inc., or a testing firm acceptable to the authority having jurisdiction as suitable for the purpose specified and indicated.
- C. All devices shall meet Federal Spec WC-596 and WC-896.

## 1.7 COORDINATION

- A. Coordinate outlet box type and heights with Specification Sections 260010 and 260533.

## 1.8 WARRANTY

- A. Provide the warranty specified in Section 260010.

## PART 2 - PRODUCTS

### 2.1 WALL SWITCHES

- A. Single Pole Switch: 120/277V, 20A:
  - 1. Hubbell Model HBL1221X
  - 2. Leviton Model 1221-2X
  - 3. Pass & Seymour Model PS20AC1-X
  - 4. Provide 2-pole, 3-way and 4-way switches of the same series as required.
- B. Color: Ivory unless directed otherwise by Architect.

### 2.2 WALL PLATES

- A. Metal Switch Cover Plate: Electrical Rooms, Mechanical Rooms, and Boiler Rooms:
  - 1. Cooper Crouse-Hinds Model TP512
  - 2. Appleton Model 8361
  - 3. Steel City Model RS-9
- B. Provide all devices, outlet boxes, junction boxes, etc with the appropriate type cover plate.
- C. Provide junior or jumbo size plates as required of the same series and type for all outlets installed in masonry walls.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Coordinate all device rough-in heights and locations with all other trades and finished room schedules as applicable. Report any conflicts to Architect/Engineer before rough-in.

- B. Verify conditions prior to beginning work.
- C. Verify that outlet boxes are installed at proper height.
- D. Verify that wall openings are neatly cut and will be completely covered by wall plates.

### 3.2 PREPARATION

- A. Provide extension rings to bring outlet boxes flush with finished surface.
- B. Clean debris from outlet boxes.

### 3.3 INSTALLATION

- A. Install in accordance with NECA “Standard of Installation” except for mounting heights. Refer to Section 260010 for mounting heights.
- B. Device’s termination may not be used to carry continuity of the branch circuit. All branch circuit wiring must be spliced and tailed out to devices.
- C. Install devices and assemblies’ plumb and level.
- D. Install switches with OFF position down.
- E. Connect wiring device grounding terminal to metallic outlet box with bonding jumper or branch circuit equipment grounding conductor for non-metallic boxes and isolated ground outlets.
- F. Connect wiring devices by wrapping solid conductor around screw terminal. Connect solid and stranded wires by inserting in screw tension pressure plate connectors. Provide solid tails or solderless connectors for stranded conductors where screw tension pressure plates are not available. Use of spring tension back wired terminals is unacceptable.
- G. Coordinate with trade responsible for painting to ensure final coat has been applied before installing wall plates.
- H. Provide all devices, outlet boxes, junction boxes, etc. with the appropriate type cover plate.
- I. Use junior or jumbo size plates for all outlets installed in masonry walls.
- J. Install galvanized steel plates on outlet boxes and junction boxes in unfinished areas, above accessible ceilings, and on devices installed in surface mounted boxes.

### 3.4 CONNECTIONS

- A. Ground equipment in accordance with Section 260526.
- B. Wire all devices in accordance with Section 260519.

- 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 and UL-486B.

### 3.5 FIELD QUALITY CONTROL

- A. Provide field inspection, testing, adjusting, and balancing.
- B. Inspect each wiring device for defects.
- C. Operate each wall switch with circuit energized and verify proper operation.
- D. Perform the following field tests and inspections:
  - 1. After installing wiring devices and after electrical circuitry has been energized, test for proper polarity, ground continuity, and compliance with requirements.
- E. Remove malfunctioning units, replace with new units, and retest as specified above.

### 3.6 ADJUSTING

- A. Adjust installed work as required to meet field conditions.
- B. Adjust devices and wall plates so they are flush and level.

### 3.7 CLEANING

- A. Clean installed work as required.
- B. Clean exposed surfaces to remove splatters and restore finish.

END OF SECTION 262726

## SECTION 262816 – ENCLOSED SWITCHES AND CIRCUIT BREAKERS

### PART 1 - GENERAL

#### 1.1 SECTION INCLUDES

- A. Fusible Switches
- B. Non-Fusible Switches
- C. Enclosed Circuit Breakers

#### 1.2 REFERENCES

- A. ANSI/NFPA 70 - National Electrical Code
- B. NECA - Standard of Installation (Published by the National Electrical Contractors Association)
- C. NEMA FU1 - Low Voltage Cartridge Fuses
- D. NEMA KS 1 - Enclosed Switches
- E. NETA ATS - Acceptance Testing Specifications for Electrical Power Distribution Equipment and Systems (published by the International Electrical Testing Association).
- F. NEMA AB 1 Molded Case Circuit Breakers

#### 1.3 SUBMITTALS FOR REVIEW

- A. Submit under provisions of Section 260010.
- B. Shop Drawings: The following items shall be submitted for review and approval:
  - 1. Submittal booklet to include the following:
    - a. Reference to Specification Section.
    - b. A list of all equipment to be provided and installed.
    - c. Data sheets to indicate type, switch ratings, dimensions and enclosure with the specific items or model numbers highlighted.

#### 1.4 SUBMITTALS FOR CLOSEOUT

- A. Submit under provisions of Section 260010.
- B. Maintenance Data: Include spare parts data, recommended maintenance procedures and intervals.
- C. Submit record copy of all testing performed.



## 1.5 QUALITY ASSURANCE

- A. Manufacturer's Installation Instructions: Install in accordance with application conditions and limitations of use stipulated by Product testing agency specified under Regulatory Requirements. Store, handle, protect, examine, prepare, install, and start the product in accordance with the manufacturer's instructions.

## 1.6 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing Products specified in this Section with minimum three years documented experience.

## 1.7 REGULATORY REQUIREMENTS

- A. Conform to requirements of ANSI/NFPA 70.
- B. Furnish products listed and classified by UL or testing firm acceptable to authority having jurisdiction as suitable for purpose specified and shown.

## 1.8 EXTRA MATERIALS

- A. Furnish extra materials described below that match products installed, are packaged with protective covering for storage and are identified with labels describing contents.
  - 1. Fuses: Provide 3 of each size and type of fuse installed.

## 1.9 WARRANTY

- A. Provide the warranty specified in Section 260010.

## PART 2 - PRODUCTS

### 2.1 MANUFACTURERS

- A. Square D Company
- B. Eaton
- C. Siemens

### 2.2 ENCLOSED SWITCHES

- A. Fusible Switch Assemblies: NEMA KS 1, Type HD load interrupter enclosed knife switch with externally operable handle interlocked to prevent opening front cover with switch in ON position. Handle lockable in OFF position. Fuse clips: Designed to accommodate specified fuses.
- B. Non-fusible Switch Assemblies: NEMA KS 1, Type HD load interrupter enclosed knife switch with externally operable handle interlocked to prevent opening front cover with switch in ON position. Handle lockable in OFF position.

### 2.3 MOLDED CASE CIRCUIT BREAKERS

- A. Circuit Breaker: NEMA AB 1.
- B. Service Conditions:
  - 1. Temperature: 104°F
  - 2. Altitude: 6000'
- C. Interrupting Rating: As indicated on the drawings.

### 2.4 MOLDED CASE CIRCUIT BREAKERS - TRIP UNITS

- A. Permanent (fixed) Trip Circuit Breaker: Provide circuit breakers with frame sizes 100 Amps and larger with permanent thermal and magnetic trip units in each pole.
- B. Provide type HCAR circuit breakers for air conditioning and refrigeration branch circuits.

### 2.5 MOLDED CASE CIRCUIT BREAKERS - OPTIONS AND FEATURES

- A. Provide accessories as scheduled, to NEMA AB 1.
- B. Handle Lock: Include provisions for padlocking.
- C. Load Side Terminations: Provide lugs on circuit breakers of sufficient size to terminate conductors scheduled or indicated on plans.
- D. Provide grounding lug in each enclosure.
- E. Provide Products suitable for use as service entrance equipment where so applied.
- F. Minimum Integrated Short Circuit Rating: Adjusted per Fault-Current Study:
  - 1. Amperes Interrupting Current (AIC) Ratings: 120V, 208V, and 240V breaker – minimum AIC 10,000 amps unless otherwise noted on the Drawings or Specifications.
  - 2. Amperes Interrupting Current (AIC) Ratings: 277V and 480V breaker – minimum AIC 18,000 amps unless otherwise noted on the Drawings or Specifications.
  - 3. The Contractor shall verify the AIC with the fault current study and adjust as required to comply with the study.

### 2.6 ENCLOSURE

- A. Enclosures: NEMA KS 1.
  - 1. Interior Dry Locations: Type 1
  - 2. Interior Wet Locations: Type 4
  - 3. Exterior Locations: Type 3R
  - 4. Kitchen: Stainless Steel
  - 5. Dishwashing Rooms/Areas: Stainless Steel

### 2.7 FUSES

- A. Refer to Section 262813.

## 2.8 LOAD SIDE TERMINATIONS

- A. Provide lugs on switches of sufficient size to terminate conductors scheduled or indicated on plans.

## 2.9 IDENTIFICATION

- A. Enclosed Switches and Circuit Breakers Engraved Plastic Nameplates: Engraving stock, melamine plastic laminate, minimum 1/16" thick for nameplates up to 20 sq. in. and 1/8" thick for larger sizes.
  - 1. Engraved legend shall be black letters on white face.
  - 2. Punched or drilled for mechanical fasteners.
- B. Fasteners for Nameplates: Self-tapping, stainless-steel screws, or #10/32 stainless-steel machine screws with nuts and flat and lock washers.

## PART 3 - EXECUTION

### 3.1 INSTALLATION

- A. Install disconnect switches where indicated and in accordance with NECA "Standard of Installation".
- B. Install fuses in fusible disconnect switches.
- C. Provide adhesive label on inside door of each switch indicating UL fuse class and size for replacement.
- D. Install enclosed circuit breakers where indicated, in accordance with manufacturer's instructions.
- E. Install enclosed circuit breakers plumb. Provide supports in accordance with Section 260529.
- F. Refer to Section 260010 for mounting heights.
- G. Provide engraved plastic nameplates for each enclosed switch and circuit breaker with 1/2" high lettering. Label shall include the following:
  - 1. Enclosed Switch or Circuit Breaker Name
  - 2. Voltage
  - 3. Size

### 3.2 FIELD QUALITY CONTROL

- A. Field inspection, testing, adjusting as required.
- B. Inspect and test in accordance with NETA ATS, except Section 4.
- C. Perform inspections and tests listed in NETA ATS, Section 7.5.
- D. Test and inspect each circuit breaker.

- E. Inspect and test each circuit breaker to NEMA AB 1.
- F. Inspect each circuit breaker visually.
- G. Perform several mechanical ON OFF operations on each circuit breaker.
- H. For record - verify circuit continuity on each pole in closed position.

### 3.3 ADJUSTING

- A. Adjust work as required.

END OF SECTION 262816

## SECTION 264313 – DISTRIBUTION SURGE PROTECTIVE DEVICES

### PART 1 - GENERAL

#### 1.1 SCOPE

- A. Work under this section consists of furnishing all materials necessary for the execution and complete installation of surge protective devices.

#### 1.2 REFERENCE STANDARDS

- A. Underwriters Laboratories, Inc. Standard No. 1449 (latest edition)
- B. IEEE Standard C62.45, C62.41 (latest edition)
- C. National Electrical Code Article 240-21 (Equipment complying with tap conductor rules) and Article 110-9 (Interrupting Capacity)
- D. Manufacturer shall be ISO 9001 Certified

#### 1.3 SUBMITTALS FOR REVIEW

- A. Submit under provisions of Section 260010.
- B. Shop Drawings: The following items shall be submitted for review and approval:
  - 1. Submit booklet to include the following:
    - a. Reference to specification section.
    - b. A list of all equipment to be provided and installed.
    - c. Data sheets to indicate rating, dimensions and finishes with the specific item or model number highlighted.
    - d. Data sheet shall also include type of unit and the protected panels name or reference number (I.E. Type H2 – Panels CP1, CP2 & CP3)

#### 1.4 SUBMITTALS FOR CLOSEOUT

- A. Submit under provisions of Section 260010.
- B. Record actual locations of equipment.
- C. Maintenance Data:
  - 1. Routing preventive maintenance schedule.
  - 2. Lists of special tools, maintenance materials, and replacement parts.
  - 3. Repair instructions for procedures to check, repair, and test equipment during typical malfunctions.
  - 4. Recommended cleaning methods, frequency, and materials.

## 1.5 WARRANTY

- A. Provide the warranty specified in Section 260010.

## PART 2 - PRODUCTS

### 2.1 GENERAL

- A. Units shall consist of parallel connections only. Series components are optional. All MOV's shall be individually fused to provide system redundancy.
- B. The surge protective device must be UL listed under the (UL 1449, Most Recent Edition), UL 1449, Third Edition Voltage protection rating, and short circuit current rating must be clearly stated.
- C. Metal Oxide Varistors (MOVs) are to be utilized as the primary suppression components.
  - 1. Suppression systems shall not employ any other technologies such as gas tubes, spark gap devices, selenium devices or filters.
- D. Enclosures:
  - 1. Units located in indoor environments shall be provided in heavy duty NEMA 1, or better rated enclosure.
  - 2. Units located in outdoor environments shall be provided in heavy duty NEMA 3R or better rated enclosure.
  - 3. Refer to the drawings to determine whether units are for indoor or outdoor applications.
  - 4. Refer to the drawings to determine whether units are for flush mount or surface mount installations.
  - 5. SDP units may be installed internal/integral to the gear.
- E. All units shall have active indicator lights, which shall extinguish when protection has failed.
- F. Units must be supplied as part of distribution equipment where UL listed as a complete assembly.
- G. Disconnect switch/overcurrent protection: See Part 3.1 for more information regarding this feature.
- H. 10-year unconditional warranty.

### 2.2 TYPE H1 UNIT – NON-CRITICAL, SERVICE ENTRANCE APPLICATIONS

- A. Voltage Rating: 480/277V, 3-phase, 4-wire.
- B. Application: Distribution Switchboard or Panelboard
- C. Minimum Modes of Protection: Common or Normal: L-N, L-G, L-L, & N-G
- D. Maximum UL 1449 Voltage Protection Ratings (VPRs) for L-N, L-G, and N-G Modes of Protection: 1200 volts.
- E. I-nominal Rating: 20kA

- F. Minimum Acceptable Single Pulse Surge Current Capacity: 240,000 amps per phase
- G. The following models are acceptable:
  - 1. Square D Company Model #SSP04EMA24
  - 2. Eaton Model SPD250480Y2K
  - 3. Siemens Model TPS3E12250X02
  - 4. ASCO Model 460277YP25ACAE10

### 2.3 TYPE H2 UNIT – NON-CRITICAL LOAD APPLICATIONS

- A. Voltage Rating: 480/277V, 3-phase, 4-wire
- B. Application: Distribution Switchboard or Panelboard
- C. Minimum Modes of Protection: Common or Normal: L-N, L-G, L-L, & N-G
- D. Maximum UL 1449 Voltage Protection Ratings (VPR's) for L-N, L-G, & N-G Modes of Protection: 1200 volts.
- E. I-Nominal Rating: 20kA
- F. Minimum Acceptable Single Pulse Surge Current Capacity: 160,000 amps per phase
- G. The following Models are acceptable:
  - 1. Square D Company Model SSP04EMA16
  - 2. Eaton Model SPD160480Y2K
  - 3. Siemens TPS3E12200X02
  - 4. ASCO Model 430277YP20ACSJ20

### 2.4 TYPE H3 UNIT – NON-CRITICAL LOAD APPLICATIONS

- A. Voltage Rating: 480/277V, 3-phase, 4-wire.
- B. Application: Distribution Switchboard or Panelboard
- C. Minimum Modes of Protection: Common or Normal: L-N, L-G, L-L, & N-G.
- D. Maximum UL 1449 Voltage Protection Ratings (VPRs) for L-N, L-G, and N-G Modes of Protection: 1200 volts.
- E. I-nominal Rating: 20kA
- F. Minimum Acceptable Single Pulse Surge Current Capacity: 120,000 amps per phase
- G. The following models are acceptable:
  - 1. Square D Company Model SSP04EMA12
  - 2. Eaton Model SPD120480Y2K
  - 3. Siemens TPS3E12150X02
  - 4. ASCO Model 430277YP20ACSJ20

## 2.5 TYPE L1 UNIT – NON-CRITICAL SERVICE ENTRANCE APPLICATIONS

- A. Voltage Rating: 120/208V, 3-phase, 4-wire.
- B. Application: Distribution Switchboard or Panelboard
- C. Minimum Modes of Protection: Common or Normal: L-N, L-G, L-L, & N-G.
- D. Maximum UL 1449 Voltage Protection Ratings (VPRs) for L-N, L-G, and N-G Modes of Protection: 1200 volts.
- E. I-nominal Rating: 20kA
- F. Minimum Acceptable Single Pulse Surge Current Capacity: 240,000 amps per phase
- G. The following models are acceptable:
  - 1. Square D Company Model SSP02EMA24
  - 2. Eaton Model SPD250208Y2K
  - 3. Siemens Model TPS3C12250X02
  - 4. ASCO Model 460120YP25ACAE10

## 2.6 TYPE L2 UNIT – NON-CRITICAL LOAD APPLICATIONS

- A. Voltage Rating: 120/208V, 3-phase, 4-wire.
- B. Application: Distribution Switchboard or Panelboard
- C. Minimum Modes of Protection: Common or Normal: L-N, L-G, L-L, & N-G.
- D. Maximum UL 1449 Voltage Protection Ratings (VPRs) for L-N, L-G, and N-G Modes of Protection: 1200 volts.
- E. I-nominal Rating: 20kA
- F. Minimum Acceptable Single Pulse Surge Current Capacity: 160,000 amps per phase
- G. The following models are acceptable:
  - 1. Square D Company Model SSP02EMA16
  - 2. Eaton Model SPD160208Y2K
  - 3. Siemens Model TPS3C12200X02
  - 4. ASCO Model 430120YP20ACAJ20

## 2.7 TYPE L3 UNIT – NON-CRITICAL LOAD APPLICATIONS

- A. Voltage Rating: 120/208V, 3-phase, 4-wire.
- B. Application: Distribution or Branch Circuit Panelboard
- C. Minimum Modes of Protection: Common or Normal: L-N, L-G, L-L, & N-G.



- D. Maximum UL 1449 Voltage Protection Ratings (VPRs) for L-N, L-G, and N-G Modes of Protection: 1200 volts.
- E. I-nominal Rating: 20kA
- F. Minimum Acceptable Single Pulse Surge Current Capacity. 120,000 amps per phase
- G. The following models are acceptable:
  - 1. Square D Company Model SSP02EMA12
  - 2. Eaton Model SPD120208Y2K
  - 3. Siemens Model TPS3C12150X02
  - 4. ASCO Model 430120YP15ACSJ20

### PART 3 - EXECUTION

#### 3.1 INSTALLATION

- A. The unit shall be installed in accordance with the manufacturer's printed instruction. All local and national codes and regulations must be observed.
- B. Units shall be installed of the same voltage rating as the intended protected equipment.
- C. Units shall be internally/integrally, surface, or flush mount to match the intended protected equipment.
- D. Installation of Units:
  - 1. Install separately enclosed units immediately adjacent to or within the protected panel with the shortest possible lead length without any unnecessary elbows, bends or turns. Where conduit is necessary to install lead connection conductors, leads shall be installed in conduit as required.
  - 2. Provide a dedicated 3-pole branch circuit breaker in all protected panels for connection. Circuit breaker size and wire size shall be per manufacturer recommendation. Connect leads to the load side of the circuit breaker.
  - 3. If space is not available in protected panel, provide a 3-pole disconnect switch between the protected panel and the SPD for connection. Fuse and wire size shall be per manufacturer recommendation. Connect leads from the disconnect switch to the main bus (or distribution bus), whichever allows for the shortest total lead length) of the protected panel.

#### 3.2 LOCATIONS

- A. See the power riser drawings for all SPD unit locations and types.

END OF SECTION 264313