PROJECT SPECIFICATIONS
PROJECT MANUAL

FOR

Dosker B Building
Electrical Upgrades

PROPOSAL NO. 1538

For

LOUISVILLE METRO HOUSING AUTHORITY
CAPITAL IMPROVEMENTS DEPARTMENT

420 South Eighth Street
Louisville, Kentucky 40203

LISA OSANKA
Executive Director and Contracting Officer

February 2021

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SECTION A

ADVERTISEMENT / INVITATION FOR BIDS

The Louisville Metro Housing Authority of Louisville, Kentucky, will receive sealed bids, in triplicate, for the contract work entitled:

Dosker B Building Electrical Upgrades
Proposal No. 1538

BID OPENING: Bids will be received until **10 a.m., local time, Tuesday, February 23, 2021**. Due to the ongoing Coronavirus (COVID-19) Outbreak, following guidelines from State and Local Authority, the Louisville Metro Housing Authority (LMHA) will be allowing bidders to drop off the "Sealed Bids" at 3223 South 7th Street Road as it is customary; however, bidders *will not be able to remain in the building* for public opening. Instead, the LMHA would like to invite all bidders and public to participate via internet or by phone as follows:

a. **Internet (video and audio), using the following link:**
https://zoom.us/j/99560701274?pwd=aGZabWFrdXlILzJrK2RvclhUektadz09
Meeting ID: 955 6070 1274
Passcode 846353

b. **Phone (audio only), by dialing the following number:** (929) 436-2866; or (312) 626-6799
Meeting ID: 955 6070 1274
Passcode 846353

Only bidder's prices and verification of submittal of required forms will be revealed at that time. Individuals wishing to review bid information must submit a written request to LMHA's Purchasing Agent at Webb@LMHA1.org.
Bidder's financial information will not be revealed at any time.

Direct procedural questions to:

Mike Lyall, Program Manager
Capital Improvements Department
Louisville Metro Housing Authority
420 S. Eighth Street, Louisville, KY 40203
(502)569-4044
Email: Lyall@LMHA1.org

Questions concerning technical issues should be directed to:

Kevin Matthews
Sherman Carter Barnhart Architect, PLLC
2405 Harrodsburg Road, Lexington, KY 40504
(859) 224-1351
kmatthews@scbarchitects.com

For the use of contractors, subcontractors, and material suppliers, the project plans and specifications are on file for reference, at:

CMD: 30 Technology Parkway South, Suite 100, Norcross, GA 30092 Phone: 1-800-424-3996, https://www.constructconnect.com/contact-us/;

Builders Exchange of Louisville: 2300 Meadow Drive, Louisville, KY 40218, Phone: (502) 459-9800, Fax: (502) 459-9803, http://www.bxkentucky.com/;

McGraw – Hill Construction Dodge / AGC: 4300 Beltway Place, Suite 150, Arlington TX 76018, Phone: 1-800393-6343, Email: support@construction.com, https://www.construction.com/contact;

Allied Construction Industries: 3 Kovach Drive, Cincinnati, OH Phone: (513) 221-8020, Fax: (513) 221-8023; and

BidTool / CDC: 2001 9th Avenue, 2nd Floor Vero Beach FL 32960 1-800-652-0008 or email at: service@cdcnews.com, https://www.cdcnews.com/bidtool-lmp.

Official bidding documents may be obtained from the Louisville Metro Housing Authority's e-procurement Marketplace free of charge:

https://ha.economicengine.com/requests.html?company_id=9038&nocache=52706282 , or at http://www.lmha1.org/bid_opportunities/index.php

The Louisville Metro Housing Authority is an equal opportunity employer and is committed to affirmative action in the involvement of minority business to the maximum extent possible. LMHA encourages MBE, WBE and DBE firms or individuals to respond. Non-minority firms or individuals are requested to seek participation of minority, women and disabled owned businesses as subcontractors or in partnership arrangements to the maximum extent possible. The specifications contain detailed information regarding MBE, WBE and DBE participation and prevailing wage requirements.

PRE-BID CONFERENCE: Due to the ongoing Coronavirus (COVID-19) Outbreak, following guidelines from State and Local Authority, the Louisville Metro Housing Authority (LMHA) will not be conducting an *in-person* public Pre-Bid Conference as it is customary. Instead, the LMHA would like to invite all bidders and public to participate in the Pre-Bid Conference via internet or by phone at **10:00 a.m., local time, Tuesday, February 9, 2021** as follows:

a. **Internet (video and audio), using the following link:**
https://zoom.us/j/99761115259?pwd=UUUyTkZYWnhMQ0c2VUZMQStiaTVNQT09
Meeting ID: 997 6111 5259
Passcode 506881

b. **Phone (audio only), by dialing the following number:** (929) 436-2866; or (312) 626-6799
Meeting ID: 997 6111 5259
Passcode 506881

Contractor may review Dosker B Building on February 10th from 10:00 am until noon, and on February 11th from 10:00 am until noon; all bidders are expected to follow the guidelines from the CDC, State and local authorities regarding the ongoing Coronavirus (COVID-19) Outbreak.

The Louisville Metro Housing Authority reserves the right to accept any bid, or portion thereof, reject any or all bids, to waive any informalities in bids received where such acceptance, rejection, or waiver is considered to be in the best interest of the Louisville Metro Housing Authority and to reject any bid where evidence or information submitted by the bidder does not satisfy the Louisville Metro Housing Authority that the bidder is qualified, capable of carrying out the requirements of the Contract Documents or is in any manner unresponsive in the preparation of its bid. By: Lisa Osanka, Executive Director and Contracting Officer

END OF SECTION A

SECTION B

INSTRUCTIONS TO BIDDERS FOR CONTRACTS
PUBLIC AND INDIAN HOUSING PROGRAMS
(Form HUD-5369)

AND

REPRESENTATIONS, CERTIFICATIONS, AND OTHER STATEMENTS OF BIDDERS
PUBLIC AND INDIAN HOUSING PROGRAMS
(Form HUD-5369-A)

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

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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 (applicable to construction and equipment contracts exceeding $25,000)

All bids must be accompanied by a negotiable bid guarantee which shall not be less than five percent (5%) 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 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.

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

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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)(l) 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)(l) 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.

(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)

SECTION C

SUPPLEMENTAL INSTRUCTIONS TO BIDDERS

SUPPLEMENTAL INSTRUCTIONS TO BIDDERS

Any bidder who submits the *Form of Bid*, consisting of *Section D* of these documents, certifies that it understands that the bid form must be fully and properly completed to be considered responsive. The Bidder also certifies that it fully understands the points set out below and warrants that it will comply with same. Failure to comply with any portion of this section may be grounds for rejection of bid. Those points are as follows:

I. Substitutions

A. Generally

In most circumstances, LMHA will consider substitute materials in lieu of those specified in the solicitation. Bidders wishing to submit bids inclusive of substitute materials are directed to Section J for guidance.

II. Bid Preparation and Submission

A. Alternate Bids

Paragraph 1. (f) of the *Instructions to Bidders for Contracts*, HUD-5369, is revised as follows:

Unless expressly authorized elsewhere in this solicitation, alternate bids and/or qualifying statements may not be considered.

III. Amendments to Invitations for Bids

A. Acknowledgment of Receipt

Paragraph 3. (b) of the *Instructions to Bidders for Contracts*, HUD-5369, is revised as follows:

Bidders must acknowledge receipt of all amendments (addenda), if any, in the space provided on the *Form of Bid* provided in the Official Bid Package. Bids which fail to acknowledge the Bidder's receipt of any amendment may result in rejection of the bid if the amendment(s) contained information that substantively changed the PHA's requirements.

B. Availability and Delivery

Paragraph 3. (c) of the *Instructions to Bidders for Contracts*, HUD-5369, is deleted and replaced by the following language:

Amendments will be on file in the offices of the PHA as far in advance of the bid opening date as is feasible. Amendments will be transmitted to plan rooms (listed in Section A, *Advertisement for Bids*), plan holders and will be posted on LMHA's Website / e-Procurement Marketplace as soon as possible after they are generated and will be included in all bid packages released thereafter.

IV. Responsibility of Prospective Contractor

A. Evaluation Factors

Paragraph 4. (a)(1), (2), (3), and (4) of the *Instructions to Bidders for Contracts*, HUD-5369, are deleted and replaced by the following, non-exclusive list:

1. Possession of adequate financial resources, or the ability to obtain such resources, as required for the performance of the work under this project;

2. Ability to fulfill all bonding and insurance requirements of this project;

3. Past performance and conduct on LMHA projects;

4. Ability to comply with the required performance schedule, taking into consideration all existing business commitments;

5. Record of satisfactory performance (particularly with reference to participation on any previous or current Louisville Metro Housing Authority projects);

6. Record of integrity and business ethics;

7. Qualification and eligibility to receive Government contracts;

8. Possession of regularly employed personnel with the experience, trade skills, and proficiency needed to perform the work as specified;

9. Possession of the necessary organization, experience, operational controls, and technical skills; and

10. Possession of adequate production capacity, construction and technical equipment, and facilities.

The Louisville Metro Housing Authority may, as a condition of determining a bidder's responsibility, require a bidder or any proposed subcontractor to submit information demonstrating that entity's possession of the above qualifications.

V. Late Submissions, Modifications, and Withdrawal of Bids

A. Evidence of Time of Receipt

Paragraph 5. (d) of the *Instructions to Bidders for Contracts*, HUD-5369, is supplemented as follows:

The official timepiece of the Louisville Metro Housing Authority is the clock in the Conference Room of the Louisville Metro Housing Authority's Purchasing Department, located at 3223 South Seventh Street Road, Louisville, Kentucky 40216 (or other such device as may be located there and designated for the purpose of official time keeping).

B. Mistakes in Bids

Paragraph 5. (h) is added to *Instructions to Bidders for Contracts*, HUD-5369, as follows:

A low bidder alleging a non-judgmental mistake may be permitted to withdraw its bid if the mistake is clearly evident on the face of the bid document, but the intended bid price is unclear or the bidder submits convincing evidence that a mistake was made. Subsequent to the bid opening, no changes in bid prices or other provisions of bids prejudicial to the interest of the Louisville Metro Housing Authority, the integrity of the Louisville Metro Housing Authority's procurement process, or fair and open competition, shall be permitted.

VI. Service of Protest

A. Delivery of Protest to Owner

Paragraph 7. (b) of the *Instructions to Bidders for Contracts*, HUD-5369, is supplemented as follows:

Lisa Osanka, Contracting Officer
Louisville Metro Housing Authority
420 S. Eighth Street
Louisville, KY 40203

B. Grounds for Protest

Paragraph 7. (d) is added to the *Instructions to Bidders for Contracts*, HUD-5369, as follows:

Written protests must state with particularity the specific grounds upon which the protest is founded. Specific grounds may include, but are not necessarily limited to: late submittal, failure to submit all required information, submittal of alternate or qualified bids, etc.

PROTESTS OF SOLICITATIONS must be delivered to the Louisville Metro Housing Authority prior to the time of the bid opening.

PROTESTS OF CONTRACT AWARD must be delivered to the Louisville Metro Housing Authority not more than ten (10) calendar days after the contract is awarded.

VII. Contract Award

A. Deletion of Paragraph 8. (g)

Paragraph 8. (g) is hereby deleted from the *Instructions to Bidders for Contracts*, HUD-5369, and is henceforth without force or effect.

VIII. Bid Guarantee

A. Return of Bid Bond

The following additional language is added to paragraph 9 of the *Instructions to Bidders for Contracts*, HUD-5369:

Bidders desiring the return of their bid bonds must submit a written request to:

Steve Webb
Louisville Metro Housing Authority

420 S. Eighth Street
Louisville, KY 40203

IX. Assurance of Completion

A. Replacement of Paragraph 10. (a)

Paragraph 10 of the *Instructions to Bidders for Contracts*, HUD-5369, is revised as follows:

1. Paragraphs 10. (a)(1), 10.(a)(2), 10.(a)(3), 10.(a)(4), and 10.(a)(5) are hereby deleted and are henceforth without force or effect.

2. The above referenced portions of Paragraph 10. (a) are replaced by the following language:

This assurance must be separate Payment and Performance Bonds, each in a penal sum of 100% of the contract price. Such assurance shall be provided on the forms included in Sections "G" and "H".

X. Proposed Subcontractors

A. Identification of Proposed Subcontractors in Bid

Paragraph 13(a) is hereby added to the *Instructions to Bidders for Contracts*, HUD-5369, as follows:

1. A listing of proposed subcontractors (including third tier subcontractors), for each category of work intended to be subcontracted, must be included in the *Form of Supplemental Bid Information*. This information MUST BE SUBMITTED WITH THE BID PACKAGE.

2. If the Bidder proposes to employ multiple subcontractors in the same category of work, each of the proposed subcontractors must be listed in the *Form of Supplemental Bid Information*. If the Bidder does not intend to employ subcontractors on this project, it must state "No Subcontractors Intended" on the forms provided. Failure to comply with these requirements is ground for rejection of the bid.

3. If instructed to do so, the apparent low bidder shall submit, within 24 hours after the bids are opened a completed Form LMHA Form 7000, *Request for Acceptance of a Subcontractor*, for each proposed subcontractor. Failure to submit this information is ground for rejection of the bid.

4. Proposed replacements for submitted subcontractors shall not be considered unless 1) the Louisville Metro Housing Authority rejects an originally proposed subcontractor or 2) a previously accepted subcontractor proves incapable of performing the work or shows cause for removal under the conditions of the contract. Replacement of a

subcontractor, for any reason, shall be done at no additional cost to the Louisville Metro Housing Authority.

5. Subcontractors not identified at the time of bid, as described in Subsection (a) above, are not eligible to work on this project unless specific approval is granted, in writing, by the Louisville Metro Housing Authority. If such approval is granted all of the above referenced provisions, and all related provisions, shall apply to the substituted subcontractor(s) as if they had been submitted at the time of bid.

B. Exception to Paragraph 13(a)

Paragraph 13(b) is hereby added to the *Instructions to Bidders for Contracts*, HUD-5369, as follows:

1. The requirements of Paragraph 13(a) notwithstanding, bidders are not required to identify waste haulers, if any, proposed to perform waste hauling incidental to and as a service of waste storage, treatment, or disposal facilities, to be considered responsive.

2. The preceding provisions apply only to the bidding process. The bidder, if any, awarded the Contract, must identify all proposed subcontractors in accordance with the applicable provisions of the Contract and shall not employ any subcontractor unless and until LMHA approves such entity.

XI. Lead-Based Paint

A. Use Prohibited

Paragraph 14 is hereby added to the *Instructions to Bidders for Contracts*, HUD-5369, as follows:

Any bidder awarded a Louisville Metro Housing Authority contract for modernization shall comply with 24 CFR Part 35 prohibiting the use of lead-based paint.

The construction and rehabilitation of residential structures with assistance provided under this Agreement is subject to the HUD Lead-Based Paint regulations, 24CFR Part 35. Rehabilitation of residential structures shall be made subject to the provisions for the elimination of lead-based paint hazards under Subparts A, B, J, K, and R of said regulations.

XII. Responsive Bidder

A. General Requirements

Paragraph 17(a) is hereby added to the *Instructions to Bidders for Contracts*, HUD-5369, as follows:

To be considered responsive, a bid must comply in all respects with the requirements of the Official Bid Package, submit all required documentation and certificates, and acknowledge any

addenda thereto so that all bidders stand on equal footing and the integrity of the competitive procurement system is maintained.

XIII. Part 5 Requirements

Paragraph 20 is hereby added to the *Instructions to Bidders for Contracts*, HUD-5369, as follows:

This Agreement is subject to the requirements set forth in 24 CFR Part 5, including but not limited to:

1. Section 5.105(c) prohibiting the participation of debarred, suspended or ineligible contractors or participants in the programs covered by this Agreement. See 24 CFR 2.2424 for the prohibitions on the use of debarred, suspended, or ineligible contractors or participants in HUD programs.
2. Section 5.105 (d) concerning the requirements of The Drug-Free Workplace Act of 1988 (41 USC 701 et seq.) and HUD's implementing regulations at 24 CFR part 21.
3. Section 5.212 concerning the requirements of the Privacy Act (5 USC 552a) concerning the collection, maintenance, dissemination and use of social security numbers, EINs and other income information of applicants, and the providing of a Privacy Act Notice to same.

XIV. Representations, Certifications, and Other Statements of Bidders

A. Items of Special Interest

Bidders are advised to thoroughly familiarize themselves with and ensure completion of the following portions of Form HUD-5369-A:

Paragraph 1. (b)(2)(i); Paragraph 7. (a), (b), and (c); Paragraph 8.(a) and (b); Paragraph 13.

XV. Certificate of Independent Price Determination

A. Statement Regarding Disclosure

Paragraph 1. (c) of the *Representations, Certifications, and Other Statements of Bidders*, HUD-5369-A, is replaced by the following language:

Bidders shall not delete or modify Paragraph 1. (a)(2) and any disclosure pertaining thereto must be submitted with the bid and must bear the signature of the bidder's authorized agent.

B. Non-Collusive Affidavit

Paragraph 1. (d) of the *Representations, Certifications, and Other Statements of Bidders*, HUD-5369-A, is applicable to all contracts, regardless of dollar amount. Subsection 1. (d)(2) is hereby deleted and henceforth is without force or effect. Subsection 1. (d)(1) is revised as follows:

Each bidder shall complete the *Non-Collusive Affidavit* form, provided in the Official Bid package, and submit that form with its bid. Failure to submit this document is ground for rejection of the bid.

XVI. Required Bid Document Submission Procedure

*A. Bids will be received until **10:00 a.m., local time, February 23, 2021** by the Louisville Metro Housing Authority (Purchasing Department), 3223 South Seventh Street Road, Louisville, Kentucky 40216. Items required by 10:00 a.m. on day of bid opening by all bidders are noted below.*

1. Section B
   - Representations, Certifications, And Other Statements of Bidders / Form HUD-5369-A (all pages)
2. Section D (all pages)
3. Section E
   - Supplemental Bid Information (page 1 of 11)
   - Bidder's Qualifications (pages 5-6 of 11)
   - Previous Participation Certification / Form HUD 2530 (pages 7-10 of 11)
4. Section M
   - If applicable – Legitimacy of Joint Venture (Page 24 of 27)
   - If applicable Details of Joint Venture Agreement (Page 25 of 27)

LMHA shall notify the apparent low bidder, who shall be required to provide "2nd Day Submissions" for review and determination of acceptability.

B. Items required by 2:00 p.m. on day after bid opening – February 24, 2021

All items noted below are due by 2:00 p.m. at the LMHA Main Office located 420 South 8th Street, Louisville, KY 40203 (Attn: Phil Reidinger)

1. Section E
   - List of Materials and Equipment (page 2 of 11)
   - List of Proposed Subcontractors/List Of Proposed Third Tier Subcontractors (page 3 of 11)
   - Affidavit of Sub-bidder (page 4 of 11)
2. Section M
   - Schedule Of MBE, FBE, and DBE Participation (page 15 of 25)
   - MBE, FBE & DBE Waiver Request Information Sheet (page 16 of 25)
   - List of Proposed Subcontractors (page 17 of 25)
   - Employment Demographics (page 18 of 25)
   - Agreement to Notify LMHA of Job Openings (page 20 of 25)
   - Statement of Intent to Perform as a Minority Business Enterprise Contractor / Subcontractor (page 21 of 25)
   - Affidavit of Minority Business Enterprise (page 22 of 25)

END OF SECTION C

SECTION D

FORM OF BID

- Form of Bid
- Form of Bid Bond
- Certificate as to Corporate Principal
- Affidavit of Non-Collusion

FORM OF BID

Louisville Metro Housing Authority
420 South Eighth Street
Louisville, Kentucky 40203

Gentlemen:

We, the signatories, state that we or our representatives have visited the sites of the proposed work on _____, 20_____ and have fully familiarized ourselves with all conditions affecting the cost of the work and with the specifications [including Advertisement for Bids, Instructions to Bidders (HUD-5369), Representations, Certifications, and Other Statements of Bidders (HUD-5369-A), Supplemental Instructions to Bidders, MBE Requirements, Bid Proposal and forms, to include this page, Form of Bid Bond, Non-Collusive Affidavit, Schedule of MBE Participation, Schedule of MBE Unavailability, Addenda, if any thereto, Supplemental Bid Information, Form of Contract, Form of Performance Bond, Form of Payment Bond, General Conditions (HUD-5370), Supplemental General Conditions, Special Conditions, Specifications, Project Manual and Drawings on file in the Capital Improvements Department Louisville Metro Housing Authority, Kentucky, and having examined the work sites and the documents titled above hereby propose to furnish all labor, materials, equipment and services required to complete the work entitled:

Dosker B Building Electrical Upgrades
PROPOSAL No. 1538

In submitting this bid it is understood and agreed that the Louisville Metro Housing Authority reserves the right to accept any bid, or portion thereof, reject any or all bids, to waive any informalities in bids received where such acceptance, rejection, or waiver is considered to be in the best interest of the Louisville Metro Housing Authority and to reject any bid where evidence or information submitted by the bidder does not satisfy the Louisville Metro Housing Authority that the bidder is qualified, capable of carrying out the requirements of the Contract Documents or is in any manner unresponsive in the preparation of its bid.

If written notice of intent to award the contract connected with this bid is mailed, telegraphed or delivered to the undersigned within sixty (60) days after the opening thereof, or at any time thereafter, unless the bid is withdrawn in writing, the undersigned agrees to execute and deliver a contract in the prescribed form and furnish the required bonds and meet other stipulated requirements within ten (10) days after the contract is presented to him/her for signature.

"FORM OF BID BOND"

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

_____
(NAME OF PRINCIPAL)
as Principal, and

_____
(NAME OF SURETY)

as Surety, are held and firmly bound unto the Louisville Metro Housing Authority, Louisville, Kentucky, hereinafter called the "LMHA", in the penal sum of _____ DOLLARS, lawful money of the United States of America, for the payment of which sum well 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 _____, 20_____, for:

Dosker B Building Electrical Upgrades
PROPOSAL No. 1538

NOW, THEREFORE, the Principal shall not withdraw said bid within the sixty (60) day period specified therein after the opening of the same, and shall within the ten (10) day period specified after the prescribed forms are presented to him/her for signatures, enter into a written contract with the LMHA 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 sixty (60) day period specified, or the failure to enter into such contract and give such bond within the time specified, the Principal shall be obligated and shall pay the LMHA the difference between the amount specified in said bid and the amount for which the LMHA may procure the required work or supplies, or both, if the latter amount be in excess of the former, as the full force and virtue of this Bid Bond shall so provide.

NOTE: Failure to complete and submit THIS bond form is ground for bid rejection.

IN WITNESS WHEREOF, the above-bonded parties have executed this instrument under their several seals this _____ day of _____, 20_____, the name and corporate seal of each incorporated party being hereto affixed and these presents duly signed by its undersigned representative, pursuant to authority of its governing body.

PRINCIPAL

Name _____

Business Address of Corporate Principal _____

BY: _____
(Representative's Signature)

AFFIX CORPORATE SEAL

TITLE: _____

ATTEST: _____
(Signature)

NAME: _____
(Print or type)

SURETY

Name and Business Address of **Corporate Surety:** _____

BY: _____
(Representative's Signature)

AFFIX CORPORATE SEAL

TITLE: _____

ATTEST: _____
(Signature)

NAME: _____
(Print or type)

POWER OF ATTORNEY FOR PERSON SIGNING FOR SURETY COMPANY MUST BE ATTACHED HERETO.

NOTE: Failure to complete and submit THIS form is ground for bid rejection.

CERTIFICATE AS TO CORPORATE PRINCIPAL

I, _____, certify that I am the
(Printed name of Corporate Officer)

_____ of the Corporation named as
(Title of Corporate Officer)

Principal in the within bond; that _____who,
(Representative who signed as Principal above)

signed the said bond on behalf of the Principal was then the _____
(Title of Representative)

of said Corporation; that I knew his/her signature, and his/her signature thereto is genuine;

and that said bond was duly signed, sealed and attested to for and in behalf of said

Corporation by Authority of its governing body.

AFFIX CORPORATE SEAL

BY: _____
(Signature of Corporate Officer)

TITLE: _____
(Print or Type)

Instructions: "Corporate Officer" means any authorized officer of the firm submitting this bid, **except** the person who signed the bid bond as "Representative" on behalf of the bidding firm.

"Name of Representative" means the person who signed the bid bond (preceding page) on behalf of the bidding firm.

Names and titles of persons associated with the Surety should not appear on this page.

NOTE: Failure to complete and submit THIS form is ground for bid rejection.

AFFIDAVIT OF NON-COLLUSION

State of _____,

County of _____,

_____, being first duly sworn,
(Printed name of Representative)

deposes and says:

That he or she is _____
(A Partner, Officer, etc. of bidding firm)

of the party making the foregoing proposal or bid, that such proposal or bid is genuine and not collusive or sham; that said Bidder has not colluded, conspired, connived, or agreed, directly or indirectly, with any bidder or person, to submit a sham bid or to refrain from bidding, and has not in any manner, directly or indirectly, sought by agreement or collusion, or communication or conference with any person, to fix the bid price of affiant or any other bidder, or to fix any overhead, profit, or cost element of said bid price, or of that of any other bidder, or to secure any advantage against the Louisville Metro Housing Authority or any person interested in the proposed contract; and that all statements in said proposal or bid are true.

BY: _____
(* Signature)

Subscribed and sworn to before me this _____ day

of _____, 20___.

Signature of Notary: _____

AFFIX SEAL
OF NOTARY

My commission expires: _____.

* Signature of: 1. Bidder, if the bidder is an individual; 2. Partner, if the bidder is a partnership; or 3. Corporate Officer, if the bidder is a corporation.

NOTE: Failure to complete and submit THIS form is ground for bid rejection.

The Bidder represents that it ___ **has** ___ **has not** participated in a previous contract or subcontract subject to the equal opportunity clause prescribed by Executive Orders 10925, 11114, or 11246, or the Secretary of Labor; that it ___ **has** ___ **has not** filed all required compliance reports; and that representations indicating submittal of required compliance reports, signed by proposed subcontractors, will be obtained prior to subcontracts being awarded. The above representation need not be submitted in connection with contracts or subcontracts which are exempt from the clause.

Certification of Non-Segregated Facilities - By signing 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, or will be, maintained. The Bidder agrees that a breach of this certification is a violation of the Equal Opportunity clause of the Contract Documents. As used in this certification, the term "segregated facilities" means any waiting rooms, work areas, rest rooms and wash rooms, restaurants and other eating areas, parking lots, time clocks, locker rooms and other storage or dressing areas, drinking fountains, recreation, break, or entertainment areas, transportation, and housing facilities provided for employees which are segregated by explicit directive or are, in fact, segregated on the basis of race, color, religion, or national origin, or because of habit, local custom, or otherwise. The Bidder further agrees that (except where it has obtained identical certifications from proposed subcontractors for specific time periods) it will obtain identical certifications from proposed subcontractors prior to the award of subcontracts exceeding $10,000.00 which are not exempt from the provisions of the Equal Opportunity clause; that it will forward a notice to proposed subcontractors as provided in the Instructions to Bidders.

The penalty for making false statements in offers (10 year imprisonment and/or $10,000 fine) is prescribed in 18 U.S.C. 1001.

RECEIPT OF ADDENDA IS ACKNOWLEDGED FOR:

ADDENDUM NUMBER	ADDENDUM DATE	
_____	_____	Attach additional
_____	_____	sheets if
_____	_____	necessary.

BIDDERS MUST SUBMIT BASE BID TO BE CONSIDERED RESPONSIVE.

☐ **Check box if claiming status as a *'Section 3Business Concern'* and supply certification.**

BASE BID:
AMOUNT OF BASE BID FOR (Use words)

_____DOLLARS AND _____CENTS,

($_____).
(Use figures)

DATE: _____

NAME OF FIRM: _____

ADDRESS: _____

BY: _____
(Representative's Signature)

AFFIX CORPORATE SEAL

TITLE: _____
(Print or type)

BIDDERS ARE CAUTIONED TO ENSURE THAT ALL INFORMATION REQUESTED IN SECTIONS B, D, AND E OF THIS SOLICITATION HAS BEEN PROVIDED IN FULL AND ACCURATE DETAIL. FAILURE TO DO SO MAY RENDER THE BID NONRESPONSIVE.

The penalty for making false statements in offers (10 year imprisonment and/or $10,000 fine) is prescribed in 18 U.S.C. 1001.

END OF SECTION D

SECTION E

SUPPLEMENTAL BID INFORMATION

- Bidder's Point of Contact
- Lists of Materials and Equipment
- List of Proposed Subcontractors
- Affidavit of Sub-Bidder
- Bidder's Qualifications
- Form HUD 2530

SUPPLEMENTAL BID INFORMATION

These documents are a supplement to the bid proposal. These forms must be submitted, at the time and place of the bid opening, in a sealed envelope, separate from Section D, *Form of Bid*. This supplemental information will be used for bid analysis and evaluation.

Failure to submit any required information is grounds for rejection of bid!

The Louisville Metro Housing Authority (LMHA) reserves the right to waive any formalities and/or accept, reject, or negotiate any or all offerings, representations, or proposals contained in this section of the bid submittal. Upon execution of the contract, all representations made herein shall become part of the contract and shall be equally as binding as any other portion of the Contract Documents (unless expressly rejected by LMHA prior to execution of the contract). The preceding sentence notwithstanding, the burden of proof of equality of all methods, equipment, and materials listed in this section to those indicated in the project specifications or drawings is on the Bidder.

Indicate below, the name and phone number of the individual who may be contacted to supply or clarify information required in connection with this bid.

NAME: _____ PHONE: _____

TITLE: _____ EMAIL: _____

Alternate Contract:

NAME: _____ PHONE: _____

TITLE: _____ EMAIL: _____

Bidder's Business Address (PO Box is not acceptable):

_____

_____

_____

Bidder's Federal Employer ID Number: _____

LIST OF MATERIALS AND EQUIPMENT

Each bidder shall indicate the brand name of materials and/or equipment it proposes to use if awarded this contract.

The bidder shall clearly identify the materials and/or equipment that it proposes to furnish. Stating "as per plans and specifications" is not sufficient identification. If the bidder identifies the name or brand of materials and/or equipment which does not conform to the requirements of this solicitation, as determined by LMHA, the bidder will be required to substitute that item with an item which does meet the requirements of this solicitation at no additional cost to LMHA, whether or not such conflict is discovered by LMHA prior to contract award.

MATERIALS/EQUIPMENT	NAME OR BRAND
1.	
2.	
3.	
4.	
6.	
7.	
5.	
6.	

THIS FORM MUST BE COMPLETED AND SUBMITTED WITH THE OFFICIAL BID PACKAGE.

Use additional Sheets If Necessary

LIST OF PROPOSED SUBCONTRACTORS

LIST OF PROPOSED THIRD TIER SUBCONTRACTORS

All proposed subcontractors who propose to employ third tier subcontractors must provide the below referenced information for each proposed third tier subcontractor. Proposed third tier subcontractors are subject to the approval of LMHA. PROPOSED THIRD TIER SUBCONTRACTORS AND SUBCONTRACT AMOUNTS SHALL NOT BE CHANGED, NOR SHALL ANY ADDITIONAL THIRD TIER SUBCONTRACTORS BE EMPLOYED, WITHOUT THE EXPRESS WRITTEN CONSENT OF THE LOUISVILLE METRO HOUSING AUTHORITY.

Subcontractor: _____ Category of Work:
(From previous page)

3rd Tier Sub: _____ $ Amount: _____

Is 3rd Tier Sub an MBE: Yes or No

Subcontractor: _____ Category of Work:
(From previous page)

3rd Tier Sub: _____ $ Amount: _____

Is 3rd Tier Sub an MBE: Yes or No

THIS FORM MUST BE COMPLETED AND SUBMITTED WITH THE OFFICIAL BID PACKAGE.

Subcontractor: _____ Category of Work:
(From previous page)

3rd Tier Sub: _____ $ Amount: _____

Is 3rd Tier Sub an MBE: Yes or No

Subcontractor: _____ Category of Work:
(From previous page)

3rd Tier Sub: _____ $ Amount: _____

Is 3rd Tier Sub an MBE: Yes or No

Use Additional Sheets If Necessary

AFFIDAVIT OF SUBBIDDER

ONE FORM FOR EVERY PROPOSED SUBCONTRACTOR MUST BE COMPLETED AND SUBMITTED WITH THE OFFICIAL BID PACKAGE.

_____, being first duly sworn, deposes and says:
(Name of Officer or Partner)

That he is _____of the firm of _____,
(Officer or Partner) (Name of firm)

the party making a certain proposal or bid dated_____, 20____

to _____for subcontract work in connection
(Name of Prime Contractor)

with the Louisville Metro Housing Authority's Project, located in Louisville, Kentucky, and the party proposed by said work as a result of said bid, that such bid is genuine and not collusive or sham; that said bidder has not colluded, conspired, connived or agreed, directly or indirectly with any bidder or person, to put in a sham bid or to refrain from bidding, and has not in any manner, directly or indirectly, sought by agreement or collusion, or communication or conference, with any person, to fix the bid price or affiant or of any other bidder, or to fix any overhead, profit or cost element of said bid price, or that of any other bidder, or to secure any advantage against the Louisville Metro Housing Authority or any person interested in the proposed contract; and that all statements in said proposal or bid are true.

Signature of Bidder (Officer or Partner)

_____

Subscribed and sworn to before me this _____day of _____, 20_____.

Attest: _____
(Signature of Notary)

SEAL OF
NOTARY

My commission expires _____20_____.

BIDDER'S QUALIFICATIONS

The bidder presently has the following jobs under contract and bonded (list all projects currently under contract and bonded; use additional sheets if necessary):

1. _____
(Project name/description) (Owner or Architect)

Contract Amount: $_____ % Complete: _____

Percentage completed with Bidder's own forces and nature of Bidder's involvement:

2. _____
(Project name/description) (Owner or Architect)

Contract Amount: $_____ % Complete: _____

Percentage completed with Bidder's own forces and nature of Bidder's involvement: _____

3. _____
(Project name/description) (Owner or Architect)

Contract Amount: $_____ % Complete: _____

Percentage completed with Bidder's own forces and nature of Bidder's involvement:

4. _____
(Project name/description) (Owner or Architect)

Contract Amount: $_____ % Complete: _____

Percentage completed with Bidder's own forces and nature of Bidder's involvement: _____

BIDDER'S QUALIFICATIONS (CONTINUED)

State the average number of workers the bidder regularly employs -- on its own full-time payroll and without regard to this project -- in each of the following classifications (the bidder shall write-in all classifications it deems appropriate and attach additional sheets if necessary):

Classification or description of duties	Average # of full-time employees in this classification

We, the bidder, will perform _____% of the work under this contract with our own forces. List trades:

We, the bidder, normally perform _____% of the work with our own forces. List trades:

Approximately _____% of our company's total employees are members of a racial minority.

Approximately _____% of our company's total employees are not members of a racial minority.

BY: _____ Date: _____
(Authorized Officer's Signature)

The penalty for making false statements in offers (10 years imprisonment and/or $10,000 fine) is prescribed in 18 U.S.C. 1001.

Previous Participation Certification

OMB Approval No. 2502-0118
(Exp. 05/31/2019)

US Department of Housing and Urban Development
Office of Housing/Federal Housing Commissioner

US Department of Agriculture
Farmers Home Administration

Part I to be completed by Principals of Multifamily Projects *(See instructions)* Reason for submission:		**For HUD HQ/FmHA use only**	
1. Agency name and City where the application is filed		**2**. Project Name, Project Number, City and Zip Code	
3. Loan or Contract amount $	**4**. Number of Units or Beds	**5**. Section of Act	**6**. Type of Project (check one) ☐ Existing ☐ Rehabilitation ☐ Proposed (New)

7. List all proposed Principals and attach organization chart for all organizations

Name and address of Principals and Affiliates (Name: Last, First, Middle Initial) proposing to participate	**8 Role of Each Principal in Project**	**9. SSN or IRS Employer Number**

Certifications: The principal(s) listed above hereby apply to HUD or USDA FmHA, as the case maybe, for approval to participate as principal(s) in the role(s) and project listed above. The principal(s) each certify that all the statements made on this form are true, complete and correct to the best of their knowledge and belief and are made in good faith, including any Exhibits attached to this form. **Warning:** HUD will prosecute false claims and statements. Conviction may result in criminal and/or civil penalties. The principal(s) further certify that to the best of their knowledge and belief:

1. Schedule A contains a listing, for the last ten years, of every project assisted or insured by HUD, USDA FmHA and/or State and local government housing finance agencies in which the principal(s) have participated or are now participating.
2. For the period beginning 10 years prior to the date of this certification, and except as shown on the certification:

a. No mortgage on a project listed has ever been in default, assigned to the Government or foreclosed, nor has it received mortgage relief from the mortgagee;
b. The principals have no defaults or noncompliance under any Conventional Contract or Turnkey Contract of Sale in connection with a public housing project;
c. There are no known unresolved findings as a result of HUD audits, management reviews or other Governmental investigations concerning the principals or their projects;
d. There has not been a suspension or termination of payments under any HUD assistance contract due to the principal's fault or negligence;
e. The principals have not been convicted of a felony and are not presently the subject of a complaint or indictment charging a felony. (A felony is defined as any offense punishable by imprisonment for a term exceeding one year, but does not include any offense classified as a misdemeanor under the laws of a State and punishable by imprisonment of two years or less);
f. The principals have not been suspended, debarred or otherwise restricted by any Department or Agency of the Federal Government or of a State Government from doing business with such Department or Agency;
g. The principals have not defaulted on an obligation covered by a surety or performance bond and have not been the subject of a claim under an employee fidelity bond;

3. All the names of the principals who propose to participate in this project are listed above.
4. None of the principals is a HUD/FmHA employee or a member of a HUD/FmHA employee's immediate household as defined in Standards of Ethical Conduct for Employees of the Executive Branch in 5 C.F.R. Part 2635 (57 FR 35006) and HUD's Standard of Conduct in 24 C.F.R. Part 0 and USDA's Standard of Conduct in 7 C.F.R. Part 0 Subpart B.
5. None of the principals is a participant in an assisted or insured project as of this date on which construction has stopped for a period in excess of 20 days or which has been substantially completed for more than 90 days and documents for closing, including final cost certification, have not been filed with HUD or FmHA.
6. None of the principals have been found by HUD or FmHA to be in noncompliance with any applicable fair housing and civil rights requirements in 24 CFR 5.105(a). (If any principals or affiliates have been found to be in noncompliance with any requirements, attach a signed statement explaining the relevant facts, circumstances, and resolution, if any).
7. None of the principals is a Member of Congress or a Resident Commissioner nor otherwise prohibited or limited by law from contracting with the Government of the United States of America.
8. Statements above (if any) to which the principal(s) cannot certify have been deleted by striking through the words with a pen, and the relevant principal(s) have initialed each deletion (if any) and have attached a true and accurate signed statement (if applicable) to explain the facts and circumstances.

Name of Principal	**Signature of Principal**	**Certification Date(mm/dd/yyyy**	**Area Code and Tel. No.**
This form prepared by (print name)		**Area Code and Tel. No.**	

Schedule A: List of Previous Projects and Section 8 Contracts. Below is a complete list of the principals' previous participation projects and participation history in multifamily Housing programs of HUD/FmHA, State and local Housing Finance Agencies. **Note:** Read and follow the instruction sheet carefully. Make full disclosure. Add extra sheets if you need more space. Double check for accuracy. If no previous projects, write by your name, "**No previous participation, First Experience"**.

1. Principals Name (Last, First)	2. List of previous projects (Project name, project ID and, Govt. agency involved)	3.List Principals' Role(s) (indicate dates participated, and if fee or identity of interest participant)	4. Status of loan (current, defaulted, assigned, foreclosed)	5.Was the Project ever in default during your participation Yes	No	If yes, explain	6. Last MOR rating and Physical Insp. Score and date

Part II- For HUD Internal Processing Only

Received and checked by me for accuracy and completeness; recommend approval or refer to Headquarters after checking appropriate box.

Date (mm/dd/yyyy)	Tel No. and area code	☐ A. No adverse information; form HUD-2530 approval recommended.	☐ C. Disclosure or Certification problem
Staff	Processing and Control	☐ B. Name match in system	☐ D. Other (attach memorandum)

Supervisor	Director of Housing/Director, Multifamily Division	Approved ☐ Yes ☐ No	Date (mm/dd/yyyy)

Instructions for Completing the Previous Participation Certificate, form HUD-2530

Carefully read these instructions and the applicable regulations. A copy of those regulations published at 24 C.F.R. 200.210 to 200.245 can be obtained from the Multifamily Housing Representative at any HUD Office. Type or print neatly in ink when filling out this form. Mark answers in all blocks of the form. If the form is not filled completely, it will delay approval of your application.

Attach extra sheets as you need them. Be sure to indicate "Continued on Attachments" wherever appropriate. Sign each additional page that you attach if it refers to you or your record.

Carefully read the certification before you sign it. Any questions regarding the form or how to complete it can be answered by your HUD Office Multifamily Housing Representative.

Purpose: This form provides HUD with a certified report of all previous participation in HUD multifamily housing projects by those parties making application. The information requested in this form is used by HUD to determine if you meet the standards established to ensure that all principal participants in HUD projects will honor their legal, financial and contractual obligations and are acceptable risks from the underwriting standpoint of an insurer, lender or governmental agency. HUD requires that you certify your record of previous participation in HUD/USDA-FmHA, State and Local Housing Finance Agency projects by completing and signing this form, before your project application or participation can be approved.

HUD approval of your certification is a necessary precondition for your participation in the project and in the capacity that you propose. If you do not file this certification, do not furnish the information requested accurately, or do not meet established standards, HUD will not approve your certification.

Note that approval of your certification does not obligate HUD to approve your project application, and it does not satisfy all other HUD program requirements relative to your qualifications.

Who Must Sign and File Form HUD-2530:

Form HUD-2530 must be completed and signed by all principals applying to participate in HUD multifamily housing projects, including those who have no previous participation. The form must be signed and filed by all principals and their affiliates who propose participating in the HUD project. Use a separate form for each role in the project unless there is an identity of interest.

Principals include all individuals, joint ventures, partnerships, corporations, trusts, non-profit organizations, any other public or private entity that will participate in the proposed project as a sponsor, owner, prime contractor, turnkey developer, managing agent, nursing home administrator or operator, packager, or consultant. Architects and attorneys who have any interest in the project other than an arm's length fee arrangement for professional services are also considered principals by HUD.

In the case of partnerships, all general partners regardless of their percentage interest and limited partners having a 25 percent or more interest in the partnership are considered principals. In the case of public or private corporations or governmental entities, principals include the president, vice president, secretary, treasurer and all other executive officers who are directly responsible to the board of directors, or any equivalent governing body, as well as all directors and each stockholder having a 10 percent or more interest in the corporation.

Affiliates are defined as any person or business concern that directly or indirectly controls the policy of a principal or has the power to do so. A holding or parent corporation would be an example of an affiliate if one of its subsidiaries is a principal.

Exception for Corporations – All principals and affiliates must personally sign the certificate except in the following situation. When a corporation is a principal, all of its officers, directors, trustees and stockholders with 10 percent or more of the common (voting) stock need not sign personally if they all have the same record to report. The officer who is authorized to sign for the corporation or agency will list the names and title of those who elect not to sign. However, any person who has a record of participation in HUD projects that is separate from that of his or her organization must report that activity on this form and sign his or her name. The objective is **full** disclosure.

Exemptions – The names of the following parties do not need to be listed on form HUD-2530: Public Housing Agencies, tenants, owners of less than five condominium or cooperative units and all others whose interests were acquired by inheritance or court order.

Where and When Form HUD-2530 Must Be Filed: The original of this form must be submitted to the HUD Office where your project application will be processed at the same time you file your initial project application. This form must be filed with applications for projects, or when otherwise required in the situations listed below:

- Projects to be financed with mortgages insured under the National Housing Act (FHA).
- Projects to be financed according to Section 202 of the Housing Act of 1959 (Elderly and Handicapped).
- Projects in which 20 percent or more of the units are to receive a subsidy as described in 24 C.F.R. 200.213.
- Purchase of a project subject to a mortgage insured or held by the Secretary of HUD.
- Purchase of a Secretary-owned project.
- Proposed substitution or addition of a principal or principal participation in a different capacity from that previously approved for the same project.
- Proposed acquisition by an existing limited partner of an additional interest in a project resulting in a total interest of 25 percent or more or proposed acquisition by a corporate stockholder of an additional interest in a project resulting in a total interest of 10 percent or more.
- Projects with U.S.D.A., Farmers Home Administration, or with state or local government housing finance agencies that include rental assistance under Section 8 of the Housing Act of 1937. For projects of this type, form HUD-2530 should be filed with the appropriate applications directly to those agencies.

Review of Adverse Determination: If approval of your participation in a HUD project is denied, withheld, or conditionally granted on the basis of your record of previous participation, you will be notified by the HUD Office. You may request reconsideration by the HUD Review Committee. Alternatively, you may request a hearing before a Hearing Officer. Either request must be made in writing within 30 days from your receipt of the notice of determination.

If you do request reconsideration by the Review Committee and the reconsideration results in an adverse determination, you may then request a hearing before a Hearing Officer. The Hearing Officer will issue a report to the Review Committee. You will be notified of the final ruling by certified mail.

Specific Line Instructions:

Reason for submitting this Certification: e.g., refinance, change in ownership, change in management agent, transfer of physical assets, etc.

Block 1: Fill in the name of the agency to which you are applying. For example: HUD Office, Farmers Home Administration District office, or the name of a State or local housing finance agency. Below that, fill in the name of the city where the office is located.

Block 2: Fill in the name of the project, such as "Greenwood Apts." If the name has not yet been selected, write "Name unknown." Below that, enter the HUD contract or project identification number, the Farmers Home Administration project number, or the State or local housing finance agency project or contract number. Include **all** project or contract identification numbers that are relevant to the project. Also enter the name of the city in which the project is located, and the ZIP Code.

Block 3: Fill in the dollar amount requested in the proposed mortgage, or the annual amount of rental assistance requested.

Block 4: Fill in the number of apartment units proposed, such as "40 units." For hospital projects or nursing homes, fill in the number of beds proposed, such as "100 beds."

Block 5: Fill in the section of the Housing Act under which the application is filed.

Block 7: Definitions of all those who are considered principals and affiliates are given above in the section titled "Who Must Sign and File...."

Block 8: Beside the name of each principal, fill in the appropriate role. The following are examples of possible roles that the principals may assume: Owner/Mortgagor, Managing Agent, Sponsor, Developer, General Con-tractor, Packager, Consultant, Nursing Home Administrator etc.

Block 9: Fill in the Social Security Number or IRS employer number of every principal listed, including affiliates.

Instructions for Completing Schedule A:

Be sure that Schedule A is filled-in completely, accurately and the certification is properly dated and signed, because it will serve as a legal record of your previous experience. All Multifamily Housing projects involving HUD/ FmHA, and State and local Housing Finance Agencies in which you have previously participated **must be** listed. Applicants are reminded that previous participation pertains to the individual principal within an entity as well as the entity itself. A newly formed company may not have previous participation, but the principals within the company may have had extensive participation and disclosure of that activity is required.

Column 2. ***All previous projects must be listed or your certification cannot be processed.*** Include the name of all projects, project number, city where it is located and the governmental agency (HUD, USDA-FmHA or state or local housing finance agency) that was involved.

Column 3. List the role(s) as a principal, dates participated and if fee or identity of interest (IOI) with owners.

Column 4. Indicate the current status of the loan. Except for current loan, the date associated with the status is required. Loans under a workout arrangement are considered assigned. For all noncurrent loans, an explanation of the status is required.

Column 5. Explain any project defaults during your participation.

Column 6. Provide the latest Management Review (MOR) rating and Physical Inspection score.

Certification: After you have completed all other parts of form HUD-2530, including schedule A, read the Certification carefully. In the box below the statement of the certification, fill in the names of all principals and affiliates as listed in block 7. Each principal should sign the certification with the exception in some cases of individuals associated with a corporation (see "Exception for Corporations" in the section of the instructions titled "Who Must Sign and File Form HUD-2530). Principal who is signing on behalf of the entity should attach signature authority document. Each principal who signs the form should fill in the date of the signature and a telephone number. By providing a telephone number, HUD can reach you in the event of any questions.

If you cannot certify and sign the certification as it is printed because some statements do not correctly describe your record, use a pen to strike through those parts that differ with your record, and then sign and certify.

Attach a signed statement of explanation of the items you have struck out on the certification. Item 2e. relates to felony convictions within the past 10 years. If you are convicted of a felony within the past 10 years, strike out 2e. and attach statement of explanation. A felony conviction will not necessarily cause your participation to be disapproved unless there is a criminal record or other evidence that your previous conduct or method of doing business has been such that your participation in the project would make it an unacceptable risk from the underwriting stand point of an insurer, lender or governmental agency.

The Department of Housing and Urban Development (HUD) is authorized to collect this information by law (42 U.S.C. 3535(d) and 24 C.F.R. 200.217) and by regulation at 24 CFR 200.210. This information is needed so that principals applying to participate in multifamily programs can become HUD-approved participants. The information you provide will enable HUD to evaluate your record with respect to established standards of performance, responsibility and eligibility. Without prior approval, a principal may not participate in a proposed or existing multifamily project. HUD uses this information to evaluate whether or not principals pose an unsatisfactory underwriting risk. The information is used to evaluate the potential principals and approve only individuals and organizations that will honor their legal, financial and contractual obligations.

Privacy Act Statement: The Housing and Community Development Act of 1987, 42 U.S.C. 3543 requires persons applying for a Federally-insured or guaranteed loan to furnish his/her Social Security Number (SSN). HUD must have your SSN for identification of your records. HUD may use your SSN for automated processing of your records and to make requests for information about you and your previous records with other public agencies and private sector sources. HUD may disclose certain information to Federal, State and local agencies when relevant to civil, criminal, or regulatory investigations and prosecutions. It will not be otherwise disclosed or released outside of HUD, except as required and permitted by law. You must provide all of the information requested in this application, including your SSN.

Public reporting burden for this collection of information is estimated to average 1 hour per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. This agency may not collect this information, and you are not required to complete this form, unless it displays a currently valid OMB control number.

A response is mandatory. Failure to provide any of the information will result in your disapproval of participation in this HUD program.

END OF SECTION E

SECTION F

FORM OF CONTRACT

THIS AGREEMENT, made this____day of_____, by and between _____, (hereinafter referred to as "Contractor"), and the Louisville Metro Housing Authority, (hereinafter referred to as "LMHA").

WITNESSETH, that the Contractor and the LMHA, for the consideration stated herein, mutually agree as follows:

ARTICLE 1 - Statement of Work: The Contractor, having visited and thoroughly inspected the site of the work, and having satisfied itself that all costs associated with the work under this contract are included in its bid and this contract, shall furnish all labor, materials, equipment, and services to complete all work required in strict accordance with the Specifications, Project Manual, Drawings, and other documents which comprise the total Contract Documents for the project titled:

Dosker B Building Electrical Upgrades
PROPOSAL No. 1538

and any addenda thereto, and any Drawings referred to therein, all as prepared by LMHA, and said Specifications, Addenda, Amendments and Drawings are incorporated herein by reference and made a part hereof.

ARTICLE 2 - Contract Price: The LMHA shall pay the Contractor for the performance of the Contract in accordance with the terms and conditions of the Contract Documents, in current funds, subject to additions, deductions, and withholdings as provided in the Contract Documents, the sum of **$**_____.

ARTICLE 3 - Contract Documents: The Contract consists of the following component parts:

a. This Instrument
b. Addenda (if any)
c. Supplemental Instructions to Bidders
d. Instructions to Bidders (HUD-5369)
e. Representation, Certifications and Other Statement of Bidders (HUD-5369 A)
f. Supplemental General Conditions
g. General Conditions (HUD-5370)
h. Abatement General Conditions
i. Special Conditions
j. Supplemental Bid Information
k. Technical Specifications
l. Project Manual
m. Large Scale Drawings
n. Small Scale Drawings
o. Shop Drawings
p. Form of Bid

This Instrument, together with all Documents enumerated in the above Articles, are as fully a part of this Contract as if hereto attached or herein repeated, and together form this Contract. In the event any provision of any component part shall be in conflict with any other component part, the provision of the

component part first enumerated in Article 3 above 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.

ARTICLE 4 - Liquidated Damages: As actual damages for delay in completion of Work are impossible to determine, the Contractor and his Surety shall be liable for and shall pay to LMHA the sum of $1,000.00, not as a penalty, but as fixed, agreed and liquidated damages for each calendar day of delay until the Contract Work is substantially completed as defined in the General Conditions. LHMA shall have the right to deduct liquidated damages from money in hand otherwise due, or to become due, to the Contractor, or to sue and recover compensation for damages for failure to substantially complete the Work within the time stipulated in the contract documents. Said liquidated damages shall cease to accrue from the date of Substantial Completion.

ARTICLE 5 – Dispute Resolution: Any dispute or claim under this contract that cannot be resolved by and between the parties shall be submitted to litigation in the Jefferson County Kentucky Circuit Court.

ARTICLE 6 – Governing Law: This contract shall be construed and enforced pursuant to the applicable laws of the Commonwealth of Kentucky.

ARTICLE 7 – Entire Agreement: This Contract supersedes all prior agreements, contracts and understandings, whether written or otherwise, between the parties relating to the subject matter of the project. This contract may only be amended or altered by a written Addendum, signed by both parties and incorporated by reference herein.

IN WITNESS WHEREOF, the parties hereto have caused This Instrument to be executed in three (3) original counterparts as of the day and year first above written. Contractor hereby certifies that it has received all documents listed in Article 3 hereof.

_____
(Contractor)

BY: _____
(Authorized Representative)

_____
(Printed Name and Title)

BUSINESS ADDRESS: _____

Attest: _____
(Signature of Notary)

SEAL OF NOTARY

_____
Contractor

_____
LMHA

My commission expires _____, 20_____.

LOUISVILLE METRO HOUSING AUTHORITY
Louisville, Kentucky

BY: _____
Lisa Osanka, Executive Director and Contracting Officer

BUSINESS ADDRESS: Louisville Metro Housing Authority
420 South Eighth Street
Louisville, Kentucky 40203

Attest: _____
(Signature of Notary)

SEAL OF NOTARY

My commission expires _____, 20_____.

CERTIFICATIONS

I, _____, certify that I am the
(Printed Name of Company Officer)

_____ of the Firm named herein as Contractor;
(Printed Title of Company Officer)

and that_____, who signed this Contract on
(Name of Authorized Representative)

behalf of the Contractor, was then_____
(Title of Authorized Representative)

of said Firm by authority of its governing body, and at that time had the authority to execute this

Contract within the scope of the Corporate powers.

BY: _____
(Signature of Company Officer)

AFFIX CORPORATE SEAL

Instructions: "Officer" means any authorized officer of the contracting firm, except the person who signed the contract (preceding page) as "Authorized Representative" on behalf of the Contractor.

"Authorized Representative" means the person who signed the contract (preceding page) on behalf of the Contractor.

END OF SECTION F

SECTION G

FORM OF MATERIAL/LABOR PAYMENT BOND

FORM OF MATERIAL/LABOR PAYMENT BOND

If desired, other forms may be attached, but this form must be properly completed and shall prevail.

DATE OF EXECUTION: _____

NAME OF PRINCIPAL: _____
(CONTRACTOR)

NAME OF SURETY: _____

NAME OF OWNER: Louisville Metro Housing Authority

AMOUNT OF BOND (100% of Contract Price): _____

Dosker B Building Electrical Upgrades
PROPOSAL No. 1538

KNOW ALL MEN BY THESE PRESENTS, that we the PRINCIPAL AND SURETY above named, are held and firmly bound unto the above named HOUSING AUTHORITY, hereinafter called LMHA, for the use of LMHA and for all persons performing work or furnishing materials under, or for the purpose of, the contract described above, in the penal sum of the amount stated above for the payment of which sum well and truly to be made, we bind ourselves, our heirs, executors, administrators, and successors, jointly and severally, firm by these presents.

THE CONDITIONS OF THIS OBLIGATION ARE SUCH, that whereas, the Principal entered into a certain contract with LMHA, identified as shown above and hereto attached:

NOW THEREFORE, if the Principal shall promptly make payment to all persons supplying labor and material in the prosecution of the work provided for in said Contract, and any and all duly authorized modifications of said Contract that may hereafter be made, notice of which modifications of the Surety being hereby waived, then, this obligation to be void; otherwise to remain in full force and virtue.

IN WITNESS WHEREOF, the above-bounded parties have executed this instrument under their several seals on the date indicated above, the name and corporate seal of each corporate party being hereto affixed and these presents duly signed by its undersigned representative, pursuant to authority of its governing body.

(To be executed in three original counterparts.)

CONTRACTOR

Witness: _____

Principal: _____
(Corporate, Proprietorship, or Partnership Name)

By: _____
(Signature of Principal's Owner, Partner, President or Vice-Pres., only)

Title: _____
Attest (For Corporations):

By: _____ **AFFIX CORPORATE SEAL**
(Corporate Sec. or Asst., Only)

Title: _____

SURETY

Surety Company:_____

Witness: _____ By: _____
(Attorney in Fact)

Countersigned:

By: _____ **AFFIX CORPORATE SEAL OF SURETY**
(Kentucky Licensed Resident Agent)

Name and Address of Surety Agency:

_____

Surety Company Name and Kentucky Regional or Branch Office Address:

_____

The rate of premium on this bond is $_____ per Thousand.

The total amount of premium charged is $_____

(To be executed in <u>three original</u> counterparts.)

CERTIFICATE AS TO CORPORATE PRINCIPAL

I, _____, certify that I am the _____
(Printed name of Officer) (title of officer)

of the Firm named as Principal within bond; that _____
(Owner, Partner, Etc.)

who signed the said bond on behalf of the Principal was then _____ _____
(Title of Owner, Partner, etc.)

of said Firm; that I know his or her signature, and his/her signature thereto is genuine; and

that said bond was duly signed, sealed, and attested to for and in behalf of said Corporation

by authority of its governing body.

BY: _____
(Signature of Officer)

TITLE: _____

AFFIX CORPORATE SEAL

Instructions: "Officer" means any authorized officer of the Principal (Contractor), except the person who signed the bond (preceding page) as "Owner, Partner, etc." on behalf of the Principal.

(To be executed in three original counterparts.)

END OF SECTION G

SECTION H

FORM OF PERFORMANCE BOND

FORM OF PERFORMANCE BOND

If desired, other forms may be attached, but this form must be properly completed and shall prevail.

DATE OF EXECUTION: _____

NAME OF PRINCIPAL: _____
(CONTRACTOR)

NAME OF SURETY: _____

NAME OF OWNER: Louisville Metro Housing Authority

AMOUNT OF BOND (100% of Contract Price): _____

Dosker B Building Electrical Upgrades
PROPOSAL No. 1538

KNOW ALL MEN BY THESE PRESENTS, that we the PRINCIPAL AND SURETY above named, are held and firmly bound unto the above named HOUSING AUTHORITY, hereinafter called LMHA, in the penal sum of the amount stated above for the payment of which sum well and truly to be made, we bind ourselves, our heirs, executors, administrators, and successors, jointly and severally, firm by these presents.

THE CONDITIONS OF THIS OBLIGATION ARE SUCH, that whereas, the Principal entered into a certain contract with LMHA, identified as shown above and hereto attached:

NOW THEREFORE, if the Principal shall well and truly perform and fulfill all the undertaking, covenants, terms, conditions, and agreements of said Contract and any extensions thereof that may be granted by LMHA, with or without notice to the Surety, and during the life of any guaranty required under the Contract, and shall also well and truly perform and fulfill all the undertakings, covenants, terms, conditions, and agreements of any and all duly authorized modifications of said Contract that may hereafter be made, notice of which modifications of the Surety being hereby waived, then, this obligation to be void; otherwise to remain in full force and virtue.

IN WITNESS WHEREOF, the above-bounded parties have executed this instrument under their several seals on the date indicated above, the name and corporate seal of each corporate party being hereto affixed and these presents duly signed by its undersigned representative, pursuant to authority of its governing body.

(To be executed in three original counterparts.)

CONTRACTOR

Witness: _____

Principal: _____
(Corporate, Proprietorship, or Partnership Name)

By: _____
(Signature of Principal's Owner, Partner, President or Vice-Pres., only)

Title: _____

Attest (For Corporations):

By: _____ **AFFIX CORPORATE SEAL**
(Corporate Sec. or Asst., Only)

Title: _____

SURETY

Surety Company: _____

Witness: _____ By: _____
(Attorney in Fact)

Countersigned:

By: _____ **AFFIX CORPORATE SEAL OF SURETY**
(Kentucky Licensed Resident Agent)

Name and Address of Surety Agency:

_____

Surety Company Name and Kentucky Regional or Branch Office Address:

_____

The rate of premium on this bond is $_____ per Thousand.

The total amount of premium charged is $_____.

(To be executed in <u>three original</u> counterparts.)

CERTIFICATE AS TO CORPORATE PRINCIPAL

I, _____, certify that I am
(Printed name of Officer)

the _____, of the Firm named as Principal
(Title of Officer)

within bond; that _____, who signed the said
(Owner, Partner, etc.)

bond on behalf of the Principal was then _____
(Title of Owner, Partner, etc.)

of said Firm; that I know his or her signature, and his/her signature thereto is genuine; and that said bond was duly signed, sealed, and attested to for and in behalf of said Corporation by authority of its governing body.

BY: _____
(Signature of Officer)

AFFIX CORPORATE SEAL

TITLE: _____

Instructions: "Officer" means any authorized officer of the Principal (Contractor), except the person who signed the bond (preceding page) as "Owner, Partner, etc." on behalf of the Principal.

(To be executed in three original counterparts.)

END OF SECTION H

SECTION I

GENERAL CONDITIONS FOR CONSTRUCTION CONTRACTS – PUBLIC HOUSING PROGRAMS
(HUD Form – 5370)

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. 3/31/2020)

Applicability. This form is applicable to any construction/development contract greater than $150,000.

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 135. 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, HAs would be unable to enforce their contracts.
Public reporting burden for this collection of information is estimated to average 1.0 hours per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Responses to the collection of information are required to obtain a benefit or to retain a benefit.
The information requested does not lend itself to confidentiality.
HUD may not conduct or sponsor, and a person is not required to respond to a collection of information unless it displays a currently valid OMB number.

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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 Contract (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, 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

(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 Schedule

(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 of the work, and that it has investigated and satisfied itself 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 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 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 contactor 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 Construction

(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 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 Construction

(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

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

(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 accordance with the terms and conditions of the subcontract.

_____
Name:

_____
Title:

_____
Date:

(f) Except as otherwise provided in State law, the PHA shall retain ten (10) percent of the amount of progress 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 nowise 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 a 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 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 Convenience

(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 agrees as follows:

(a) The Contractor shall not discriminate against any employee or applicant for employment because of race, color, religion, sex, national origin, or handicap.

(b) The Contractor 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, national origin, or handicap. Such action shall include, but not be limited to, (1) employment, (2) upgrading, (3) 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 shall post in conspicuous places available to employees and applicants for employment the notices to be provided by the Contracting Officer that explain this clause.

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

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

(g) The Contractor 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 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 determination that the Contractor is not in compliance with this clause or any rule, regulation, or order of the Secretary of Labor, this contract may be canceled, terminated, or suspended in whole or in part, and the Contractor may be declared ineligible for further Government contracts, or Federally assisted construction contracts under the procedures authorized in Executive Order 11246, as amended. In addition, sanctions may be imposed and remedies invoked against the Contractor as provided in Executive Order 11246, as amended, the rules, regulations, and orders of the Secretary of Labor, or as otherwise provided by law.

(i) The Contractor shall include the terms and conditions of this clause in every subcontract or purchase order unless exempted by the rules, regulations, or orders of the Secretary of Labor issued under Executive Order 11246, as amended, so that these terms and conditions will be binding upon each subcontractor or vendor. The Contractor shall take such action with respect to any subcontract or purchase order as the Secretary of Housing and Urban Development or the Secretary of Labor may direct as a means of enforcing such provisions, including sanctions for noncompliance; provided that if the Contractor becomes involved in, or is threatened with, litigation with a subcontractor or vendor as a result of such direction, the Contractor may request the United States to enter into the 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 135, 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 135 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 preference, shall set forth minimum number and job titles subject to hire, availability of apprenticeship and training positions, the qualifications for each; and the name and location of the person(s) taking applications for each of the positions; and the anticipated date the work shall begin.

(d) The contractor agrees to include this section 3 clause in every subcontract subject to compliance with regulations in 24 CFR Part 135, 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 135. 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 135.

(e) The contractor will certify that any vacant employment positions, including training positions, that are filled (1) after the contractor is selected but before the contract is executed, and (2) with persons other than those to whom the regulations of 24 CFR Part 135 require employment opportunities to be directed, were not filled to circumvent the contractor's obligations under 24 CFR Part 135.

(f) Noncompliance with HUD's regulations in 24 CFR Part 135 may result in sanctions, termination of this contract for default, and debarment or suspension from future HUD assisted contracts.

(g) With respect to work performed in connection with section 3 covered Indian housing assistance, section 7(b) of the Indian Self-Determination and Education Assistance Act (25 U.S.C. 450e) also applies to the work to be performed under this contract. Section 7(b) requires that to the greatest extent feasible (i) preference and opportunities for training and employment shall be given to Indians, and (ii) preference in the award of contracts and subcontracts shall be given to Indian organizations and Indian-owned Economic Enterprises. Parties to this contract that are subject to the provisions of section 3 and section 7(b)agree to comply with section 3 to the maximum extent feasible, but not in derogation of compliance with section 7(b).

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 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 Acts

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 $10 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.

(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.
(b) 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.

SECTION J

SUPPLEMENTAL GENERAL CONDITIONS

SECTION J

SUPPLEMENTAL GENERAL CONDITIONS

Form HUD-5370, *General Conditions of the Contract for Construction*, is supplemented, amended, and modified by the provisions of this Section J. Additional supplements, amendments, and modifications are contained in Section M.

I. DEFINITIONS

A. The term "Contract", in Paragraph 1. (b) of the *General Conditions*, includes all items identified at Article 3 of Section F, *Form of Contract*.

B. The term "LMHA" shall have the same meaning as the other terms noted in Paragraph 1. (h) of the *General Conditions*.

II. CONTRACTOR'S RESPONSIBILITY FOR WORK

A. The 12% performance requirement of Paragraph 2. (b) also applies to any entity represented as a subcontractor.

B. As used in Paragraph 2. (h) of the *General Conditions*, the term "accepted" means written acceptance.

C. Paragraph 2. (i) is added to the *General Conditions*, as follows:

The following forms, and any others LMHA may require, shall be used by the Contractor and are available for review upon request:

- HUD Form 5282, Certificate from Contractor Appointing Officer or Employee to Supervise Payment of Employees
- HUD Form 5372, Construction Progress Schedule
- HUD Form 51000, Schedule of Amounts for Contract Payments
- HUD Form 51001, Periodic Estimate for Partial Payment (must be accompanied by LMHA Form 7001)
- HUD Form 51002, Schedule of Change Orders
- HUD Form 51003, Schedule of Materials Stored
- HUD Form 51004, Summary of Materials Stored
- WH Form 347, Payroll Reporting Form
- WH Form-348, Payroll Statement of Compliance (on back of WH-347)
- LMHA Form 7000, Request for Acceptance of a Subcontractor
- LMHA Form 7001, Certifications of Payments to Subcontractors and Suppliers
- LMHA Form 7002, Agreement to Store Materials Off-Site

D. The Contractor shall perform the work in full compliance with LMHA requirements stated at the pre-bid conference(s), the pre-construction conference(s), and in the contract documents, unless otherwise expressly required by LMHA.

III. ARCHITECT'S DUTIES, RESPONSIBILITIES, AND AUTHORITY

A. The following sentence is hereby deleted from Paragraph 3. (c)(1) of the *General Conditions* and is henceforth without force or effect:

"The Architect shall file a copy of the report with the Contractor's designated representative at the site."

B. Paragraph 3. (d) is added to the *General Conditions* as follows:

In the event that no project architect/engineer is appointed, or the architect/engineer has contracted for limited services, the Contracting Officer, the Contracting Officer's Designee, or another person appointed by LMHA shall perform the necessary services under this paragraph.

C. For purposes of this Contract, day-to-day construction administration shall be performed by LMHA's Program Manager.

IV. NOTICE TO PROCEED

A. Paragraph 5. (b) of the *General Conditions* is replaced with the following:

The Contractor shall begin work on the date designated in the duly executed Notice to Proceed, bearing the original signature of the Contracting Officer's Designee and the Contractor. Work will not commence prior to receipt of such notice.

V. CONSTRUCTION PROGRESS SCHEDULE

A. The following provisions are added to Paragraph 6. (a) of the *General Conditions*:

For projects expected to require more than five working days to complete, the Contractor, shall use a calendar schedule, with separate divisions for each major operation, activity, or category of work. Such schedules shall sequentially indicate the first and last day of work for each operation, activity, or category of work, as well as overall start and finish dates. The Contractor shall supplement the schedule with sub-schedules for each major operation, activity, or category of work. The Contractor shall schedule work so as to minimize adverse impact on the lives and activities of LMHA residents and employees and the quiet enjoyment of LMHA premises. The schedule shall include a reasonable time allocation for LMHA to conduct punch list and final inspections. No schedule shall be effective as against LMHA until such time as LMHA expressly approves it in writing.

If the Contractor fails to provide a fully acceptable schedule within the allotted time, LMHA may allow work to begin prior to receipt of a fully acceptable schedule. Such special consideration by LMHA shall not be construed as acceptance of any less-than-fully-acceptable schedule or schedules. Neither shall such action be the basis for, or any element of, any claim against LMHA or any LMHA officer, agent, or employee; nor shall it relieve the Contractor of the duty to provide a fully acceptable schedule in a timely fashion.

If LMHA permits the Contractor to begin work prior to LMHA's receipt of a fully acceptable schedule, LMHA may rescind, modify, or otherwise remedy such permission at any time

LMHA deems such action appropriate. LMHA's remedies may include termination of the Contractor's right to proceed with part or all of the work. The Contractor shall have no claim, cause of action, remedy, or defense in connection with such actions by LMHA.

On the first working day of each month (or as LMHA otherwise directs) the Contractor shall submit an updated schedule showing any and all deviations from the originally approved schedule (or interim, less-than-fully-acceptable schedule). Each updated schedule shall indicate the total accumulated percentage of completion for each major operation, activity, or category of work. Updated schedules are for monitoring purposes and, unless expressly stated in writing by LMHA, shall not constitute an approved schedule revision or change of contract time for completion or basis for any claim by the Contractor.

B. The following provisions are added to Paragraph 6. (b) of the *General Conditions*:

Should any such action become necessary, the Contractor shall bear any increased cost to LMHA for architects', engineers', environmental monitoring consultants', or others' services needed in conjunction with the work. The Contractor shall within 30 days of receiving LMHA invoices for such increased costs remit payment to LMHA. If the Contractor fails to remit payment within 30 days LMHA shall deduct the amount of the unpaid invoice(s) from remaining payments to the Contractor.

C. Paragraph 6. (d) is added to the *General Conditions* as follows:

The Contractor's schedule, and any updated schedules, whether or not approved by the LMHA, shall not be construed by the Contractor as grounds for determining the date for completion for the purposes of assessing liquidated damages or delay damages. Liquidated and delay damages may only be assessed in relation to the time for completion indicated in Section L, *Special Conditions*, and the date for completion calculated there from and set forth in the Notice to Proceed, except as expressly modified by any change order.

D. Paragraph 6. (e) is added to the *General Conditions* as follows:

Paragraph 6.(d), above, notwithstanding, if the Contractor gives the LMHA certain assurances (including construction progress schedules) that a specific portion of the contract work will be completed on a specific date, and the LMHA plans relocation or use activities based on such assurances, and the Contractor should fails to complete said portion of the contract work on the specified date, and has not provided a minimum of thirty (30) days written notice to LMHA that completion will not occur on the specified date, then the Contractor shall be held liable for any costs incurred by LMHA as a result of that portion of the contract work not being completed on the specified date.

E. Paragraph 6. (f) is added to the *General Conditions* as follows:

Paragraph 6.(d), above, notwithstanding, where the Contractor gives LMHA assurances (including construction progress schedules) that some portion(s) of the contract work will be completed on a particular date or as indicated by the construction progress schedule, and LMHA plans for, solicits, or awards a contract for professional services in connection with activities

under this contract, based on such assurances or schedule, and the Contractor should fails to complete said portion(s) of the contract work in accordance with said assurances or schedule, then the Contractor shall be liable for any increased cost to LMHA of securing or enjoying such professional services as a result of that failure.

VI. DIFFERING SITE CONDITIONS

A. Paragraph 8. (b)(1) is added to the *General Conditions* as follows:

LMHA will investigate the site conditions within 30 working days of receipt of written notice from the Contractor. Unless the site conditions materially differ from those indicated in this contract and are of a nature that requires stoppage of all work pending resolution, no adjustment of the contract time and/or price will be made for the time attributable to LMHA's investigation, direction, and processing in connection with the conditions.

VII. SPECIFICATIONS AND DRAWINGS FOR CONSTRUCTION

A. The following provisions are added to Paragraph 9. (a) of the *General Conditions*:

The Contractor shall maintain, in readable condition, at the project site or office, a complete set of approved project drawings, specifications, change orders, shop drawings, and submittals. All such items shall be readily available for review by LMHA or its representatives.

B. The following provisions are added to Paragraph 9. (c) of the *General Conditions*:

The terms "provide", "furnish", "furnish and install", and similar terms shall be interpreted to mean:

> The Contractor -- without LMHA’s participation or assistance, unless specifically promised in writing -- shall furnish and install the several components of the project work, complete, in place, and 100% ready for activation and use.

C. The following provisions are added to Paragraph 9. (f) of the *General Conditions*:

If shop drawings or other submittals show variance from the Contract Documents, and the Contractor fails to bring such variance to LMHA’s attention, in writing, at the time of submittal, and LMHA, having failed to recognize such variance, approves such submittal, LMHA may, upon subsequent discovery of said variance, rescind approval and require the Contractor to remove any work performed under the previously approved submittal and replace that work in a manner complying with the requirements of the Contract Documents at no additional cost to LMHA and with no adjustment of the contract time.

D. Paragraph 9. (j) is added to the *General Conditions* as follows:

All documents submitted to LMHA shall be delivered in a neat and easily interpreted format and shall be accompanied by a transmittal cover letter identifying the items being submitted and stating the action requested of LMHA with respect to such items.

E. Paragraph 9. (k) is added to the *General Conditions* as follows:

The Contractor, by signing this contract, certifies that 1) the Contractor has thoroughly reviewed the contract documents, 2) the Contractor had the opportunity to attend at least one pre-bid conference, 3) the Contractor, prior to the bid opening, had sufficient opportunity to raise any and all questions regarding any perceived ambiguity, conflict, error, omission, irregularity, or defect of the contract documents or raised by other LMHA representations, 4) the Contractor, prior to the bid opening, addressed to LMHA any and all such questions that the Contractor may have had, 5) the Contractor would not have submitted a bid for this contract had LMHA not satisfactorily answered the Contractor's questions prior to the bid opening, 6) the Contractor waives any and all right to challenge LMHA's pre-bid responses to such questions in the future, 7) the Contractor understands and agrees that contract interpretation is solely LMHA's right and that where the Contractor's view of contract requirements differs from LMHA's, LMHA's view shall govern and the Contractor shall proceed with the work as directed by LMHA without change or adjustment of the contract time, price, or conditions, and 8) the Contractor waives any and all right to challenge LMHA's interpretation of the contract documents or other LMHA representations or to pursue any remedy of any kind related to such interpretation.

VIII. MATERIAL AND WORKMANSHIP

A. Paragraph 11. (a)(1) is added to the *General Conditions* as follows:

Wherever the words "or equal", or words of similar meaning, appear in the Contract Documents, they shall be interpreted to mean an item, material, equipment, article, product, method, or process equal in quality to that named and suitable to the same use and capable of performing the same function as that named with equivalent efficiency, as determined by LMHA based on salient features and intended purpose.

B. Paragraph 11. (a)(2) is added to the *General Conditions* as follows:

Proof of equality is not implied by the Contract Documents and is not LMHA's burden. The burden of proof of equality shall be upon the Contractor. LMHA shall weigh the evidence of equality with fairness to all parties. Inclusion of a brand name, or type of item, material, equipment, article, product, method, or process in the Contractor's bid shall not obligate LMHA to accept such item, material, equipment, article, product, method, or process, if, in LMHA's opinion, that item, material, equipment, article, product, method, or process does not meet the requirements of the Contract Documents and its acceptance is not in LMHA's best interest. LMHA's determination regarding equality shall be final.

C. The following provisions are added to Paragraph 11. (b)(2) of the *General Conditions*:

1. All documents submitted to LMHA shall be transmitted in a neat and easily interpreted format and shall be accompanied by a transmittal cover letter stating the action requested of LMHA with respect to such items.

2. If any submittal shows variance from the Contract Documents, and the Contractor fails to bring such variance to LMHA's attention, in writing at the time of submittal, and LMHA, having failed to recognize such variance, approves such submittal, LMHA may, upon subsequent discovery of said variance, rescind approval and require the Contractor to remove any work performed under the previously approved submittal and replace that work in a manner complying with the requirements of the Contract Documents at no additional cost to LMHA and with no adjustment of the contract time.

D. Paragraph 11. (b)(6) of the *General Conditions* is replaced with the following:

All samples shall become the property of LMHA and shall be retained by LMHA until such time as LMHA sees fit to dispose of them. LMHA may dispose of samples in any way it sees fit, with no liability to the Contractor.

E. Paragraph 11. (b)(7) is added to the *General Conditions* as follows:

In the event the specifications indicate that either of two or more materials, equipment, articles, products, or processes is acceptable, the Contractor shall propose one of those items and shall indicate the basis for that item's selection. The process of submittal and approval for such items shall be the same as that prescribed for other items elsewhere in these documents. LMHA shall evaluate the item to determine if approval is in LMHA's best interest. If LMHA does not approve the submittal, the Contractor shall submit an alternate for LMHA's consideration. LMHA's decision regarding <u>any</u> submittal shall be final and shall not be the basis for any increase in the contract price or time, provided the item finally approved by LMHA was among, or comparable to, those included in the listed options. The Contractor shall maintain a legible copy of each approved submittal at the project site for the use of LMHA and LMHA's representatives.

IX. HEALTH, SAFETY, AND ACCIDENT PREVENTION

A. Paragraph 13. (d)(1) is added to the *General Conditions* as follows:

Paragraph 13. (d), above, notwithstanding, LMHA's failure to identify any incident of, or potential for, non-compliance with these requirements shall not relieve the Contractor of the duty to maintain current knowledge of, and compliance with, all such requirements, whether existing at the time of contract award or implemented thereafter.

B. Paragraph 13. (D)(2) is added to the *General Conditions*, as follows:

The Contractor is hereby notified of the existence of, and requirement to comply with, 29 CFR 1926.62, OSHA's standard on lead exposure in the construction industry.

X. INSPECTION AND ACCEPTANCE OF CONSTRUCTION

A. The following provisions are added to Paragraph 20 of the *General Conditions*:

The terms "acceptance", "instructions", and "approvals", as used in Paragraph 20. (a)(1), 20. (d), and 20. (j) of the *General Conditions*, means written acceptance, instructions, and approvals. As used in this instrument, the term “final completion” means that the work designated by LMHA is–in LMHA’s sole discretion—complete to allow LMHA to take full possession of it and use it for its intended purpose.

B. The following provisions are added to Paragraph 20. (j) of the *General Conditions*:

Such acceptance may be affected by the necessity of HUD inspections, reviews, etc. Should HUD become involved, any time required for HUD to complete its activities shall not be counted against the Contractor or against LMHA for the purposes of assessing liquidated damages or delay damages or for any other modification of the contract amount or time.

C. Paragraph 20. (k) is added to the *General Conditions* as follows:

LMHA’s Program Manager and the Construction Manager will at all times have access to the work to observe the progress and quality wherever it is in preparation of progress, and the Contractor will provide proper facilities for such access and for necessary inspection and testing at the Contractor’s expense.

D. Paragraph 20. (l) is added to the *General Conditions* as follows:

As part of achieving final completion, the Contractor shall organize and submit four (4) copies of any operating, service, maintenance, and installation manuals for each item of manufactured equipment or system supplied and installed under this contract. Data required shall include, but is not necessarily limited to, manufacturer’s data and cut sheets, installation instructions and notes, start-up procedures, servicing and maintenance manuals and instructions, and any related data including parts lists and “as-built drawings.” The Contractor shall also submit all related warranty documents and shall provide assurance that all warranties have been assigned to LMHA.

XI. WARRANTY OF CONSTRUCTION

A. The following provisions are added to Paragraph 23. (a) of the *General Conditions*:

The Contractor shall immediately and at no cost to LMHA, provide qualified service personnel, regardless of the time of day or night, to correct warranty related deficiencies, which may cause personal injury or damage to other components.

B. Paragraph 23 (k) is added to the *General Conditions* as follows:
Approximately eleven (11) months after final acceptance of the project, but in any case, prior to expiration of the warranty period, LMHA shall conduct a warranty inspection to identify items requiring repair or replacement. The Project Architect, if any, may participate in said inspection. The Contractor may also join in the inspection, if so desired, provided such participation is in the best interests of LMHA and LMHA residents. LMHA or the Project Architect shall then prepare a list of warranty items requiring correction and present said list to the Contractor for appropriate action. The Contractor shall coordinate and effect all necessary repairs, replacements, etc., including any incidental costs associated with such work, at no

expense to LMHA and within 30 days of receipt of the list of warranty items. If the project was finally accepted by LMHA in several parts, warranty inspections and lists shall follow the timeline established by such acceptance.

XII. CONTRACT PERIOD

A. Paragraph 25 of the *General Conditions* is replaced with the following:

The Contractor shall complete all work required under this Contract within the time specified in Section L, *Special Conditions*, of the Contract, and on, or before, the date for completion set forth in the Notice to Proceed, and as modified by any approved change orders.

XIII. PAYMENTS

A. Paragraph 27. (c)(1) is added to the *General Conditions* as follows:

The above referenced breakdown shall be submitted on Form HUD-51000, *Schedule of Amounts for Contract Payments*, unless an alternate format has been approved, in writing, by LMHA. If Unit Prices are for any reason not included in the bid documents, LMHA may, at its discretion, rely upon this breakdown as a guide for determining additions to, or deductions from, the contract price.

B. The following provisions are added to Paragraph 27. (e) of the *General Conditions*:

The form of this certification will be provided by LMHA and shall be used by the Contractor. The Contractor shall complete, sign, and attach this certification form when submitting Form HUD-51001, *Periodic Estimate for Partial Payment*.

Insert the word "Timely" at the beginning of the second clause of the form so it begins, "Timely payments to subcontractors and suppliers have been made from previous payments ... "

C. Paragraph 27. (f) of the General *Conditions* shall be replaced as follows:

The PHA shall retain ten (10) percent of the amount of progress payments until completion and acceptance of all work under the contract.

D. Paragraph 27. (l) is added to the *General Conditions* as follows:

Ten-Day Payment, Subcontractors -- The Contractor shall, within ten (10) consecutive calendar days after receiving payment from LMHA, pay all subcontractors for the work, or material, or both, for which the Contractor received payment from LMHA. The Contractor shall pay each subcontractor the full amount LMHA paid the Contractor with respect to the particular subcontractor, except that the Contractor may withhold retainage from subcontractors in the same percentage as LMHA withholds retainage from the Contractor. The Contractor's failure to perform this obligation is ground for LMHA to withhold, from future payments to the Contractor, any and all sums not paid to subcontractors. LMHA may not withhold funds if the Contractor submits an affidavit averring that a genuine dispute exists between the Contractor

and the unpaid, or underpaid, subcontractor. LMHA may ignore such an affidavit, and may take such other action as LMHA may deem appropriate or necessary, where the Contractor has previously delivered to LMHA a payment request that included the amount allegedly in dispute between the Contractor and the subcontractor. LMHA reserves the right, without obligation, to place sums withheld under this provision in an interest-bearing escrow account or to pay such sums directly to subcontractors.

XIV. CONTRACT MODIFICATIONS

A. The following provisions are added to Paragraph 28. (c) of the *General Conditions*:

Time required for HUD or LMHA processing of proposed modifications shall not--under any circumstances--be construed as a delay on the part of LMHA. Nor shall the Contractor be entitled to additional payment for overhead, direct costs, impact costs, lost profit, etc., in connection with such review or processing time, either as a part of that modification or as a part of any other modification (s).

XV. CHANGES

A. Paragraph 29. (b) of the *General Conditions* is replaced with the following language:

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 (1) the Contractor gives the Contracting Officer written notice stating (a) the date, circumstances and source of the order and (b) that the Contractor regards the order as a change order and (2) in LMHA's sole opinion there has, in fact, been a material change. In the event of ambiguity, real or alleged, in the contract documents, it is for LMHA, not the Contractor, to determine the proper meaning and intent of the documents. Where the contract documents conceivably comprehend more than one method or means of accomplishing the work and the Contractor did not, before submitting its bid, expressly state the method or means it intended to use the Contractor shall use the method or means LMHA prescribes. Where the Contractor fails to expressly raise such issues prior to bidding the work the Contractor shall perform as LMHA directs, regardless of what the Contractor may have construed the documents as meaning, without any adjustment of time, price, or other conditions.

B. The following provisions are added to Paragraph 29. (d) of the *General Conditions*:

The Contractor's mere assertion that a change has occurred, that the Contractor's costs are increased because of some LMHA action, or that the specifications are defective is not sufficient ground for a change or an equitable adjustment. The Contractor bears a heavy burden of proof and LMHA, alone, shall determine whether the Contractor has carried that burden sufficiently to merit a change and equitable adjustment.

C. The following provisions are added to Paragraph 29. (g) of the *General Conditions*:

Such information shall, at the very least, demonstrate all ways in which the project's critical path may be delayed and why such delay cannot be avoided or mitigated by rescheduling or

resequencing work activities. Such information is required both for compensable and non-compensable time extension requests. These provisions shall not be construed as conflicting with, nullifying, or in any way limiting or abrogating the prohibitions set forth in Items XIII and XIV, above, regarding review time.

XVI. DISPUTES

A. The following Paragraph 31. (e)(1) is added to the *General Conditions*:

Under no circumstances shall LMHA be compelled to submit to arbitration, mediation, or other form of alternative dispute resolution (ADR), except by LMHA's express written consent. Under no circumstances shall any arbitration, mediation, or other form of ADR (Alternate Dispute Resolution) to which LMHA may submit be binding upon LMHA, except by LMHA's prior express written consent.

B. The following Paragraph 31. (e)(2) is added to the *General Conditions*:

The Contractor shall not resort to legal action in any court unless and until the Contractor has actually exhausted all administrative remedies.

XVII. LIQUIDATED DAMAGES

A. Paragraph 33. (a) of the *General Conditions* notwithstanding, the terms of Liquidated Damages are stated at Section F, *Form of Contract*, of the Contract.

XVIII. TERMINATION FOR CONVENIENCE

A. The time set forth in Paragraph 34. (c) of the *General Conditions* shall be sixty (60) days, but may be longer if deemed necessary by LMHA.

XIX. INSURANCE

A. Paragraph 36. (a)(2) of the *General Conditions* is amended as follows:

Commercial General Liability combined single limit for bodily injury and property damage shall be not less than $1,000,000.00 per occurrence.

B. Paragraph 36. (a)(3) of the *General Conditions* is amended as follows:

Automobile Liability combined single limit for bodily injury and property damage shall be not less than $1,000,000.00 per occurrence. Automobile Insurance Certificate shall include a 1980 Motor Carrier Act endorsement for contracts involving the transportation of hazardous waste.

C. The following sentence(s) shall be added to Paragraph 36. (b) of the *General Conditions*:

The Contractor shall be fully responsible for protection, maintenance, and insurance of the property against theft, vandalism, accidental mishaps, natural disasters, and any other harm during the construction period.

The builder's risk policy shall be in form and substance acceptable to LMHA and shall include (i) a soft cost endorsement in the amount of $300,000 and (ii) a debris removal sublimit no less than 50% of the amount paid for the direct loss.

D. Paragraphs 36. (d), (e), and (f) are added to the *General Conditions* as follows:

(d) For contracts involving lead-based paint or asbestos abatement the Contractor and affected subcontractors shall maintain appropriate liability insurance expressly providing coverage for those activities. The minimum limit of coverage shall be $1,000,000.00 per occurrence. "Claims-Made" policies are unacceptable for lead-based paint or asbestos activities.

(e) **Under no circumstances shall any contractor or subcontractor perform work on LMHA property prior to LMHA's acknowledgment of receipt of proper and satisfactory proof of such party's insurance as specified herein.** Likewise, any contractor or subcontractor whose insurance certificate has expired shall immediately cease work on LMHA property until such time as LMHA acknowledges receipt of a current, acceptable certificate. It is the Contractor's responsibility to ensure that all insurance certificates are kept up-to-date.

(f) Insurance Certificates shall:

- Identify the project site; and,
- Indicate the Contract Number; and,
- Include LMHA as an additionally insured; and,
- Include the following language, verbatim, with regard to cancellation:

  None of the above described policies shall be canceled or non-renewed without at least thirty (30) days prior written notice from the issuing company to the Additional Insured named at left.
  and,

- Bear the original signature of the Carrier's authorized representative.

XX. SUBCONTRACTS

A. The following provisions are added to Paragraph 37. (a)(1) of the *General Conditions*:

Employment of an individual or entity to perform work for a set amount of payment per unit of work or on a "per job" basis, is strictly prohibited where such arrangement results in the individual or any individual employed by the entity receiving less than the applicable Davis-Bacon hourly wage (including fringe benefits). Any doubt as to such issues shall be resolved against the Contractor and LMHA shall act against the Contractor as LMHA deems appropriate to resolve the matter and the Contractor shall have no recourse against LMHA for any action taken in the matter.

Third tier subcontracting is not strictly prohibited, but is strongly discouraged and subject to approval by the LMHA. Third tier subcontractors must submit for LMHA's consideration all the same documents as subcontractors.

B. Paragraph 37. (a)(2)(i) is added to the *General Conditions* as follows:

To maintain high standards of quality and craftsmanship in materials and services and to facilitate expedient completion of the work, suppliers, vendors, and firms must demonstrate that they have been established and operating successfully in the area of expertise in which they propose to participate may work on this project. For example, a firm that normally erects or supplies masonry, but proposes to furnish or install windows on this project, would not qualify as a window subcontractor (i.e., supplier, vendor, or firm).

The Contractor shall submit evidence, suitable to LMHA, of any subcontractor's qualifications whenever LMHA requests such evidence, whether before or after LMHA's acceptance of such subcontractor. In the event LMHA approves a subcontractor and later determines the subcontractor is not suitable the Contractor shall, upon LMHA's demand, dismiss the subcontractor and propose a suitable replacement for LMHA's consideration. No adjustment increasing the contract time or price shall flow from such action by LMHA.

C. Paragraph 37. (b)(1) is added to the *General Conditions* as follows:
Contractor's may consult the ***System for Award Management*** (SAM) (formerly known as the U.S. General Services Administration's *Excluded Parties List* - EPL) using the following link: https://sam.gov/SAM/pages/public/searchRecords/searchResults.jsf to determine subcontractor eligibility.

D. Paragraph 37. (f) is added to the *General Conditions* as follows:

The Contractor shall not enter into any subcontract agreement prior to receipt of LMHA's written acceptance of the proposed subcontractor. The Contractor shall not instruct or permit anyone to perform work on this project without LMHA's express written consent. LMHA shall make no payment for work performed by any subcontractor whom LMHA has not accepted in writing, or whom LMHA has subsequently determined is unacceptable. Failure to comply with these requirements is grounds for LMHA to order work stoppage, termination of the Contractor's right to proceed, or any other action LMHA deems necessary to ensure compliance.

E. Paragraph 37. (g) is added to the *General Conditions* as follows:

Only one subcontractor may be employed at any time for each category of work. Multiple subcontractors for the same category of work will not be considered unless each of those subcontractors appeared on the *List of Proposed Subcontractors* in the bid documents. If at any time the Contractor wishes to employ multiple subcontractors in the same category of work, all of the proposed subcontractors for that category of work must be submitted simultaneously for LMHA's consideration.

LMHA may approve the use of multiple subcontractors in a single category of work, if the contractor produces evidence, satisfactory to LMHA, that use of a single subcontractor would be less cost-effective, less efficient, or is not feasible. Such approval will be based solely on the best interests of LMHA.

F. Paragraph 37. (h) is added to the *General Conditions* as follows:

The Contractor shall require all subcontractors proposed to participate in this project to complete and sign a form certifying that the subcontractor is familiar with the requirements of the contract between the Contractor and LMHA and agrees to be bound by those requirements insofar as they apply to said subcontractor (forms will be provided at the pre-construction meeting).

G. Paragraph 37. (i) is added to the *General Conditions* as follows:

If the general contractor is authorized to substitute subcontractors (including 3rd tier subcontractors) and a cost saving to the general contractor is realized, 50% of the saving shall be credited to the Louisville Metro Housing Authority.

XXI. LABOR STANDARDS, DAVIS-BACON AND RELATED ACTS

A. Paragraph 46. (a)(2)(V) is added to the *General Conditions* as follows:

The General Wage Decision applicable to this project, and required by the Federal Davis-Bacon Act, is included in these documents at Section K.

B. The following provisions are added to Paragraph 46. (c)(2)(i) of the *General Conditions*:

All payrolls shall be submitted on Form WH-347. No other form may be used without LMHA's prior written consent. If granted, LMHA may at any time rescind such consent should the alternative form prove less than satisfactory for LMHA's purposes.

C. The following provisions are added to Paragraph 46. (c)(2)(i) of the *General Conditions*:

Payrolls shall be submitted no later than five working days after the last day of that payroll period to which they pertain.

D. Paragraph 46. (l) is added to the *General Conditions* as follows:

LMHA shall notify the Contractor, in writing, of labor standards discrepancies as they become known. Should any discrepancy remain unresolved thirty (30) consecutive calendar days after notification from LMHA, LMHA shall begin recording time expended by LMHA employees in pursuit of resolving such discrepancy. For each such hour, or portion of an hour, the sum of $30.00 shall be set-off from remaining payments to the Contractor as compensation for such costs. Such charges shall continue accruing until the discrepancy is satisfactorily resolved.

END OF SECTION J

SECTION K

FEDERAL DAVIS-BACON GENERAL WAGE DECISION

"General Decision Number: KY20210093 01/15/2021

Superseded General Decision Number: KY20200093

State: Kentucky

Construction Type: Building

County: Jefferson County in Kentucky.

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

Note: Under Executive Order (EO) 13658, an hourly minimum wage of $10.95 for calendar year 2021 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, 2015. If this contract is covered by the EO, the contractor must pay all workers in any classification listed on this wage determination at least $10.95 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 calendar year 2021. If this contract is covered by the EO and a classification considered necessary for performance of work on the contract does not appear on this wage determination, the contractor must pay workers in that classification at least the wage rate determined through the conformance process set forth in 29 CFR 5.5(a)(1)(ii) (or the EO minimum wage rate,if it is higher than the conformed wage rate). The EO minimum wage rate will be adjusted annually. Please note that this EO applies to the above-mentioned types of contracts entered into by the federal government that are subject to the Davis-Bacon Act itself, but it does not apply to contracts subject only to the Davis-Bacon Related Acts, including those set forth at 29 CFR 5.1(a)(2)-(60). Additional information on contractor requirements and worker protections under the EO is available at www.dol.gov/whd/govcontracts.

Modification Number	Publication Date
0	01/01/2021
1	01/15/2021

BOIL0040-001 03/01/2018

	Rates	Fringes
BOILERMAKER	$ 35.10	27.56

CARP0175-001 12/01/2020

	Rates	Fringes
CARPENTER (Includes Acoustical Ceiling Installation, Drywall Hanging, Metal Stud Installation, Form Work, and Floor Laying - Carpet and Vinyl)	$ 26.75	19.61

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CARP1076-001 06/01/2018

	Rates	Fringes
MILLWRIGHT	$ 27.20	19.97

ELEC0369-012 05/28/2019

	Rates	Fringes
ELECTRICIAN (Includes Low Voltage Wiring)	$ 32.44	17.22

ELEV0020-001 01/01/2020

	Rates	Fringes
ELEVATOR MECHANIC	$ 46.53	35.425

PAID HOLIDAYS:

a. New Year's Day, Memorial Day, Independence Day, Labor Day, Vetern's Day, Thanksgiving Day, the Friday after Thanksgiving, and Christmas Day.

b. Employer contributes 8% of regular hourly rate to vacation pay credit for employee who has worked in business more than 5 years; 6% for less than 5 years' service.

ENGI0181-054 07/01/2020

	Rates	Fringes
POWER EQUIPMENT OPERATOR (Drill)	$ 33.58	17.25

ENGI0181-079 07/01/2020

	Rates	Fringes
POWER EQUIPMENT OPERATOR (Loader)	$ 33.58	17.25

ENGI0181-081 07/01/2020

	Rates	Fringes
POWER EQUIPMENT OPERATOR (Crane)	$ 33.58	17.25

CRANES WITH BOOM 150 FEET & OVER, INCLUDING JIB, SHALL RECEIVE $.75 ABOVE THE WAGE RATE; 250 FEET AND OVER, INCLUDING JIB, SHALL RECEIVE $1.50 ABOVE THE WAGE RATE. ALL CRANES WITH PILING LEADS WILL RECEIVE $.50 ABOVE THE WAGE, REGARDLESS OF BOOM LENGTH.

ENGI0181-082 07/01/2020

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	Rates	Fringes
POWER EQUIPMENT OPERATOR (Forklift)	$ 33.58	17.25

ENGI0181-093 07/01/2020

	Rates	Fringes
POWER EQUIPMENT OPERATOR (Oiler)	$ 28.20	17.25

IRON0044-017 06/01/2020

	Rates	Fringes
IRONWORKER, ORNAMENTAL	$ 30.47	21.20

IRON0070-014 06/01/2020

	Rates	Fringes
IRONWORKER (Structural and Reinforcing)	$ 30.42	23.15

LABO0576-016 07/01/2020

	Rates	Fringes
LABORER (Backfiller, Carpenter Tender, Demolition, Common or General)	$ 20.52	11.40

LABO0576-019 07/01/2020

	Rates	Fringes
LABORER (Grouting, Mason Tender - Cement/Concrete, Power Tool Operator, Tamper - Hand Held)	$ 20.72	11.40

PLUM0502-006 08/01/2020

	Rates	Fringes
PLUMBER	$ 34.37	23.33

PLUM0502-011 08/01/2020

	Rates	Fringes
PIPEFITTER (Includes HVAC Pipe and Unit Installation)	$ 34.37	23.33

ROOF0147-001 04/01/2018

	Rates	Fringes
ROOFER	$ 24.43	10.20

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* SFKY0669-001 01/01/2021

	Rates	Fringes
SPRINKLER FITTER (Fire Sprinklers)	$ 36.63	22.07

SHEE0110-005 06/01/2017

	Rates	Fringes
SHEET METAL WORKER (Includes HVAC Duct Installation)	$ 29.17	22.00

* UAVG-KY-0015 01/01/2019

	Rates	Fringes
LABORER: Airtool Operator	$ 20.14	10.63

* UAVG-KY-0017 01/01/2019

	Rates	Fringes
LABORER: Vibrating Plate	$ 20.16	10.63

* UAVG-KY-0019 01/01/2019

	Rates	Fringes
ASBESTOS WORKER/HEAT & FROST INSULATOR	$ 28.60	16.62

SUKY2015-032 06/02/2015

	Rates	Fringes
ASBESTOS WORKER/HEAT & FROST INSULATOR	$ 26.83	12.67
BRICKLAYER	$ 24.03	8.03
CEMENT MASON/CONCRETE FINISHER	$ 20.21	9.70
LABORER: Concrete Saw (Hand Held/Walk Behind)	$ 19.93	5.97
LABORER: Mason Tender - Brick	$ 14.30	1.13
LABORER: Pipelayer	$ 20.36	9.90
OPERATOR: Backhoe/Excavator/Trackhoe	$ 22.27	3.72
OPERATOR: Bulldozer	$ 21.49	3.84
OPERATOR: Paver (Asphalt, Aggregate, and Concrete)	$ 22.52	4.00
OPERATOR: Roller	$ 23.60	12.65

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PAINTER (Brush and Roller).....$ 21.28 11.94

PAINTER: Spray.....$ 22.81 11.87

TILE FINISHER.....$ 15.42 5.63

TILE SETTER.....$ 22.64 6.10

TRUCK DRIVER: Dump Truck.....$ 23.60 8.03

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

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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 www.dol.gov/whd/govcontracts.

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) (ii)).

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

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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.

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

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* 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 Regional Office for the area in which the survey was conducted because those Regional Offices have 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.

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END OF GENERAL DECISION"

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SECTION L

SPECIAL CONDITIONS

1. ORDER OF WORK

A. **Under no circumstances shall any contractor or subcontractor perform work on LMHA property prior to LMHA's receipt of proper and satisfactory evidence of such party's insurance as specified elsewhere in the Contract.** Likewise, any contractor or subcontractor whose insurance certificate has expired shall immediately cease work on LMHA property until such time as a new and current certificate is received by LMHA. It is the Contractor's responsibility to ensure that all insurance certificates are kept up-to-date.

B. No work shall commence under the Contract unless and until all pre-work requirements have been met and all necessary materials and equipment are on-hand and ready to be installed complete, in-place, and ready for use, as specified in the Contract.

C. The Contractor shall give priority to completing work in the order directed by LMHA. Minimizing inconvenience to residents is a Contract priority. The Contractor shall make every feasible effort to schedule and prosecute the work in such manner as to minimize inconvenience to LMHA residents. The Contractor is forewarned, LMHA may change the work sequence at any time and may do so more than once. If, the Contractor demonstrates that such a change materially increases the cost of performance, LMHA may grant an equitable adjustment.

D. The Contractor shall prepare a calendar schedule of the entire project. The schedule shall ensure that the contract is completed on or before the stipulated date for completion. All work shall be planned and performed so as to minimize inconvenience to LMHA residents and employees. Where the contract requires work in an occupied area the Contractor shall take all necessary steps to ensure that all work in such dwelling is completed as quickly as reasonably possible. The calendar schedule shall.

- Ensure that the contract is completed within the allotted time for completion;
- Identify starting and completion dates for each element of work;
- Identify starting and completion dates for the total project.

2. TIME FOR COMPLETION

A. Work, including preparation and submittal of schedules and other required items, shall commence on the date stipulated in the duly executed Notice to Proceed. The Contract Period shall be **THREE HUNDRED (300) CALENDAR DAYS.**

B. The Contractor shall not perform, or permit, overtime or holiday work without the LMHA's prior written consent. The following days are observed holidays:

New Year Day - January 1
Martin Luther King, Jr. Day - Third Monday in January
Memorial Day - Last Monday in May
Independence Day - July 4
Labor Day - First Monday in September

Thanksgiving Day - Fourth Thursday in November

Day after Thanksgiving Day - Fourth Friday in November
Christmas Day - December 25
Day after Christmas Day - December 26

C. NOTE: If holiday falls on a Saturday, it will be observed on the preceding Friday. If holiday falls on a Sunday, it will be observed on the following Monday.

D. The Contractor is hereby advised that LMHA administrative personnel may take vacation(s), or other leave, during the contract period. Every effort will be made to maintain smooth administration of the contract during such vacations, however, any effect such vacations may have on the administration of this contract shall not be construed by the Contractor as the basis for delay or damage claims.

E. The Contractor may perform work between the hours of 8:00 a.m. and 4:00 p.m., Monday through Friday, except as otherwise provided by the Contract or otherwise directed or permitted in writing by the LMHA.

3. MINIMUM DAILY ACTIVITY

A. General Construction: Time is of the essence. The Contractor shall provide all labor, materials, and equipment necessary to complete the work as quickly as reasonably possible. The Contractor shall exercise professional judgment to ensure provision of adequate resources to accomplish the work without unduly interfering with LMHA residents' use and enjoyment of their homes.

4. SITE CONDITIONS

A. The Contractor shall remove all debris from the site and clean all work areas at the end of each day of work. The Contractor shall keep the project site clean and free from debris at all times. If the Contractor is negligent or lax in discharging these responsibilities, the LMHA may furnish labor and equipment to perform the needed work and may deduct the cost of such work from the Contract Price.

B. The Contractor shall provide appropriately sized trash receptacles at the project site and shall ensure that they are promptly removed when full. The Contractor shall not dispose of trash in LMHA trash receptacles.

C. Workers shall use designated areas when eating lunch, taking breaks, etc., and shall properly dispose of all personal debris.

D. The Contractor is ultimately responsible for securing its work areas, equipment, and other interests.

6. PROJECT SITE

A. The project site is located in the City of Louisville, Kentucky, and is identified elsewhere in the Contract.

7. COMMUNICATIONS

A. The Contractor shall present all notices, demands, requests, proposals, instructions, approvals, and claims in writing. Regarding matters related to this project, the Contractor shall communicate only with LMHA's Program Manager, unless otherwise authorized in writing by LMHA's Contracting Officer.

B. Any notice to, or demand upon, the Contractor shall be sufficiently given if delivered at the Contractor's address indicated on the signature page of the *Form of Contract* (or at such other address as the Contractor may, from time to time, designate, in writing, to LMHA) or if deposited in the U.S. Mail in a postage prepaid envelope, or if delivered with charges prepaid to any telegraph company for transmission, in each case addressed to such office.

C. Unless otherwise stated in writing by the Contracting Officer, only the following individuals have the authority to order work under this contract on LMHA's behalf:

LMHA Employee	**Name**
Contracting Officer	Lisa Osanka
Director, Capital Improvements Department	Norma Ward
Program Manager, Capital Improvements Department	Mike Lyall

D. **The Contractor performs work ordered by any other persons at its own risk**. LMHA will notify the Contractor if LMHA removes, replaces, or adds any LMHA agent during the contract period.

E. All deliveries to the Louisville Metro Housing Authority shall, unless otherwise specified in writing, be addressed to:

Norma Ward
Louisville Metro Housing Authority
420 South Eighth Street
Louisville, KY 40203

F. Any notice to, or demand upon, LMHA shall be sufficiently given if delivered at the address written above (or at such other address as LMHA may, from time to time, designate in writing) or if deposited in the U.S. Mail in a postage prepaid envelope, or if delivered with charges prepaid to any telegraph company for transmission, in each case addressed to such office.

G. Any communication shall be deemed to have been delivered at the time of receipt indicated by LMHA's time/date stamp or similar device. The preceding sentence notwithstanding, any communication received after 3:00 p.m., Monday through Friday, or on a holiday, shall be considered as having been received on the next business day.

8. JOB OFFICES/TEMPORARY STRUCTURES

A. A job site office is NOT REQUIRED.

B. The Contractor shall provide telephone, toilet, and other facilities for its use, as they deem necessary. Neither the Contractor nor subcontractors shall use LMHA facilities or equipment.

C. Upon completion of the contract work, or when directed by LMHA, the Contractor shall remove all such temporary structures and facilities from the project site and leave the premises in condition equal to, or better than, its condition at the time of contract award. The Contractor shall provide before and after photographs to substantiate its compliance with this requirement.

9. COOPERATION WITH THE LMHA AND LMHA RESIDENTS

A. Should any worker on this project become abusive or offensive to LMHA, LMHA employees, LMHA Residents, or the general public, the Contractor shall immediately remove the worker from the project.

B. Should any LMHA resident become a nuisance, by complaining about or interfering with the work, or by other acts, the Contractor shall immediately notify the LMHA so that steps may be taken to alleviate the problem. In the event the safety of the Contractor's personnel is imminently jeopardized by the action of a resident, or other person, the Contractor should first notify the appropriate authorities (i.e., Police, Fire Dept., etc.) and notify LMHA thereafter.

C. LMHA must notify residents 48 hours prior to performing any work that requires displacement of vehicles, closure of streets, disruption of public services, or interruption of heat, hot water, electricity, etc.

LMHA will provide personnel to deliver such notices and to accompany the Contractor's or subcontractors' personnel to occupied units where residents cannot be present during the work. The Contractor shall, to the maximum extent feasible, notify LMHA's Program Manager at least 96 hours in advance of each such activity so that LMHA may prepare and distribute notices.

10. MATERIALS STORAGE

A. Materials may be stored off-site in certain instances, provided LMHA and HUD requirements are satisfied, and the Contractor enters into an " Agreement to Store Materials Off-Site" (utilizing the LMHA Form 7002).

13. PROGRESS MEETINGS

A. With the express purpose of expediting the work and providing opportunities for cooperation of affected parties, representatives of the LMHA, the Contractor, and such others as LMHA may deem necessary shall attend progress meetings.

B. Others, including the Contractor, may suggest or request meetings, but LMHA, alone, shall determine whether, when, and where meetings are appropriate.

14. TEMPORARY UTILITIES

A. Utilities are not available. Contractor shall be responsible for utilities.

15. SANITARY FACILITIES

A. The Contractor shall furnish, install, and maintain ample sanitary facilities for workers employed on this project.

B. The Contractor shall furnish drinking water from an approved safe source, piped or transported so as to remain clean and fresh and served from single service containers or satisfactory types of sanitary drinking stands or fountains.

C. The Contractor shall maintain all sanitary facilities in strict accordance with all state and local health regulations and shall remove them from the project site upon completion or at LMHA's direction.

16. PROTECTION OF GROUNDS

A. As described elsewhere in the Contract Documents.

17. EXPLOSIVES

A. No explosives shall be used on this project.

18. PARKING

A. LMHA may designate some parking space for the Contractor's use. Designated parking, if any, may not be adequate for all project vehicles and is not guaranteed under the Contract. The Contractor must submit written requests for designated parking.

B. Whether or not LMHA provides designated parking space for the Contractor's use, the Contractor shall ensure that no vehicle owned by the Contractor, any subcontractor, any employee of the Contractor or

subcontractor(s), or any other party in the service of any of the above-named parties, is permitted to park in LMHA parking areas or on other portions of LMHA property without LMHA's written consent.

19. TEMPORARY PROTECTION

A. The Contractor shall at all times protect all work, equipment, and materials and shall comply with all applicable OSHA and General Contractors Association of America safety rules.

B. The Contractor shall observe all ordinances and police regulations concerning the occupation of, and work in, public spaces and shall save and hold harmless LMHA and LMHA employees from and against all claims, damages, losses, and expenses, including attorneys' fees, arising from or related to accidents to persons or property which may occur in connection with the Contractor's operations.

C. The Contractor shall furnish, install, and maintain such temporary work as may be required for the protection of its work, the public, and employees in or about the work site, including, but not necessarily limited to, guardrails, fences, and barricades.

D. As conditions require it, the Contractor shall provide personnel to guard the work after hours, and at other times as necessary, to prevent vandalism, personal injury, damage, etc. Anything that is damaged or defaced because of the Contractor's negligence shall be repaired or replaced by the Contractor at no additional expense to the LMHA.

20. SUPERVISION AND WORKMANSHIP

A. Throughout the progress of the work the Contractor shall keep on the job a competent superintendent, satisfactory to LMHA. The Contractor shall not change the superintendent without LMHA’s consent, unless the Contractor terminates the superintendent’s employment. The superintendent shall have authority to act on behalf of the Contractor and instruction, direction, and notices given to or by the superintendent shall be binding upon the Contractor.

B. The Contractor shall supervise and consult with each subcontractor during the work. The Contractor shall cause each subcontractor to lay-out and execute its work so as not to interfere with, delay, or damage, the work of other individuals or entities working at the project site.

C. The Contractor shall promptly remove from the premises all work rejected by the LMHA for failure to comply with the Contract Documents, whether incorporated in the construction or not, and the Contractor shall promptly replace and re-execute the Work in accordance with the Contract Documents and without expense to LMHA and shall bear the expense of making good all Work of other Contractors destroyed or damaged by such removal or replacement.

22. CUTTING AND PATCHING

A. Execute all cutting and patching in a neat and workmanlike manner using individuals skilled in the appropriate trades. Patch to match adjacent finishes. Where patching is required, refinish the entire surface of the component being patched.

23. PERMITS AND REGULATORY INSPECTIONS

A. The Contractor shall pay for and obtain from legally authorized agencies all permits and inspections necessary for the completion of work under this contract.

B. All work shall be performed by licensed persons and in accordance with all applicable codes and regulations including, but not necessarily limited to:

1. City and State Building Inspector;
2. National Fire Protection Agency;
3. Kentucky Standards of Safety;
4. Local Insuring Agency;
5. State and Local Plumbing Code;
6. Board of Health; KY Cabinet of Health Services
7. Kentucky State Fire Marshall;
8. National Sanitation Foundation;
9. National and Local Electrical Code;
10. Louisville Metro Air Pollution Control District; and
11. others, as required
12. Metropolitan Sewer District
13. Inspections, Permits, and License

C. This is notice to the Contractor that this project may be subject to Phase I or Phase II, or both, EPA Storm Water Control regulations pursuant to the Clean Water Act (33 U.S. Code 1358) as amended (40 CFR 122.26(b)(14)(x), 33 U.S. Code 1342 (p)(1988), and the Water Resources Development Act of 1992, P.L. 102-580 paragraph 364, 106 Stat. 4797).

D. This is notice to the Contractor that the EPA Storm Water Hotline / Region 4 [(404) 562-9303] is available to assist with questions regarding these requirements. Any and all permits, inspections, fees, etc. required in connection with these requirements shall be the responsibility of the Contractor and shall be acquired at no additional cost to LMHA.

E. The Contractor shall furnish LMHA and consultant with one (1) copy of each required permit.

24. POSTING REQUIREMENTS

A. The Contractor shall maintain a job bulletin board in a location where all project workers will see required postings daily.

B. LMHA will provide the following required postings to the Contractor:

1) Davis-Bacon General Wage Decision;
2) State and Federal notices to employees;
3) EEO notice;
4) Workers' Compensation notice;
5) State and Federal Safety and Health Protection notices; and

6) Contractor's Affirmative Action policy.

25. DRAWINGS AND SPECIFICATIONS

A. The Contract Documents are intended to address all work enumerated under the respective headings. The Contractor shall not take advantage of conflict between, or error in, the Contract Documents. Should any conflict or error be discovered, the Contractor shall immediately request clarification.

B. The Contractor shall not, under any circumstances, scale schematics for the location of equipment or work.

26. COORDINATION OF WORK

A. Owing to the nature of the work, and to prevent confusion and discrepancies, approximate or general dimensions may be indicated in some instances. It is intended that, in some instances, a reasonable limit of variation may be allowed to expedite the making and completion of the work and to serve the best interests of the project as a whole.

B. Other provisions of the Contract further address the Contractor's high duty to coordinate the work to minimize inconvenience to LMHA residents.

28. APPROVALS

A. Final payment shall be released only after LMHA's (and, where necessary, HUD's) written acceptance of all work.

B. The Contractor shall, at no additional cost to LMHA, furnish LMHA with certificates of inspection and approval from the appropriate inspecting agencies. Final payment shall be contingent upon LMHA's receipt of such certifications.

30. INSPECTIONS

A. Except as the Contract otherwise provides, no work of any kind shall be covered-up prior to testing, examination, and approval.

B. All installations shall be inspected by the proper authority to insure compliance with all requirements of this Contract.

C. Where formal inspections (such as punch list or final inspections) by LMHA are required, the Contractor shall provide written notice that such an inspection is needed no less than seven (7) days prior to the date on which such inspection is desired. If HUD inspection is required, the Contractor shall notify LMHA in writing no less than fourteen (14) days in advance.

31. GUARANTEE

A. Except where the contract documents require a greater guarantee period, the Contractor shall guarantee all work to be free from any defects in material and workmanship for a period of at least one (1) year from the date of acceptance.

B. The date of acceptance shall be stated in writing by LMHA when it is satisfied that all punch list and final inspection deficiencies have been corrected.

C. LMHA reserves the right to occupy individual areas at the conclusion of demolition for construction of new facilities.

D. In the event of the failure of any component or material during the period of this guarantee, the Contractor shall promptly restore such components or materials to the standards set forth by this contract at no additional expense to LMHA within a time frame established by LMHA.

32. SECURITY

A. The Contractor shall, at all times, protect and secure all work, equipment, and material.

B. All open conduits and pipes shall be tightly covered and protected against dirt, water, and other injury for the duration of the Contract.

C. It is solely the Contractor's responsibility to maintain the security of the work.

D. The Contractor shall, at no additional cost to LMHA, repair or replace – at LMHA's option – damaged, defective, or defaced work, whether or not such condition may impair the structural integrity or utility of the work.

33. ENERGY STANDARDS

A. The Contractor shall comply with all mandatory standards and policies relating to energy efficiency, which are contained in the state energy plan, issued in compliance with the Energy Policy and Conservation Act (Public Law 94-163).

34. ENVIRONMENTAL PROTECTION

A. The Contractor shall comply with all applicable standards, orders, or requirements issued under Section 3-6 of the Clean Air Act (42 U.S. Code 1857(h)), Section 508 of the Clean Water Act (33 U.S. Code 1358), Executive Order 11738, and Environmental Protection Agency regulations (40 CFR Part 15). This provision applies to contracts and subcontracts in excess of $100,000. Refer to paragraph 22.C, above, for additional information regarding the Clean Water Act.

B. The Contractor shall comply with the standards of OSHA's Health and Safety Partnership Program (HSPP) and shall ensure the application of any and all engineering controls, personal protective equipment, and safety measures necessary to protect the health of employees, LMHA personnel, the general public, and

the environment during the removal, installation, or disturbance of any and all mineral fiber and respirable synthetic vitreous fiber (SVF) materials containing fibers characteristically 5 microns, or more, in length with a length to width ratio greater than or equal to 3:1, whether or not such materials, or activities affecting such materials, are regulated by any federal, state, or local agency.

35. SUBMITTALS

A. The Contractor shall submit all required LMHA and HUD forms, certificates, and documentation as directed at the pre-construction conference and as otherwise required under the Contract.

B. The Contractor shall submit additional information, as required by the LMHA, throughout the course of this project.

C. The Contractor shall submit cut-sheets, shop drawings, product data sheets, and other relevant information to the LMHA for review prior to purchase, installation, or use, as may be required by LMHA. No material, equipment, or installation shall be purchased, installed, or used without the prior written approval of the LMHA.

END OF SECTION L

SECTION M

(v.5370)

MBE, WBE & DBE, and SECTION 3 PROGRAMS CONTRACTUAL REQUIREMENTS, FORMS AND DOCUMENTS

LMHA Minority Business Enterprise (MBE), Women Business Enterprise (WBE), Disabled Business Enterprise (DBE) and Section 3 Programs

All bidders must comply with the requirements of LMHA's MBE, WBE and DBE, and Section 3 Programs to be considered responsive.

THE PARTICIPATION PERCENTAGE GOALS FOR THIS PROJECT ARE:
MBE - TWENTY-FIVE PERCENT (25%)
WBE - TEN PERCENT (10%)
DBE - ONE HALF OF ONE PERCENT (.5%)

SECTION 3 REQUIRED NUMERICAL GOALS:

- AWARD AT LEAST 10% OF THE TOTAL DOLLAR AMOUNT OF THE CONTRACT TO SECTION 3 BUSINESS CONCERNS
- HIRING SECTION 3 RESIDENTS IN A NUMBER EQUAL TO AT LEAST 30% OF THE AGGREGATE NUMBER OF NEW HIRES

I. LMHA Minority Business Enterprise (MBE), Women Business Enterprise (WBE), and Disabled Business Enterprise (DBE) Programs

A. Generally

This contract includes provisions regarding MINORITY BUSINESS ENTERPRISE (MBE), WOMEN BUSINESS ENTERPRISE (WBE), and DISABLED BUSINESS ENTERPRISE (DBE) solicitation and employment for firms wishing to participate in LMHA federally funded procurement activities that have potential for MBE, WBE, or DBE involvement in accordance with Executive Order 11625.

FAILURE TO MEET THE MBE, WBE and DBE GOALS MAY HAVE A SERIOUS IMPACT ON THE EVALUATION OF A BIDDER'S RESPONSIVENESS!

B. Definitions

The following definitions are used throughout the bid documents and Contract Documents:

1. MBE - Means Minority Business Enterprise. That is, a business which is fifty-one percent (51%), or more, owned by one or more persons who are members of a racial minority ("Racial Minority" is defined below), and in which such persons share economic interests and have proportionate control over management, interest in capital, and interest in earnings (minority/non-minority joint ventures are addressed elsewhere in these documents).

2. WBE - Means Women Business Enterprise. That is, a business which is at least fifty-one percent (51%) owned by one or more Women, or in the case of a publicly owned business, at least 51% of the stock is owned by one or more Women; is managed by, and the daily business operations are controlled by one or more Women; and is a domestic corporation with its home office located in the United States, which is not a branch or subsidiary of a foreign corporation, firm or other business.

3. DBE - Means Disabled Business Enterprise. That is, a business which is fifty-one percent (51%), or more, owned by one or more disabled individuals, or in the case of a publicly owned business, at least 51% of the stock is owned by one or more disabled individuals; is managed by, and the daily business operations are controlled by one or more disabled individual; and is a domestic corporation with its home office located in the United States, which is not a branch or subsidiary of a foreign corporation, firm or other business.

4. MBE Certification -- All MBE, WBE, and DBE firms must be certified through either the Tri-State Minority Supplier Development Council, the Louisville and Jefferson County Human Relations Commission, or must provide evidence satisfactory to LMHA of minority ownership.

5. Racial Minority - Also called "Minority," means any United States Citizen who is:

   a) African American (racial classification 2) - All persons of origins in any black African racial group not of Hispanic origin; or,

   b) Hispanic American (racial classification 3) - All persons of Mexican, Puerto Rican, Cuban, Central or South American, or other Spanish descended culture or origin, regardless of race; or,

c) Asian American (racial classification 4) - All persons having origins in any of the Pre-Magellanic peoples of the Far East, Southeast Asia, the Indian Sub-Continent, or the Pacific Islands; or,

d) American Indian or Native Alaskan (racial classification 5) - All persons having origins in any of the Pre-Colombian peoples of North America, including Alaska, who maintain identifiable tribal affiliations, through membership and participation or community-identification; or,

e) Hasidic Jew (racial classification 6) - All persons having origins in the Hasidic Jewish culture, who maintain identifiable cultural affiliations, through membership and participation or community-identification.

6. Disabled Person - Means any person who has a physical or mental impairment which substantially limits one or more of such person's major life activities, or has a record of such an impairment, or is regarded as having such an impairment.

7. Woman - Means a person born with the physical and genetic characteristics commonly associated with the Women gender as currently defined by the professional medical community.

Women and disabled persons are not "Minority" persons, for the purposes of this project, unless they also meet one of the above-indicated definitions of a "Racial Minority."

C. MBE, WBE, and DBE Certification

All MBE, WBE, and DBE firms must be certified through the Tri-State Minority Supplier Development Council, 600 W. Main Street, Louisville, Kentucky 40202, (502) 625-0159, or the Louisville and Jefferson County Human Relations Commission, 410 West Chestnut Street, Louisville, Kentucky 40202, (502)574-3631. Certifications from other agencies will be reviewed on a case by case basis. A copy of the certification must be submitted upon request.

Questions concerning MBE participation may be directed to the Louisville Metro Housing Authority's MBE/Section 3 Coordinator, Phil Reidinger at (502) 569-4922 or Reidinger@LMHA1.org.

1. Certification through one or more of the listed agencies indicates that a firm meets or exceeds the certifying agency's requirements for MBE, WBE, or DBE certification, however, it should not be construed as implying LMHA approval of such MBE, WBE, or DBE. MBE, WBE, or DBE certification is not indicative of any qualification to perform the work for which the Bidder has proposed the MBE firm. It is the Bidder's inherent responsibility to ensure, prior to submitting a bid, that ALL proposed subcontractors are qualified.

D. MBE, WBE, and DBE Participation in LMHA Contracts

This policy applies to LMHA projects for construction, demolition, renovation, abatement, and similar activities. HUD mandates that the primary procurement responsibility of PHAs is to secure the best goods or services at the best price. However, MBE, WBE, and DBE participation is an integral and highly important part of LMHA's contracting activities. A minimum MBE, WBE, and DBE participation percentage goal has been established for this project and set forth above. The potential for achieving the MBE, WBE, and DBE participation percentage goal may depend upon the relative availability of MBE, WBE, and DBE firms in the categories of work anticipated. The Contract will be awarded to the responsible and responsive bidder who submits the lowest price, provided award serves LMHA's best interests.

1. IN ORDER TO BE CONSIDERED RESPONSIVE, a bidder must either meet the goals or provide evidence conclusively demonstrating that it made a strenuous, albeit unsuccessful, good faith effort to meet the goals. Failure to aggressively respond to these requirements is grounds for rejection of bid as non-responsive.

2. Law prohibits public housing agencies, including LMHA, from mandating MBE, WBE, or DBE participation. Bidders on LMHA projects are not obligated to use MBE, WBE, or DBE goods or services simply to meet the MBE, WBE, or DBE participation goal if the goods or services are available from non-MBE, non-WBE, or non-DBE sources at lower cost or using the MBE, WBE, or DBE would increase the cost of performance. Likewise, this policy shall not be construed as endorsing the representation of MBE, WBE, or DBE participation, when in fact a substantial portion of the participation proposed to be performed by an MBE, WBE, or DBE will be performed by the Contractor or by a third tier, non-MBE, non-WBE, or non-DBE subcontractor. For example:

   If, on the *List of Proposed Subcontractors*, the bidder indicates that an MBE, WBE, or DBE will provide case work and trim carpentry services; and, the MBE, WBE, or DBE intends to, or commonly does, subcontract a substantial portion of its work to third tier non-MBE, non-WBE, or non-DBE subcontractors; such conditions would conflict with the intent of LMHA's MBE, WBE, and DBE Policy and the bidder's MBE, WBE, or DBE participation percentage would be reduced commensurately and its responsiveness reevaluated accordingly. The foregoing statements should not be construed as diminishing LMHA's commitment to MBE, WBE, or DBE participation. LMHA is committed to MBE, WBE, and DBE participation and expects contractors to employ MBE, WBE, and DBE firms to the fullest extent feasible.

E. Calculating MBE Participation

1. General -- An MBE's, WBE's, and DBE's participation in the Contract may count toward the goal to the extent that the MBE, WBE, or DBE performs Contract work with its own forces or through an MBE, WBE, or DBE subcontractor that uses its own forces. Work that an MBE, WBE, or DBE subcontracts to a non-MBE, non-WBE, or non-DBE subcontractor does not count toward the goal. Any contractor, subcontractor, or joint venture, that claims MBE, WBE, or DBE participation may be required, at any time, to produce evidence that the portion of the total contract price claimed was actually awarded to, performed, or supplied by MBE, WBE, or DBE firms.

2. MBE, WBE, and DBE Qualifications -- For their participation to count toward the goal, MBE, WBE, and DBE firms must be currently certified as MBE, WBE, or DBE firms at the time of the bid opening. MBE, WBE, and DBE firms, to participate in the Contract, must meet all the responsiveness and responsibility requirements imposed on other contractors and subcontractors under the Contract.

3. Commercial Utility -- The participation of an MBE, WBE, or DBE may count toward the goal only if the MBE, WBE, or DBE performs a commercially useful function in executing the Contract work.

   a) An MBE, WBE, or DBE firm's function may be commercially useful if it includes direct, day-to-day responsibility for significant work of the Contract and the MBE, WBE, or DBE actually fulfills its responsibilities by performing, managing, and supervising that work.

   b) Responsibility for negotiating prices, determining quality and quantities, ordering, installing, and paying for materials and supplies involved in the MBE's, WBE's, or DBE's portion of the Contract work may, also, indicate commercial utility.

   c) An MBE's, WBE's, or DBE's function is not commercially useful if the firm's actual role is limited to that of an extra participant in a transaction, contract, or project through which funds are passed in order to present the appearance of MBE, WBE, or DBE participation. In determining whether a firm is an extra participant, LMHA may examine similar transactions, contracts, or projects, particularly those in which MBE, WBE, or DBE firms do not participate.

   d) An MBE, WBE, or DBE that does not perform, or bear and exercise responsibility for, at least 12 percent of the total cost of its Contract work with its own forces, or that subcontracts a greater portion of its Contract work than would be expected under normal industry

practice for the type of work involved, is preemptively not performing a commercially useful function. An MBE, WBE, or DBE

may challenge the presumption that it is not performing a commercially useful function. Because no privity can exist between LMHA and a subcontractor, MBE, WBE, and DBE subcontractors must assert such challenges through the prime contractor.

e) LMHA may evaluate industry practices, the amount and type of work awarded to the MBE, WBE, or DBE, and any other factors LMHA deems appropriate, to determine whether a function is commercially useful.

4. MBE, WBE, or DBE Prime Contractors -- MBE, WBE, or DBE firms are under the same obligations as any other prime contractor with respect to LMHA's MBE, WBE, or DBE goals. To receive MBE, WBE, or DBE participation credit, an MBE, WBE, or DBE prime contractor must perform at least 12% of the Contract work with its own forces. MBE, WBE, or DBE prime contractors may be credited with MBE, WBE, or DBE participation to the extent that they perform the Contract work with their own forces and employ MBE, WBE, or DBE subcontractors pursuant to the provisions of this policy. For example:

If an MBE, WBE, or DBE prime contractor will perform $12,000-worth of work with its own forces, and the total contract price is $100,000, MBE, WBE, or DBE participation would be 12%. Thus, if the MBE, WBE, or DBE participation goal was 20%, the MBE, WBE, or DBE prime contractor would be short of the goal and required to either obtain another 8% participation or demonstrate fruitless good faith efforts to obtain another 8% and request a waiver of that portion of the goal.

5. Non-MBE, WBE, or DBE Prime Contractors - may be credited with MBE, WBE, or DBE participation based on the dollar value of that portion of the total contract work subcontracted to MBE, WBE, or DBE firms and performed by such MBE, WBE, or DBE firms using their own forces or through third tier MBE, WBE, or DBE subcontractors that use their own forces. For example:

If a non-MBE, WBE, or DBE prime contractor subcontracts $15,000-worth of the total contract work to one or more MBE, WBE, or DBE subcontractors, and the total contract price is $75,000, MBE, WBE, or DBE participation would be 20% ($15,000/$75,000).

6. MBE, WBE, or DBE Subcontractors -- To receive MBE, WBE, or DBE participation credit, an MBE, WBE, or DBE subcontractor must perform at least 12% of its portion of the Contract work with its own forces. An MBE, WBE, or DBE subcontractor's participation in the Contract counts toward the goal to the extent that the MBE, WBE, or DBE performs Contract work with its own forces and through third-tier MBE, WBE, or DBE subcontractors that use their own forces. Work that an MBE, WBE, or DBE

subcontractor subcontracts to a non-MBE, WBE, or DBE subcontractor does not count toward the goal. For example:

If an MBE, WBE, or DBE firm is subcontracted to fabricate and supply equipment for this project, at least 12% of the fabrication must be performed by the MBE, WBE, or DBE firms' own forces, in its own facility.

a) A prime contractor shall receive no credit for the participation of an MBE, WBE, or DBE subcontractor unless the prime contractor, before the start of work, delivers to LMHA a fully executed original counterpart of the agreement between the prime contractor and the MBE, WBE, or DBE subcontractor.

b) Such agreement must bear the prime contractor's and MBE, WBE, or DBE subcontractor's notarized signatures, must state the price the MBE, WBE, or DBE will receive for its work, and must include a reasonably detailed description of the work the subcontractor will perform.

7. Joint Ventures - Joint ventures between an MBE, WBE, or DBE and a non-MBE, WBE, or DBE, bidding and performing as a joint venture prime contractor or sub-contractor, may count toward the goal to the extent of the dollar value of the Contract work performed with the MBE, WBE, or DBE party's forces. For example:

If the joint venture will perform $35,000-worth of the total contract work with its joint forces, and the MBE, WBE, or DBE party's forces will perform $15,000-worth of that work, and the total contract price is $100,000, MBE, WBE, or DBE participation would be 15% ($15,000/$100,000).

If, in the preceding example, the joint venture was the prime contractor and employed MBE, WBE, or DBE, WBE, or DBE subcontractors to perform $10,000-worth of the remaining total contract work, MBE, WBE, or DBE participation would be 25% (($15,000 + $10,000)/$100,000).

a) A joint venture shall receive no MBE, WBE, or DBE participation credit unless, before the start of work, it delivers to LMHA a fully executed original counterpart of the joint venture agreement.

b) Such agreement must bear the notarized signatures of all parties to the agreement, must state the sum each party will receive for its work, and must include a reasonably detailed description of the work each party will perform.

c) To be counted at all, the MBE, WBE, or DBE party's portion of the dollar value of the work must be distinct and clearly defined.

8. Materials and Supplies - Any contractor or subcontractor may, under certain conditions, claim MBE, WBE, or DBE participation credit for MBE, WBE, or DBE suppliers who provide materials for the Contract work. MBE, WBE,

or DBE supplier participation is based, generally, on the dollar value of the goods purchased from the MBE, WBE, or DBE supplier. For example:

Subject to the conditions following this example, if a non-minority prime contractor purchases $20,000-worth of supplies from an MBE, WBE, or DBE supplier, and the total contract price is $100,000, MBE, WBE, or DBE participation would be 20% ($20,000/$100,000).Materials and supplies purchased from MBE, WBE, or DBE firms for use in the Contract may count toward the goal as follows:

a) If the materials or supplies are purchased from an MBE, WBE, or DBE manufacturer, 100 percent of the cost of the materials or supplies may count toward the goal.

(1) For the purposes of these provisions, a "manufacturer" is a business entity that operates or maintains a factory or production facility that routinely produces, on its premises and in the normal course of its business, materials, supplies, articles or equipment required under the Contract.

b) Materials and supplies purchased from MBE, WBE, or DBE firms who are regular retail or wholesale dealers will only be counted toward the goal at 60 percent of their cost.

(1) For the purposes of these provisions, a "regular retail or wholesale dealer" is a business entity that:

(a) owns, operates, or maintains a store, warehouse, or other establishment in which materials, supplies, articles or equipment required under the Contract are bought, kept in stock, and regularly sold or leased to the public in the normal course of business; and

(b) is an established, regular business that engages, as its principal business and under its own name, in the purchase and sale or lease of the items required under the Contract.

(2) A person may be a regular retail or wholesale dealer in such bulk items as petroleum products, steel, cement, gravel, stone, or asphalt without owning, operating, or maintaining a place of business as described above, if the person owns and operates distribution equipment for distribution of such products.

(3) Long-term lease agreements by which a regular retail or wholesale dealer supplements its own distribution equipment may be acceptable as to the goal, but ad hoc or contract-by-contract agreements for that purpose are not.

(4) Packagers, brokers, manufacturers' representatives, and other persons who arrange or expedite transactions are not regular

retail or wholesale dealers within the meaning of these provisions. Such persons' or entities' participation shall not count toward the MBE, WBE, or DBE or DBE goal.

9. Fees or commissions -- charged by an MBE, WBE, or DBE that is neither a manufacturer nor a regular retail or wholesale dealer, for assistance in procuring materials or supplies, or for feed or transportation charges for delivering materials or supplies required under the Contract, may count toward the goal, provided LMHA finds such fees or commissions are reasonable and not excessive in comparison to fees customarily allowed for similar services. No portion of the cost of the materials and supplies themselves shall count toward the goal under these circumstances, unless they qualify under one of the other provisions of this subsection.

10. Professional Services -- Fees or commissions charged by an MBE, WBE, or DBE for providing a bona fide service, such as professional, technical, consultant, or managerial services, or for providing bonds or insurance specifically required for the performance of the Contract, may count toward the goal, if LMHA finds them reasonable and not excessive in comparison to fees customarily allowed for similar services.

11. Any contractor, subcontractor, or joint venture that claims MBE, WBE, or DBE participation may, at any time, be required to produce evidence that the portion of the total contract price claimed was actually awarded to, and performed or supplied, by MBE, WBE, or DBE firms.

F. Required Forms

Bidders must submit the following two (2) forms, among others, as a part of the bid proposal, regarding proposed employment of MBE, WBE, or DBE firms on this project:

1. *Schedule of Minority Business Participation*

a) The Bidder shall list, on this form, all MBE, WBE, or DBE firms proposed to perform as prime contractors or subcontractors for this project; the type of work to be performed; the anticipated start and completion dates for the work to be performed; and the agreed upon price for the work.

b) The Bidder, by completing this form, represents that, if awarded this contract, it will enter into formal contracts (provided each MBE, WBE, or DBE is accepted, in writing, by LMHA), in the amounts indicated, with the MBE, WBE, or DBE firms listed on this form.

2. *Schedule of MBE, WBE, or DBE Unavailability*

a) In the event the Bidder is unable to achieve the MBE, WBE, or DBE participation percentage goal, the Bidder shall list on this form all MBE,

WBE, or DBE firms contacted and/or considered, but not proposed to participate in this project, and the reasons they are not proposed to participate.

FAILURE TO SATISFY THE MBE, WBE, or DBE PARTICIPATION PERCENTAGE GOALS MAY HAVE A SIGNIFICANT ADVERSE IMPACT ON A BIDDER'S RESPONSIVENESS!

G. Evidence of Responsiveness

As evidence that the Bidder has made a significant good faith effort to involve MBE, WBE, or DBE firms in this project, the Contractor, upon request, shall make available to the Louisville Metro Housing Authority such documentation as is described below.

Bidders that fail to meet MBE, WBE, or DBE goals and fail to demonstrate sufficient good faith efforts to merit a waiver, may be required to forfeit their bid guaranty as agreed liquidated damages.

H. Waiver of MBE, WBE, or DBE Goals

Minority Business Enterprise participation is a priority objective of this agency and LMHA's MBE, WBE, and DBE policy applies to all construction and abatement contracts. If, because of extreme circumstances, a bidder cannot meet the MBE, WBE, or DBE participation percentage goal, LMHA may grant a full or partial waiver of the goal. LMHA will, however, grant a waiver of the MBE, WBE, or DBE participation percentage goal only upon receipt of persuasive evidence that a bidder has made diligent, albeit ultimately unsuccessful, efforts to meet the MBE, WBE, or DBE participation percentage goal (as further explained below).

1. Bidders must make <u>every</u> reasonable effort to meet the MBE, WBE, or DBE goals.

   Limited or merely formalistic efforts are not considered "good faith" efforts. The bidder must demonstrate that, given all relevant circumstances, it actively and aggressively endeavored to meet the MBE, WBE, or DBE goals.

2. In the event a bidder finds that it cannot fully satisfy the MBE, WBE, or DBE goals of this solicitation, the bidder must submit a written request for a full or partial waiver of the goals and receive approval prior to submission of bid. <u>All request for waivers for MBE, WBE, and DBE must be submitted with the "2nd Day Submission" documents after the bid opening.</u>

   The "MBE, WBE and DBE Waiver Request Information Sheet" can be found on Page 16 of this Section.

IF THE BIDDER WILL NOT USE <u>ANY</u> SUBCONTRACTORS OR HAS MET THE <u>FULL</u> MBE, WBE, AND DBE GOALS, IT IS NOT NECESSARY TO REQUEST A WAIVER.

a) The written request for a waiver must explain how the bidder views and evaluates the subcontractable components of a project and why the bidder was unable to attain the MBE, WBE, or DBE participation percentage goal. The request must also include detailed narrative statements describing the bidder's "good faith" efforts to secure MBE, WBE, and DBE participation. If bidder has requested such waiver from LMHA within the last five (5) years, submit copies of all waiver requests.

3. Examples of "good faith efforts" to attain the MBE, WBE, or DBE goal include, but are not necessarily limited to:

a) Attending scheduled meetings, regarding the project.

b) Providing written notice, (preferably certified mail) to a reasonable number of MBE, WBE, and DBE firms requesting bids. *A reasonable number means at least as many MBE, WBE, or DBE firms as non-MBE, WBE, or DBE firms, in each trade category, must be contacted.* Copies of certified letters sent to MBE, WBE, or DBE firms requesting bids, and original, signed, receipts, or copies of telegrams soliciting bids from MBE, WBE, or DBE firms, indicating the date of delivery, would be considered evidence of such efforts.

c) Allowing sufficient time (five working days, or more, as time permits) for MBE, WBE, and DBE firms to respond to a written notice. *Sufficient time means initiating contact with MBE, WBE, or DBE firms at least as far in advance of the bid date as contact is initiated with non-MBE, WBE, or DBE firms.* Original responses from MBE, WBE, or DBE firms indicating the reasons why they do not wish to participate in this project and bids received from MBE, WBE, or DBE firms on those firm's letterhead or standard bid forms would be considered evidence of such efforts.

d) Following up written notification by telephone or other means. Date-stamped copies of telephone conversation records and faxed letters would be considered evidence of such efforts.

e) Contacting MBE, WBE, and DBE assistance agencies and organizations (see Section J of Official Bid Package for lists) and the LMHA's MBE/Section 3 Coordinator at (502) 569-4922, for assistance in locating qualified MBE, WBE, or DBE firms. Date-stamped copies of telephone conversation records and faxed or mailed letters would be considered evidence of such efforts.

f) Selecting portions of the work to be performed by MBE, WBE, and DBE firms in order to increase the likelihood of meeting the MBE, WBE, or DBE goals. Documentation demonstrating that extra

effort was made to solicit MBE, WBE, or DBE bids for categories of work in which MBE, WBE, or DBE firms are particularly well represented in the geographical area of the project would be considered evidence of such efforts.

g) Providing MBE, WBE, and DBE firms with adequate information about the project when requesting quotations (i.e., identifying potential subtrades involved in the project and identifying a potential dollar range for those subtrades). Copies of certified letters sent to MBE, WBE, and DBE firms, and original, signed, receipts, date-stamped copies of telephone records and faxed or mailed follow-up letters, or copies of telegrams sent to MBE, WBE, and DBE firms, would be considered evidence of such efforts.

h) Advertising in general circulation media (e.g., Courier-Journal), and media aimed at minorities (e.g., Louisville Defender), at least 20 days before bids are due. Or, if 20 days are not available, publication for a shorter, but maximum available, period is acceptable. Copies of legal advertisements published as an attempt to obtain MBE, WBE, and DBE involvement would be considered evidence of such efforts.

i) Making efforts to assist MBE, WBE, or DBE firms in obtaining bonding, credit, or insurance. Date-stamped copies of telephone conversation records and faxed or mailed letters to MBE, WBE, or DBE firms and/or bondsmen, creditors, or insurers would be considered evidence of such efforts.

j) Making efforts to meet and negotiate with potential MBE, WBE, and DBE Bidders prior to the bid opening. Copies of certified letters sent to MBE, WBE, and DBE firms and original, signed, receipts, date-stamped copies of telephone records and faxed or mailed follow-up letters, or copies of telegrams sent to MBE, WBE, and DBE firms, would be considered evidence of such efforts.

k) Efforts made by the Bidder to expand its search for MBE, WBE, and DBE firms, beyond the usual geographic boundaries. Documentation demonstrating that such efforts were made would be considered evidence of such efforts.

4. LMHA reserves the right to examine the Bidder's bid preparation materials, including all requests for bids the Bidder issued to potential subcontractors, the Bidder's bid calculation work sheets, and the Bidder's telephone records, notes, and any other information LMHA believes may be helpful in verifying the Bidder's assertions.

5. LMHA's "MBE, WBE and DBE Waiver Request" review protocol includes the following steps:

a) The contractor's "MBE, WBE and DBE Waiver Request" and supporting documentation will be reviewed by the MBE, WBE, DBE and Section 3 Coordinator and the appropriate LMHA Directors overseeing the solicitation. The Waiver Request Reviewers Team will collectively make a determination for the appropriate wavier action.

b) The MBE, WBE, DBE and Section 3 Coordinator will send the written recommendation from the Waiver Request Reviewers Team to the Deputy Executive Director. If necessary, the Deputy Executive Director will schedule a meeting with the Waiver Request Reviewers Team for additional dialogue regarding the suggested waiver action.

c) The Deputy Executive Director will forward its and the Waiver Request Reviewers Team's recommendations to the Executive Director for final review and approval. This recommendation will include "MBE, WBE and DBE Waiver Request" and supporting documentation, and a transmittal signature sheet.

d) The MBE, WBE, DBE and Section 3 Coordinator will send a written notification regarding the "MBE, WBE and DBE Waiver Request" decision to the contractor or offeror.

6. The bidder's delivery of a request for waiver does not, in and of itself, ensure that such a request will be granted.

a) A full or partial waiver may be granted only after the Louisville Metro Housing Authority has thoroughly reviewed the project's MBE, WBE, or DBE participation potential. Documentation supporting a request

for waiver, if such evidence exists, may be presented to the Louisville Metro Housing Authority's Executive Director for a final decision.

b) If a waiver is granted, and there are no other impediments to the award of the contract, the contract award process may proceed.

c) If a waiver is not granted, or if no request for waiver is received, and the bid is otherwise acceptable, the Louisville Metro Housing Authority may require the Bidder to satisfy the total MBE, WBE, and DBE goals at no additional cost to the Louisville Metro Housing Authority or may deem the Bidder non-responsive.

I. Replacing MBE, WBE, or DBE Subcontractors

1. Any contractor who proposes to replace a proposed or accepted MBE, WBE, or DBE subcontractor must maintain the MBE, WBE, or DBE participation percentage that existed prior to the replacement of that subcontractor, or, if possible, achieve an even greater MBE, WBE, or DBE participation percentage. If the contractor finds it cannot satisfy these requirements, it must submit a request for waiver of the MBE, WBE, or DBE participation percentage goal, as prescribed above.

2. LMHA reserves the right to conduct compliance reviews on minority and non-minority contractors that utilize MBE, WBE, or DBE subcontractors, or

perform as joint ventures. Contractors shall maintain records of all MBE, WBE, or DBE participation for three (3) years following completion of the project. Failure on the part of the contractor to comply with these requirements could result in the withholding of payment, termination of the Contractor's right to proceed with the work, legal fines, imprisonment, or all of the above.

J. Assistance to MBE, WBE, and DBE firms

The Louisville Metro Housing Authority actively works to assist minority vendors and contractors/subcontractors. LMHA is committed to providing equal opportunities for Minority Business Enterprises (MBE, WBE, and DBE firms).

Such opportunities are advertised through newsletters and newspapers, including minority newspapers, minority purchasing councils, and the Department of Housing and Urban Development.

When requested, LMHA will provide special assistance, to the fullest extent possible, to MBE, WBE, and DBE firms, by providing instruction on the preparation of bids, MBE, WBE, and DBE policy, and any other requirements related to LMHA's MBE, WBE, and DBE program, in connection with activities including but not necessarily limited to:

1. Architectural, Engineering, and similar Professional Services contracts;
2. Construction and Maintenance contracts;
3. Purchase Contracts; and,
4. Bank Deposits.

MBE, WBE, or DBE firms, and others, seeking assistance in these areas should first contact:

1. Tri-State Minority Supplier Development Council, 600 West Main Street, Louisville, KY 40202.
   Contact: (502) 625-0159

2. Kentucky Cabinet for Economic Development, Department of Existing Business & Industry, Minority Business Division, 2201 Capital Plaza Tower, Frankfort, KY 40601.
   Contact: (502) 564-2064

3. Louisville and Jefferson County Human Relations Commission, 410 West Chestnut Street, Suite 300A, Louisville, KY 40202.
   Contact: (502) 574-3631

NOTE: The following forms on pages 15-22 shall be completely filled out and submitted with the bid.

SCHEDULE OF MBE, WBE, AND DBE PARTICIPATION

_____
(Name of Bidder)

For each MBE, WBE, or DBE firm proposed to participate in this project, list the firm's name, business address, category of work, percentage of total bid to be performed by the firm, and the firm's Federal Tax ID number in the space provided below. Use additional sheets if necessary.

_____

_____

_____

_____

_____

_____

_____

_____

The combined total of MBE participation proposed is _____ % of the total bid amount.
The combined total of WBE participation proposed is _____ % of the total bid amount.
The combined total of DBE participation proposed is _____ % of the total bid amount.

In addition to completion of this form, a Bidder who has met the MBE, WBE, and DBE goals must submit a copy of the signed sub-bid from each MBE, WBE, and DBE subcontractor listed with its bid.

The bidder, if successful, agrees to enter into a formal contract with each of the above referenced firms, in the amounts indicated, provided those firms are acceptable to the Louisville Metro Housing Authority.

NOTE: With respect to all MBD, WBE and DBE firms, whether proposed or otherwise, Bidder [or Contractor] hereby certifies that it and its fiduciaries and affiliates (i) have engaged in a fair and impartial manner with all such firms; (ii) have not utilized any such firms to obtain any unfair advantage; (iii) have made no negligent or fraudulent representations or misrepresentations to or about such firms; (iv) and there exist no side deals or undisclosed contracts or agreements that would otherwise frustrate the purpose of contracting with any MBD, WBE or DBE firms.

Signature/Title: _____ Date: _____

NOTE: Failure to complete and submit THIS form or comply with directions therein is ground for bid rejection.

MBE, WBE AND DBE WAIVER REQUEST INFORMATION SHEET

Contractor's Name: _____
Business Address, City, State and Zip Code:

_____
_____
_____
Telephone Number: _____
Contract Person: _____

Project Name and Proposal Number:

_____

WAVIER REQUESTED FOR: (fill in as needed for any that apply)

MBE: _____ WBE: _____ DBE: _____
% Requested: _____ % Requested: _____ % Requested: _____

NOTE: The "MBE, WBE and/or DBE waiver percentages" requested, when added with the "MBE, WBE and/ or DBE percentages" proposed on Page 15, must add up to the percentage needed for each category (MBE is 25%; WBE is 10%; and DBE is 0.5%).

STEPS TAKEN TO MEET GOALS: (must choose one for respond for each "step"):

		YES	NO
1	Provide written notice to potential bidders		
2	Allowed sufficient time to respond		
3	Follow-up written notification to potential bidders		
4	Contacting MBE, WBE, and DBE Agencies		
5	Selecting portions of work to be performed by MBE, WBE and DBE		
6	Advertising in general circulation media		
7	Marking efforts to meet and negotiate with potential MBE, WBE and DBE bidders		

PROVIDE A WRITTEN NARRATIVE OF THE "GOOD FAITH EFFORTS" TAKEN AND RESULTS: (Use Additional Sheets if Necessary):

_____
_____
_____

NOTE: With respect to all MBD, WBE and DBE firms, whether proposed or otherwise, Bidder [or Contractor] hereby certifies that it and its fiduciaries and affiliates (i) have engaged in a fair and impartial manner with all such firms; (ii) have not utilized any such firms to obtain any unfair advantage; (iii) have made no negligent or fraudulent representations or misrepresentations to or about such firms; (iv) and there exist no side deals or undisclosed contracts or agreements that would otherwise frustrate the purpose of contracting with any MBD, WBE or DBE firms.

Signature/Title: _____ Date: _____

LIST OF PROPOSED SUBCONTRACTORS

The following list of proposed subcontractors is required to be submitted with each bidder's proposal, in accordance with the requirements of Section C of this solicitation. All subcontractors are subject to the approval of LMHA. PROPOSED SUBCONTRACTORS AND SUBCONTRACT AMOUNTS SHALL NOT BE CHANGED, NOR SHALL ANY ADDITIONAL SUBCONTRACTORS BE EMPLOYED, WITHOUT THE EXPRESS WRITTEN CONSENT OF THE LOUISVILLE METRO HOUSING AUTHORITY.

NAME OF SUBCONTRACTOR	CATEGORY OF WORK	$ Amount
1.		
2.		
3.		
4.		
5.		
6.		

(Employer ID numbers must be provided upon request)
Use Additional Sheets If Necessary

THIS FORM MUST BE COMPLETED AND SUBMITTED WITH THE OFFICIAL BID PACKAGE.

NOTE: WITHIN TWO WEEKS OF CONTRACT EXECUTION, THE GENERAL CONTRACTOR SHALL SUBMIT, FOR THIS CONTRACT, COPIES OF ALL SUBCONTRACTOR CONTRACTS OR WRITTEN AGREEMENTS TO THE LOUISVILLE METRO HOUSING AUTHORITY

NOTE: If third tier subcontracts are intended, the information on the following page must be provided for each proposed subcontractor.

NOTE: With respect to all MBD, WBE and DBE firms, whether proposed or otherwise, Bidder [or Contractor] hereby certifies that it and its fiduciaries and affiliates (i) have engaged in a fair and impartial manner with all such firms; (ii) have not utilized any such firms to obtain any unfair advantage; (iii) have made no negligent or fraudulent representations or misrepresentations to or about such firms; (iv) and there exist no side deals or undisclosed contracts or agreements that would otherwise frustrate the purpose of contracting with any MBD, WBE or DBE firms.

Signature/Title: _____ Date: _____

EMPLOYMENT DEMOGRAPHICS

This form to be completed and submitted by the prime contractor and every proposed subcontractor. Failure to complete and submit this form is grounds for rejection.

Company Name: _____ ☐Contractor ☐Subcontractor

1 Last Name	2 First Name	3 Job Title	4 Date Hired	5 Description of Work	6 Race

Certified By: _____ Date: _____
(Authorized Officer's Signature)

In witness whereof, I hereunto set my hand and official seal: _____
(Notary's Signature)

_____
(Notary's Printed Name)

AFFIX
NOTARY'S
SEAL

My commission expires _____.

See the following page for instructions for completing this form.

The penalty for making false statements in offers (10 years imprisonment and/or $10,000 fine) is prescribed in 18 U.S.C. 1001.

Instructions for Completing EMPLOYMENT DEMOGRAPHICS Form

1. Duty to Submit Form -- Every bidder shall complete the *Employment Demographics* form (hereafter, the Form). Every bidder shall ensure that each of its sub-bidders also completes the Form. The Bidder shall submit fully executed Forms for itself and each sub-bidder, with its bid, in the package labeled "Supplemental Bid Information."

2. Space Constraints/Additional Forms -- If the space provided on a single Form is insufficient to list every employee (see definition below)of the bidder or sub-bidder completing the Form (hereafter, the Entity), such Entity shall use additional Forms. Said Entity shall, however, ensure that each separate Form is dated, signed, and notarized. Each Official Bid Package contains one (1) blank copy of the Form. From that, the Bidder shall make as many copies as needed to ensure compliance with the preceding requirements.

3. Completing the Form -- The Form is divided into six numbered columns. Write the appropriate name and check the appropriate box at the top of the Form, then complete each column as follows:

Columns 1 and 2 -- Identify, by name, each and every employee, officer, principal, and agent of the Entity. Identify every such person (hereafter, the employee), whether or not intended to perform work under or related to this Contract. Be careful to list each employee by last name first. List only proper, legal names, do not list nicknames. Do not list names of persons the Entity employs as independent contractors. If the employee routinely works less than 37 and 1/2 hours per week, write the letter "P" in the left margin adjacent to the employee's name.

Column 3 -- State the employee's job title (e.g., secretary, laborer, carpenter, CEO). Use the job titles the Entity actually, routinely uses to describe the employee.

Column 4 -- State the date upon which the Entity hired the employee. If the employee has left the Entity's employ in the past and returned to work for the Entity again, state the most recent date of hire.

Column 5 -- Describe the nature of the work the employee routinely performs for the Entity. For example, if the employee's job title is "Laborer," the employee's work may be described as "performs unskilled physical labor." Or, a "Secretary" might be described as doing "filing, typing, etc." Use additional lines if necessary, to provide a clear description of an employee's duties.

Column 6 -- State the employee's race. Use the racial classifications provided in page 2, Section M. If you write "other" or a similar classification in Column 6, attach a signed statement explaining in detail exactly what is meant by such description. Attach a separate signed statement for each employee so described, tailoring each such statement to the employee to whom it refers.

4. Each Form shall be signed and dated by an authorized officer of the Entity and shall be notarized.

AGREEMENT TO NOTIFY LMHA OF JOB OPENINGS

(This form to be completed and submitted by prime contractor and all subcontractors.)

By my signature below, _____ (hereafter "the Company"), agrees to the
(Company's Name)
following conditions:

1. The Company shall, if awarded the contract for which this Bid is offered, give LMHA notice of any and all job openings that may arise at the Company during the course of that contract.

2. Such notice shall be in writing and mailed, first class, to LMHA via the U.S. Postal Service within two business days after such opening arises. The notice shall describe the minimum qualifications and requirements of the job, the nature of the work, the expected pay rate or range, the place and manner of submitting applications, the name, address and telephone number of the person to contact to obtain an application or additional information, and the date by which applications must be submitted.

3. LMHA will notify its residents of such job openings and encourage qualified residents to submit applications for employment.

4. The Company will, if it receives an application from a qualified LMHA resident, give that application and applicant the same opportunity and consideration for the job as would be given any other, similarly qualified applicant and, if such applicant is the most qualified applicant and there is no bar to employing the applicant, the Company will hire the applicant for the job if it hires anyone for the job.

Date: _____ By: _____
(Authorized Officer's Signature)

In witness whereof, I hereunto set my hand and official seal:

_____ _____
(Notary's Signature) (Notary's printed name)

My commission expires _____. AFFIX NOTARY'S SEAL

STATEMENT OF INTENT TO PERFORM AS A MINORITY BUSINESS ENTERPRISE CONTRACTOR/SUBCONTRACTOR

(Separate form required for each MBE, WBE, and DBE prime or sub-bidder)

Name of Prime Bidder: _____

Name of MBE firm completing this form: _____

The undersigned wishes to perform work in connection with the above referenced project as:

☐ Individual ☐ Corporation ☐ Partnership ☐ Joint Venture

The undersigned hereby confirms its status as a Minority Business Enterprise as defined by LMHA and that a copy of the certification from the agency specified in Section C of this solicitation, or other evidence, is attached hereto.

The undersigned intends to perform the following work in connection with this project (specify, in detail, the work to be performed):

_____

_____

_____

Bid amount to be entered by sub-contractor $ _____

The undersigned MBE projects its start and completion dates for the work as follows:

Project Start: _____ Project Completion: _____

BY: _____ _____
(Signature of MBE's Principal) (Name and Title)

THIS FORM MUST BE COMPLETED, and included in this *Supplemental Bid Information* package, by each and every MBE contractor or subcontractor proposed to participate in this project.

The penalty for making false statements in offers (10 years imprisonment and/or $10,000 fine) is prescribed in 18 U.S.C. 1001.

AFFIDAVIT OF MINORITY BUSINESS ENTERPRISE

(Separate form required for each MBE, WBE, and DBE proposed)

State of _____ County of _____

I hereby declare and affirm that _____ is a Minority
(Bidder's printed company name)

Business Enterprise (MBE), as defined by LMHA in the bid solicitation and that I am an officer of the above referenced MBE firm, and that I am authorized to provide information required by LMHA to support that firm's representation that it is a Minority Business Enterprise.

I do solemnly declare and affirm, under the penalties of perjury, that the foregoing is true and correct, and that I am authorized, on behalf of the above-named firm, to make this affidavit.

_____ _____
(Signature of Affiant) (Printed name and title of Affiant)

STATE OF KENTUCKY, COUNTY OF JEFFERSON, CITY OF LOUISVILLE

On this _____ day of _____, 20_____,

_____, the undersigned officer, personally appeared before me,
(Printed name of Affiant)

known to me to be the person described in the foregoing Affidavit, and acknowledged that he/she executed the same in the capacity therein stated and for the purposes therein contained.

In witness whereof, I hereunto set my hand and official seal:

_____ _____
(Notary's Signature) (Notary's printed name)

My commission expires _____. AFFIX NOTARY'S SEAL

THIS FORM MUST BE COMPLETED, and included in this *Supplemental Bid Information* package, by each and every minority contractor or subcontractor proposed to participate in this project.

The penalty for making false statements in offers (10 years imprisonment and/or $10,000 fine) is prescribed in 18 U.S.C. 1001.

LEGITIMACY OF JOINT VENTURE

(Separate form required for each joint venture)

Majority Party's Name, Address, Phone, and Principal's Name:

_____

_____

_____

Minority Party's Name, Address, Phone, and Principal's Name:

_____

_____

_____

Portion of work to be performed by Majority Party: _____% $_____
Portion of work to be performed by Minority Party: _____% $_____

(Provide additional details on following page if applicable.)

"The undersigned do hereby declare and affirm, under the penalties of perjury, that the foregoing statements are true and correct and that all material information necessary to identify and explain the terms and operation of the joint venture, and the intended participation by each joint venture, in this undertaking, is attached hereto. Further, the undersigned agree to provide LMHA current, complete, and accurate information regarding the actual joint venture work, payments and any proposed changes in the above-stated arrangements, and to permit audits and/or examinations of books, records, and files of the joint ventures by authorized representatives of LMHA. The undersigned recognize and acknowledge that the statements herein are given under oath and any material misrepresentation will be grounds for terminating any contract that may be awarded the undersigned for this project."

BY: _____ Date: _____
(Signature of Majority Party's Principal)

BY: _____ Date: _____
(Signature of Minority Party's Principal)

Which, if any, of the parties to this venture are MBE firms? _____

_____

THIS FORM MUST BE COMPLETED, and included in this *Supplemental Bid Information* package, by every joint venture proposed to participate in this project (ATTACH the Joint Venture Agreement and Letters of Incorporation).

DETAILS OF JOINT VENTURE AGREEMENT

(Separate form required for each joint venture)

The Majority Party normally employs _____ tradespersons and performs work in the following trades:

_____.

The Minority Party normally employs _____ tradepersons and performs work in the following trades:

_____.

Indicate all work to be performed under this contract by the parties to this joint venture and the dollar value of each item (on a per-party basis):

Description of Work Item	Party Performed By	$ Value

Total Dollar Value: $_____

(Attach additional pages if needed.)

IF THE BID INVOLVES A JOINT VENTURE OR JOINT VENTURES, THIS FORM MUST BE COMPLETED AND SUBMITTED WITH THE OFFICIAL BID PACKAGE.

II. SECTION 3 PROGRAM REQUIREMENTS

A. Paragraph 40.(f) of Section I, *General Conditions* is replaced with the following:

The purpose of Section 3 of the Housing and Urban Development Act of 1968 (12 U.S.C. 1701u - Section 3) is to ensure that employment and other economic opportunities shall be to the greatest extent feasible and directed to low and very low income persons, particularly those who are recipients of government assistance for housing, and to business concerns which provide economic opportunities to low and very low income persons.

1. Definitions of specific terms are as follows:

a) *New Hires*: Full time employees for permanent, temporary or seasonal employment opportunities.

b) *Section 3 Business Concern*: A business concern:

- That is 51% or more owned Section 3 residents; or,
- Whose permanent, full time employees include persons, at least 30% of whom are currently Section 3 residents, or within three years of the date of first employment with the business concern were Section 3 residents; or,
- That provides evidence of a commitment to subcontracts in excess of 25% of the dollar award of all subcontract to be awarded to business concerns that meet the qualifications set forth in paragraph (1) or (2) above.

c) *Section 3 Resident*:

- A public housing resident; or,
- An individual who resides in the metropolitan statistical area and who is a low-income person (families, including single persons, whose incomes do not exceed 80% of the median family income) or very low-income person (families, including single persons, whose incomes do not exceed 50% of the median family income).

d) *Subcontractor*: Any entity (other than a person who is an employee of the Contractor) that has a contract with the Contractor to undertake a portion of the Contractor's obligation for the performance of work.

2. Contractor's may demonstrate compliance with the "greatest extent feasible" requirement of Section 3 by meeting the numerical goals set forth for providing training, employment, and contracting opportunities to Section 3 residents and business concerns as follows:

    a) Awarding at least 10% of the total dollar amount of the Contract to Section 3 business concerns; and

    b) Hiring Section 3 residents in a number equal to at least 30% of the aggregate number of new hires.

3. Contractor's shall provide training and employment opportunities to Section 3 residents in the following order of priority:

    a) Residents of the housing development or developments for which the Section 3 covered assistance is expended;

    b) Residents of other housing developments managed by the Louisville Metro Housing Authority;

    c) Participants in HUD YouthBuild programs in the metropolitan statistical area; and

    d) Other Section 3 residents of the metropolitan statistical area.

4. Contractor's shall award to Section 3 business concerns in the following order of priority:

    a) Business concerns that are 51% or more owned by residents of the housing development or development for which the Section 3 covered assistance expended, or whose full, permanent work force includes 30% of these persons as employees;

    b) Business concerns that are 51% or more owned by residents of other Louisville Metro Housing Authority developments, or whose full-time permanent workforce includes 30% of those persons as employees;

    c) HUD YouthBuild programs being carried out within the metropolitan statistical area; and

    d) Business concerns that are 51% or more owned by Section 3 residents, or whose permanent, full time workforce includes no less than 30% Section 3 residents, or that subcontract in excess of 25% of the total amount of subcontracts to business concerns in (1) and (2) above.

5. A contractor that has not met the numerical goals set forth has the burden of demonstrating why it was not feasible to meet the numerical goals set forth in this section.

B. Paragraph 40. (g) of Section I, *General Conditions* is replaced with the following:

Employment Demographics Reporting Requirements -- The Contractor and each subcontractor shall complete and submit "Employment Demographics" forms once every month, or more frequently if LMHA so chooses, during the course of the contract.

In completing the forms, the Contractor and each subcontractor shall clearly identify persons newly employed since the last form was submitted (hereafter "New Hires"). The Contractor or subcontractor shall provide the address and telephone number of each New Hire, and shall state whether each New Hire is a Section 3 Resident. The Contractor shall collect the forms and deliver them to LMHA by the seventh calendar day of each such month. LMHA will provide the Contractor with proper, blank forms at the pre-construction conference, from which the Contractor shall make and distribute copies for its own use and its subcontractors' use. The Contractor's failure to submit a monthly Employment Demographics form, or that of any subcontractor, is ground for termination, for default, of the Contractor's right to proceed with the work.

C. The following paragraph shall be added to Section I, *General Conditions*:

Notice of Job Openings -- The Contractor shall notify LMHA of any and all job openings that arise in the Contractor's company during the course of the Contract. Such notice shall be in writing and mailed, first class, to LMHA via the U.S. Postal Service within two business days after such opening arises. The notice shall describe the minimum qualifications and requirements of the job, the nature of the work, the expected pay rate or range, the place and manner of submitting applications, the name, address and telephone number of the person to contact to obtain an application or additional information, and the date by which applications must be submitted. LMHA will notify its residents of such job openings and encourage qualified residents to submit applications for employment. The Contractor shall, if it receives an application from a qualified LMHA resident, give that application and applicant the same opportunity and consideration for the job as would be given any other, similarly qualified applicant and, if such applicant is the most qualified applicant and there is no bar to employing the applicant, the Contractor shall hire the applicant for the job if it hires anyone for the job. The Contractor's right to proceed with the work may be terminated, for default, upon failure to perform this obligation.

END OF SECTION M

SECTION 012000 - PROJECT MEETINGS

PRE-CONSTRUCTION CONFERENCE

Contractor shall be present and accompanied by his project coordinator, job superintendent and all major subcontractors including testing agencies.

PROGRESS MEETINGS

Contractor, subcontractors, material men and vendors whose presence is necessary or requested must attend meetings when called by the Owner or his representatives for purpose of discussing execution of work.

Meetings will be held at a time and place designated by the Owner or his representative.

Decisions, instructions and interpretations given by the Owner or his representative at these meetings, shall be binding and conclusive on the Contractor.

Proceedings of these meetings will be recorded and Contractor will be furnished one copy for his use. Contractor shall distribute copies to the various subcontractors, material men and vendors involved.

PRE-INSTALLATION MEETINGS

Contractor, subcontractors, material men and vendors whose presence is necessary or requested must attend the meetings for the purpose of discussing execution of work.

Decisions, instructions and interpretations given by the Owner or his representative at these meetings, shall be binding and conclusive on the Contractor.

Proceedings of these meetings will be recorded and Contractor will be furnished one copy for his use. Contractor shall distribute copies to the various subcontractors, material men and vendors involved.

The following pre-installation meetings shall be held prior to start of work.

1. Abatement
2. Demolition
3. Electrical
4. Mechanical

CONTRACT PROGRESS SCHEDULE

Contractor shall be required to complete and submit to the Owner a Contract Progress Schedule within 10 days after Notice to Proceed. This schedule will be required to be reviewed and approved prior to submission of first application for payment.

END OF SECTION

SECTION 013300 – SUBMITTAL PROCEDURES

CONSTRUCTION SCHEDULES

See General Conditions.

PROGRESS REPORTS

Keep progress reports on a daily basis to cover each facet of work. Keep these reports on file at field office and make available for the PHA or his representative's review upon request.

SCHEDULE OF VALUES

Submit schedule of values as required by General Conditions.

PROJECT RECORD DOCUMENTS

Submit project record documents as required by Project Closeout Section.

OTHER SUBMITTALS

Submit all other information required by Contract Documents.

SUBMITTAL PROCEDURES

A. Coordination: Coordinate preparation and processing of submittals with performance of construction activities. Transmit each submittal sufficiently in advance of performance of related construction activities to avoid delay.

1. Submit shop drawings and samples for all items called for in the specifications.

    a. Submit electronic (email) copy of shop drawing to Architect.
    b. Submit (3) hard copies of each color sample, unless otherwise specified.
    c. Electronic (email) copy of the shop drawing and brochure bearing “final action” stamp of the Architect will be returned to the Contractor.
    d. One printed hardcopy of each drawing and one sample bearing "final action" stamp of the Architect shall be kept at project office and shall be maintained in good condition.
    e. No shop drawing or sample shall be submitted directly to the Architect from a manufacturer, jobber or subcontractor.

2. Coordinate each submittal with fabrication, purchasing, testing, delivery, other submittals, and related activities that require sequential activity.

3. Coordinate transmittal of different types of submittals for related elements of the Work so processing will not be delayed by the need to review submittals concurrently for coordination.

    a. The Architect reserves the right to withhold action on a submittal requiring coordination with other submittals until all related submittals are received.

4. Processing: To avoid the need to delay installation as a result of the time required to process submittals, allow sufficient time for submittal review, including time for resubmittals. Advise the Architect on each submittal, as to whether processing time is critical to the progress of the Work, and if the Work would be expedited if processing time could be reduced.

    a. Allow fourteen (14) working days for initial review. Allow additional time if the Architect must delay processing to permit coordination with subsequent submittals. The Architect will advise the Contractor promptly when it is determined that a submittal being process must be delayed for coordination.
    b. Allow fourteen (14) working days for color selections to be made. Color selections will only be made after ALL materials have been “reviewed” with “no exceptions”.
    c. If an intermediate submittal is necessary, process the same as the initial submittal.
    d. Allow seven (7) working days for reprocessing each submittal.
    e. No extension of Contract Time will be authorized because of failure to transmit submittals to the Architect sufficiently in advance of the Work to permit processing.
    f. The Contractor shall pay the Architect a review fee of $300.00 per shop drawing sheet and a review fee of $30.00 per page (letter and legal size) for third and subsequent resubmittals of shop drawings, product data and samples.
    g. Copies of the Contract Documents SHALL NOT be used for submittals.

B. Submittal Preparation: Place a permanent label or title block on each submittal for identification. Indicate the name of the entity that prepared each submittal on the label or title block.

1. Provide a space approximately 4 by 5 inches on the label or beside the title block on Shop Drawings to record the Contractor’s review and approval markings and the action taken.

2. Include the following information on the label for processing and recording action taken.

    a. Project name.
    b. Data.
    c. Name and address of the Consultant.
    d. Name and address of the Contractor.
    e. Name and address of the subcontractor.
    f. Name and address of the supplier.
    g. Name of the manufacturer.
    h. Number and title of appropriate Specification Section.
    i. Drawing number and detail references, as appropriate.

3. Provide a space on the label for the Contractor review and approval markings, and a space for the Architect’s “Action” marking.

C. Submittal Transmittal: Package each submittal appropriately for transmittal and handling. Transmit each submittal from the Contractor to the Consultant using a transmittal form. The Consultant will not accept submittals received from sources other than the Contractor and will be returned to sender “without action”.

1. On the transmittal, record relevant information and requests for data. On the form, or separate sheet, record deviations from Contract Document requirements, including variations and limitations. Include Contractor’s certification that information complies with Contract Document requirements.

D. In checking shop drawings and samples, the Architect shall not be required to check dimensions, quantities, electrical characteristics, specific capacities or coordination with other trades, these being Contractor's responsibility.

1. Contractor shall attest, either in writing or by stamp or signature that all shop drawings and samples submitted for approval have been checked for compliance with Contract Documents prior to submission to the Architect; otherwise, they will be returned **REJECTED.**

2. If sample warranties of items requiring warranties are not included in submittals they will be returned **REJECTED.**

3. Incomplete submittals will be returned **REJECTED.**

E. Stamp on returned shop drawing and samples shall be interpreted as follows:

No Exceptions Taken: No corrections, proceed with work.

Revise and Resubmit: Items unacceptable as submitted, make corrections and resubmit.

Note Markings: Items marked up shall not be fabricated or furnished without incorporation of marks and notes.

Rejected: Item is rejected as not in accordance with contract requirements, or for other justified cause. Submission shall be revised and resubmitted. No item shall be fabricated or furnished under this stamp.

Comments attached: As noted.

CONTRACTOR’S CONSTRUCTION SCHEDULE

A. Bar-Chart Schedule: Prepare a fully developed, horizontal bar-chart-type, contractor’s construction schedule. Submit within 15 days after the date established for “Commencement of the Work”.

1. Provide a separate time bar for each significant abatement, demolition or construction activity. Provide a continuous vertical line to identify the first working day of each week. Use the same breakdown of units of the Work as indicated in the “Schedule of Values”.

2. Within each time bar, indicate estimated completion percentage in 10 percent increments. As Work progresses, place a contrasting mark in each bar to indicate Actual Completion.
3. Prepare the schedule on a sheet, or series of sheets, of stable transparency, or other reproducible media, of sufficient width to show data for the entire construction period.
4. Secure time commitments for performing critical elements of the Work from parties involved. Coordinate each element on the schedule with other construction activities; include minor elements involved in the sequence of the Work. Show each activity in proper sequence. Indicate graphically the sequences necessary for completion of related portions of the Work.
5. Coordinate the Contractor's Construction Schedule with the Schedule of Values, list of subcontracts, Submittal Schedule, progress reports, payment requests, and other schedules.
6. Indicate completion in advance of the date established for Substantial Completion. Indicate Substantial Completion on the schedule to allow time for the Consultant's procedures necessary for certification of Substantial Completion.

B. Work Stages: Indicate important stages of construction for each major portion of the Work, including submittal review, testing, and installation.

C. Area Separations: Provide a separate time bar to identify each major construction area involved in the work. Indicate where each element in an area must be sequenced or integrated with other activities.

D. Cost Correlation: At the head of the schedule, provide a cost correlation line, indicating planned and actual costs. On the line, show dollar volume of work performed as of the dates used for preparation of payment requests.

E. Distribution: Following response to the initial submittal, print and distribute copies to the Consultant, PHA, subcontractors, and other parties required to comply with scheduled dates. Post copies in the Project meeting room and temporary field office.

1. When revisions are made, distribute to the same parties and post in the same location. Delete parties from distribution when they have completed their assigned portion of the Work and are no longer involved in construction activities.

F. Schedule Updating: Revise the schedule after each meeting, event, or activity where revisions have been recognized or made. Issue the updated schedule concurrently with the report of each meeting.

SUBMITTAL SCHEDULE

A. After development and acceptance of the Contractor's Construction Schedule, prepare a complete schedule of submittals. Submit the schedule within 10 days of the date required for submittal of the Contractor's Construction Schedule.

1. Coordinate Submittal Schedule with the list of subcontracts, Schedule of Values, and the list of products as well as the Contractor's Construction Schedule.
2. Prepare the schedule in chronological order. Provide the following information:

a. Scheduled date for the first submittal.
b. Related Section number.
c. Submittal category (Shop Drawings, Product Data, or Samples).
d. Name of the subcontractor.

END OF SECTION 013300

SECTION 014000 - QUALITY REQUIREMENTS

CODES, STANDARDS AND INDUSTRY SPECIFICATIONS

Material or operations specified by reference to published specifications of a manufacturer, testing agency, society, association or other published standards shall comply with requirements in latest revisions thereof and amendments or supplements thereto in effect on date of Contract Award.

Discrepancies between referenced codes, standards, specifications and Contract Documents shall be brought to the attention of the Architect for interpretation.

Material or work specified by reference to conform to a standard, code, law or regulation shall be governed by Contract Documents when they exceed requirements of such references; referenced standards shall govern when they exceed Contract Documents.

Proof of Compliance

Whenever Contract Documents require that a product be in accordance with Federal Specification, ASTM designation, ANSI specification or other association standard, at the Architect’s request, Contractor shall present an affidavit from manufacturer certifying that product complies therewith. Where requested or specified, submit supporting test data to substantiate. Provide documentation that products comply with the Buy American requirements of the American Reinvestment and Recovery Act.

MANUFACTURER'S DIRECTIONS

Utilize manufactured articles, materials and equipment as directed by manufacturers unless herein specified to contrary. Discrepancy between an installation required by Contract Documents, and manufacturer's instructions and recommendations shall be resolved by the Architect before work may proceed.

LINES AND MEASUREMENTS

Be responsible for properly laying out work and for lines and measurements for the work executed under Contract Documents. Verify figures indicated on Drawings before laying out work and report errors or inaccuracies in writing to the Architect before commencing work. The Architect or their representative will in no case assume responsibility for laying out work.

END OF SECTION

SECTION 015000 - TEMPORARY FACILITIES AND CONTROLS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section includes requirements for temporary utilities, support facilities, and security and protection facilities.

1.3 USE CHARGES

A. General: Installation and removal of and use charges for temporary facilities shall be included in the Contract Sum unless otherwise indicated. Allow other entities to use temporary services and facilities without cost, including, but not limited to, Owner's construction forces, Architect, occupants of Project**,** 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.

1.4 INFORMATIONAL SUBMITTALS

A. Site Plan: Show temporary facilities, utility hookups, staging areas, and parking areas for construction personnel.

1.5 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.

PART 2 - PRODUCTS

2.1 TEMPORARY FACILITIES

A. Field Offices, General: Not required.

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 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.

3.2 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. Sanitary Facilities: Provide temporary toilets, wash 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.

1. Toilets: Use of Owner's existing toilet facilities **WILL NOT** be permitted.

C. Electric Power Service: Connect to Owner's existing electric power service. Maintain equipment in a condition acceptable to Owner.

D. Parking: parking areas for construction personnel are limited.

E. Waste Disposal Facilities: Provide waste-collection containers in sizes adequate to handle waste from construction operations. Comply with requirements of authorities having jurisdiction.

3.3 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.

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. Barricades, Warning Signs, and Lights: Comply with requirements of authorities having jurisdiction for erecting structurally adequate barricades, including warning signs and lighting.

D. Temporary Egress: Maintain temporary egress from existing occupied facilities as indicated and as required by authorities having jurisdiction.

E. Temporary Fire Protection: Install and maintain temporary fire-protection facilities of types needed to protect against reasonably predictable and controllable fire losses. Comply with NFPA 241; manage fire-prevention program.

1. Prohibit smoking in construction areas.
2. Develop and supervise an overall fire-prevention and -protection program for personnel at Project site. Review needs with local fire department and establish procedures to be followed. Instruct personnel in methods and procedures. Post warnings and information.

3.4 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.

END OF SECTION 015000

SECTION 016000 – PRODUCT REQUIREMENTS

RELATED DOCUMENTS

General provisions of Contract, General and Supplementary Conditions and General Requirements apply to this Section.

TRANSPORTATION

Materials, products and equipment shall be properly containerized, packaged, boxed and protected to prevent damage during transportation and handling. More detailed requirements for transportation and handling are specified under technical sections.

STORAGE AND PROTECTION

Store and protect materials delivered at site from damage. Do not use damaged material on work.

IDENTIFYING MARKINGS

All fire rating labels and product certifications are to remain intact on the material.

MEASUREMENTS

All Contractors furnishing materials and equipment for this contract shall obtain exact dimensions at site.

Scale and figure dimensions on Drawings indicate correct size under ideal conditions and shall not under any circumstances be so construed as to relieve Contractor from responsibility of taking measurements at site and furnishing materials and equipment of correct size.

PRODUCT APPROVAL STANDARDS

Term "product" shall include material, equipment, assembly methods, manufacturer, brand, trade name or other description.

Manufacturers

Wherever manufacturers and products are listed in Contract Documents they shall establish required quality. Products, which are equal in quality, suited to same use and are capable of performing same function, as those names will be acceptable. Burden of proof of equal quality or service shall be on Contractor.

Proof of inequality is not implied by Specifications and is not a burden of the Owner. His duty shall be to properly weigh proven facts of equality in fairness to all parties involved.

Inclusion of a certain make or type of material or equipment in Contractor's bid or estimate shall not obligate Owner to accept such material or equipment if it does not meet requirements of Contract Documents. The Owner will advise Contractor of acceptance and approval thereof, and of action to be taken.

If an item of material or equipment, or manufacturer, is specifically specified to have no approved equal, it shall be provided and no substitution will be entertained or allowed unless otherwise determined by the Owner.

SUBSTITUTIONS

Inclusion in Specifications of Non-specified Products Prior to Bid Date:

For inclusion of products other than those specified, does not require prior approval. Manufacturers listed in the specifications are used to establish a level of quality. Other manufacturers may be acceptable provided the product complies with the Construction Documents. Burden of proof shall be the bidder's responsibility.

Substitutions After Award of Contract

Substitution of products will be considered only under one of the following conditions:

When specified product is not available, a proposed substitution will not be considered unless proof is submitted within forty-five (45) days after contract is signed that firm orders were placed within ten (10) days after contract signing or unavailability is due to a strike, lockout, bankruptcy, discontinuance of manufacturer of a product or natural disasters.

When a guarantee of performance is required, and in judgment of Contractor, specified product or process will not produce desired results.

Make request for such substitutions in writing to within ten days of date that Contractor ascertains he cannot obtain product specified or that performance cannot be guaranteed.

Procedure Respecting Substitutions Prior to or After Bid Date

Should Contractor wish to substitute some product other than one previously approved, he shall request permission, in writing, from the Architect, giving the following information in his letter of request:

Name and manufacturer of product specified.

Name and manufacturer of product he wishes to substitute.

Complete descriptive and specification data and illustrations and samples of product he wishes to substitute and reasons for substitutions.

In consideration of proposed substitutions, Contractor shall supply the Architect with all information, which may be requested.

The Architect will approve or disapprove proposed substitution in writing and his decision will be final if within provisions of contract documents.

END OF SECTION 016000

SECTION 017300 - EXECUTION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section includes general administrative and procedural requirements governing execution of the Work including, but not limited to, the following:

1. Installation of the Work.
2. Cutting and patching.
3. Progress cleaning.
4. Starting and adjusting.
5. Protection of installed construction.

1.3 DEFINITIONS

A. Cutting: Removal of in-place construction necessary to permit installation or performance of subsequent work.

B. Patching: Fitting and repair work required to restore construction to original conditions after installation of subsequent work.

1.4 PREINSTALLATION MEETINGS

A. Cutting and Patching Conference: Conduct conference at Project site.

1. Prior commencing work requiring cutting and patching, review extent of cutting and patching anticipated and examine procedures for ensuring satisfactory result from cutting and patching work. Require representatives of each entity directly concerned with cutting and patching to attend, including the following:

a. Contractor's superintendent.
b. Trade supervisor responsible for cutting operations.
c. Trade supervisor(s) responsible for patching of each type of substrate.
d. Subcontractors' supervisors, to the extent each trade is affecting by cutting and patching operations.

2. Review areas of potential interference and conflict. Coordinate procedures and resolve potential conflicts before proceeding.

1.5 INFORMATIONAL SUBMITTALS

A. Cutting and Patching Plan: Submit plan describing procedures at least [**10**] days prior to the time cutting and patching will be performed. Include the following information:

1. Extent: Describe reason for and extent of each occurrence of cutting and patching.
2. Changes to In-Place Construction: Describe anticipated results. Include changes to structural elements and operating components as well as changes in building appearance and other significant visual elements.
3. Products: List products to be used for patching and firms or entities that will perform patching work.
4. Dates: Indicate when cutting and patching will be performed.
5. Utilities and Mechanical and Electrical Systems: List services and systems that cutting and patching procedures will disturb or affect. List services and systems that will be relocated and those that will be temporarily out of service. Indicate length of time permanent services and systems will be disrupted.

1.6 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.
3. Other Construction Elements: Do not cut and patch other construction elements or components in a manner that could change their load-carrying capacity, that results in reducing their capacity to perform as intended, or that results in increased maintenance or decreased operational life or safety.
4. Visual Elements: Do not cut and patch construction in a manner that results in visual evidence of cutting and patching. Do not cut and patch exposed construction in a manner that would, in 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. General: Comply with requirements specified in other Sections.

1. For projects requiring compliance with sustainable design and construction practices and procedures, use products for patching that comply with sustainable design requirements.

B. In-Place Materials: Use materials for patching identical to in-place materials. For exposed surfaces, use materials that visually match in-place adjacent surfaces to the fullest extent possible.

1. If identical materials are unavailable or cannot be used, use materials that, when installed, will provide a match acceptable to 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 construction indicated as existing is not guaranteed. Before beginning, investigate and verify the existence and location of construction affecting the Work.

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 systems to verify actual locations of connections before equipment and fixture installation.
2. Examine walls, floors, etc., 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. Proceed with installation only after unsatisfactory conditions have been corrected. Proceeding with the Work indicates acceptance of surfaces and conditions.

3.2 PREPARATION

A. 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.

B. Space Requirements: Verify space requirements and dimensions of items shown diagrammatically on Drawings.

C. 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.

3.3 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 wiring in finished areas unless otherwise indicated.

B. Comply with manufacturer's written instructions and recommendations for installing products in applications indicated.

C. 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.

3.4 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. Cutting: Cut in-place construction by sawing, drilling, breaking, chipping, grinding, and similar operations, 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. Masonry: Cut using a cutting machine, such as an abrasive saw or a diamond-core drill.
4. Proceed with patching after construction operations requiring cutting are complete.

F. 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.
3. 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 watertight condition and ensures thermal and moisture integrity of building enclosure.

G. Cleaning: Clean areas and spaces where cutting and patching are performed. Remove paint, mortar, oils, putty, and similar materials from adjacent finished surfaces.

3.5 PROGRESS CLEANING

A. General: Clean Project site and work areas daily, including common areas. Enforce requirements strictly. Dispose of materials lawfully.

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. Comply with waste disposal requirements in Section 017419 "Construction Waste Management and Disposal."

H. During handling and installation, clean and protect construction in progress and adjoining materials already in place. Apply protective covering where required to ensure protection from damage or deterioration at Substantial Completion.

I. Clean and provide maintenance on completed construction as frequently as necessary through the remainder of the construction period. Adjust and lubricate operable components to ensure operability without damaging effects.

J. Limiting Exposures: Supervise construction operations to ensure that no part of the construction, completed or in progress, is subject to harmful, dangerous, damaging, or otherwise deleterious exposure during the construction period.

3.6 PROTECTION OF INSTALLED CONSTRUCTION

A. Provide final protection and maintain conditions that ensure installed Work is without damage or deterioration at time of Final Completion.

B. Protection of Existing Items: Provide protection and ensure that existing items to remain undisturbed by construction are maintained in condition that existed at commencement of the Work.

C. Comply with manufacturer's written instructions for temperature and relative humidity.

END OF SECTION 017300

SECTION 017419 - CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section includes administrative and procedural requirements for the following:

1. Recycling nonhazardous demolition waste.
2. Disposing of nonhazardous demolition waste.

1.3 DEFINITIONS

A. Construction Waste: Building and site improvement materials and other solid waste resulting from construction, remodeling, renovation, or repair operations. Construction waste includes packaging.

B. Demolition Waste: Building and site improvement materials resulting from demolition or selective demolition operations.

C. Disposal: Removal off-site of demolition and construction waste and subsequent sale, recycling, reuse, or deposit in landfill or incinerator acceptable to authorities having jurisdiction.

D. Recycle: Recovery of demolition or construction waste for subsequent processing in preparation for reuse.

1.4 PERFORMANCE REQUIREMENTS

A. General: Practice efficient waste management in the use of materials in the course of the Work. Use all reasonable means to divert construction and demolition waste from landfills and incinerators. Facilitate recycling and materials, including the following:

1. Demolition Waste: (As Applicable)

2. Construction Waste:

- Concrete.
- Concrete reinforcing steel.
- Structural and miscellaneous steel.

- Rough hardware.
- Insulation.
- Doors and frames.
- Door hardware.
- Windows.
- Glazing.
- Gypsum board.
- Carpet.
- Carpet pad.
- Equipment.
- Cabinets.
- Plumbing fixtures.
- Piping.
- Supports and hangers.
- Mechanical equipment.
- Electrical conduit.
- Copper wiring.
- Lighting fixtures.
- Lamps.
- Ballasts.
- Electrical devices.
- Switchgear and panelboards.
- Packaging: Regardless of recycle goal indicated in paragraph above, recycle 100 percent of the following uncontaminated packaging materials:

    1) Paper.
    2) Cardboard.
    3) Boxes.
    4) Plastic sheet and film.
    5) Polystyrene packaging.
    6) Wood crates.
    7) Plastic pails.

1.5 ACTION SUBMITTALS

A. Waste Management Plan: Submit plan not less than 10 days after the Preconstruction Meeting.

1.6 INFORMATIONAL SUBMITTALS

A. Recycling and Processing Facility Records: Indicate receipt and acceptance of recyclable waste by recycling and processing facilities licensed to accept them. Include manifests, weight tickets, receipts, and invoices.

B. Landfill and Incinerator Disposal Records: Indicate receipt and acceptance of waste by landfills and incinerator facilities licensed to accept them. Include manifests, weight tickets, receipts, and invoices.

1.7 QUALITY ASSURANCE

A. Regulatory Requirements: Comply with hauling and disposal regulations of authorities having jurisdiction.

B. Waste Management Conference: Conduct conference to review methods and procedures related to waste management including, but not limited to, the following:

1. Review and discuss waste management plan.
2. Review requirements for documenting quantities of each type of waste and its disposition.
3. Review and finalize procedures for materials separation and verify availability of containers and bins needed to avoid delays.
4. Review procedures for periodic waste collection and transportation to recycling and disposal facilities.
5. Review waste management requirements for each trade.

1.8 WASTE MANAGEMENT PLAN

A. General: Develop a waste management plan. Plan shall consist of waste identification, waste reduction work plan. Distinguish between demolition and construction waste. Indicate quantities by weight or volume, but use same units of measure throughout waste management plan.

B. Waste Identification: Indicate anticipated types and quantities of waste generated by the Work. Include estimated quantities and assumptions for estimates.

C. Waste Reduction Work Plan: List each type of waste and whether it will be recycled, or disposed of in landfill or incinerator

1. Recycled Materials: Include list of local receivers and processors and type of recycled materials each will accept. Include names, addresses, and telephone numbers.
2. Disposed Materials: Indicate how and where materials will be disposed of. Include name, address, and telephone number of each landfill and incinerator facility.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 PLAN IMPLEMENTATION

A. General: Implement approved waste management plan. Provide handling, containers, storage, signage, transportation, and other items as required to implement waste management plan during the entire duration of the Contract.

B. Training: Train workers, subcontractors, and suppliers on proper waste management procedures, as appropriate for the Work occurring at Project site.

1. Distribute waste management plan to everyone concerned within three days of submittal return.
2. Review plan procedures and locations established for recycling, and disposal.

C. Site Access and Temporary Controls: Conduct waste management operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities.

1. Designate and label specific areas on Project site necessary for separating materials that are to be salvaged, recycled, reused, donated, and sold.

3.2 RECYCLING WASTE, GENERAL

A. Recycling Incentives: Revenues, savings, rebates, tax credits, and other incentives received for recycling waste materials shall accrue to Contractor.

B. Preparation of Waste: Prepare and maintain recyclable waste materials according to recycling or reuse facility requirements. Maintain materials free of dirt, adhesives, solvents, petroleum contamination, and other substances deleterious to the recycling process.

C. Procedures: Separate recyclable waste from other waste materials, trash, and debris. Separate recyclable waste by type at Project site to the maximum extent practical according to approved construction waste management plan.

1. Provide appropriately marked containers or bins for controlling recyclable waste until they are removed from Project site. Include list of acceptable and unacceptable materials at each container and bin.

    a. Inspect containers and bins for contamination and remove contaminated materials if found.

2. Stockpile processed materials on-site without intermixing with other materials. Place, grade, and shape stockpiles to drain surface water. Cover to prevent windblown dust.
3. Stockpile materials away from construction area. Do not store within drip line of remaining trees.
4. Store components off the ground and protect from the weather.
5. Remove ALL waste off Owner's property and transport to recycling receiver or processor.

3.3 DISPOSAL OF WASTE

A. General: Except for items or materials to be recycled, or otherwise reused, remove waste materials from Project site and legally dispose of them in a landfill or incinerator acceptable to authorities having jurisdiction.

1. Except as otherwise specified, do not allow waste materials that are to be disposed of accumulate on-site.
2. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.

B. Burning: Do not burn waste materials.

C. Disposal: Transport waste materials off Owner's property and legally dispose of them.

END OF SECTION

SECTION 017700 – CLOSEOUT PROCEDURES

RELATED DOCUMENTS

General provisions of the Contract, and General and Supplementary Conditions and General Requirements apply to this Section.

This Section shall be governed by alternates insofar as they affect this work.

CLEANING UP

Keep site free of combustible materials.

Do not dump debris, waste and excess earth on other property without prior permission of property owner.

Burning of waste materials on site will not be permitted.

Upon completion of work, remove temporary buildings and structures, fences, scaffolding, surplus materials, equipment and rubbish of every kind from site of work.

DOCUMENTS REQUIRED PRIOR TO FINAL PAYMENT

Prior to final payment and before issuance of a final certificate of payment in accordance with provisions of General Conditions, file the following papers with the Owner.

Warranties:

Three (3) copies of warranty required by General Conditions and other extended warranties stated in technical specification sections shall be bound and submitted in a 3-ring binder.

Release of Waiver of Liens:

Provide Release of Waiver of Liens for each subcontractor, trade and vendor.

Project Record Documents:

As work progresses, keep a complete and accurate record of all changes or deviations from Contract Documents including all addenda items. Changes shall be neatly and correctly indicated on respective portion of affected document, using blackline or blueline prints of Drawings affected or Project Manual with appropriate supplementary notes. This record set Drawings and Project Manual shall be kept at job site for inspection by Architect, Owner or their representatives.

The record drawings shall not be used as a construction set.

All Addenda, Architect's Supplemental Instructions, Field Orders and Change Orders issued for this project shall be included in the Record Drawings.

Records above shall be arranged in order in accordance with various sections of specifications and properly indexed. At completion of work, certify by endorsement thereof that each of revised prints of Drawings and Project Manual is complete and accurate. Prior to application for final payment, and as a condition to its approval by Owner, deliver Record Documents, arranged in proper order, indexed and endorsed as herein before specified. Provide suitable transfer cases and deliver records therein, indexed and marked for each division of work for the following:

A full set of shop drawings bearing the Architect's stamp

Contract Drawings

Project Manual (specifications) - Highlight or otherwise note each specific product used in this project, for each section of project manual.

Change Order drawings and field changes – place on back of previous drawing sheet in record drawings.

No review or receipt of such records by Owner shall be a waiver of any deviation from Contract Documents or shop drawings or in any way relieve Contractor from his responsibility to perform work in accordance with Contract Documents and shop drawings to extent they are in accordance with Contract Documents.

Certificate of Final Completion

Provide Release of Surety, as required by General Conditions

Operating and maintenance manuals to include the following information:

1. Each Contractor shall compile product data related to the maintenance and operation of products and equipment provided under the Contract. Provide O & M information for products specified in schedules and specific work sections of the Project Manual.

   Prepare a typewritten table of contents for each volume, arranged in project manual order. Include for each product, the name, address and telephone number of subcontractor, maintenance contractor and parts vendor.

   Supplement product data with drawings to clearly illustrate the relationship of component parts and control and flow diagrams.

   Include a copy of each warranty, bond and service agreement.

2. Submit 3 copies of each manual.

3. For Materials and Finishes: Provide full information on products, including catalog number, size, composition, color and texture designations and information for reordering special-manufactured products.

   Provide manufacturer's recommendations for cleaning agents/methods and recommended cleaning and maintenance schedules.

4. For Equipment and Systems: Provide operating characteristics and limiting conditions, performance curves, engineering data and tests.

   Include operating procedures, start-up, break-in, routine and normal operating instructions; regulation, control, stopping, shutdown and emergency instructions; summer and winter operating instructions, maintenance procedures; servicing and lubrication schedules.

   Provide manufacturer's operating and maintenance instructions; sequence of operation by control manufacturer, manufacturer's parts list, illustrations, assembly drawings and diagrams for maintenance, predicted life expectancy of parts subject to wear, recommended spare parts.

END OF SECTION 017700

TECHNICAL SPECIFICATION FOR THE REMOVAL OF ASBESTOS CONTAINING MATERIALS

LOUISVILLE METRO HOUSING AUTHORITY

Pre-Renovation Asbestos Containing Materials Abatement
Dosker Manor – Building B
413 East Muhammad Ali Boulevard
Louisville, Jefferson County, Kentucky 40202

PART 1: GENERAL

1.01 WORK INCLUDED

A. Furnish all labor, materials, services, insurance, appliances, permits, patents, decontamination facilities, and equipment in accordance with the most stringent requirements of EPA, OSHA, these specifications, and all other applicable regulatory agencies to complete asbestos abatement and disposal associated with the Dosker Manor Building B (SITE) renovation in Louisville, Jefferson County, Kentucky.

B. Per applicable local, state, and federal regulations, full and/or partial enclosure methods of removal shall be employed, as deemed suitable by the consultant, to ensure safe abatement of the asbestos and hazardous materials. These methods are described herein.

C. Removal of the following listed asbestos containing materials prior to the scheduled renovation. **No asbestos containing materials are to remain in the scheduled work areas.**

ASBESTOS CONTAINING MATERIALS

ITEM	MATERIAL / CLASSIFICATION	LOCATION / APPROXIMATE QUANTITY*
1	Vinyl Floor Tile and Mastic	All units with scheduled work must have all vinyl floor tile and associated mastic completely abated. Estimated Quantity is 450 SF/unit

All quantities of materials to be abated are approximate and must be field verified by the abatement contractor

D. The designated locations of asbestos materials removal will be further defined during the site walk(s). The Contractor shall be responsible for verifying all quantities of asbestos containing materials and locations of removal of the defined asbestos containing materials by performing a thorough site inspection prior to commencing work, including the obtaining of permits. The Owner and its representatives will not be held responsible for additional work caused by the Contractor not performing a thorough site inspection.

E. This specification is not intended to describe nor illustrate the material, labor and equipment necessary to perform the work. These documents represent the Owner's and Owner's Representative's best estimate of the quantity of the defined ACMs to be removed during this project. It is the responsibility of the Contractor to determine the

precise linear footage and square footage of the defined ACM for bidding purposes. No extra compensation will be allowed for differences between the best estimate and actual quantities of material to be removed. Additionally, the inspection report and this specification are considered complete, and the collection of additional samples of materials not included within the original report (if any) will be completed by the owner's representative. The collection of samples for the purposes of demonstrating materials previously analyzed and demonstrated or assumed to be positive as non-asbestos containing is prohibited.

F. Bidders shall inform themselves of the conditions under which the work is to be performed at the work-site and all obstacles which may be encountered during the work. Bidders shall also inform themselves of all other relevant matters concerning the work to be performed, and, the bidder, if awarded the contract, shall not be allowed any extra compensation by reason of any matter or thing concerning which the bidder might have fully informed themselves, but failed to do so prior to bidding.

G. Work in all Areas shall be accomplished with workmen wearing respiratory protection that will ensure a fiber level of less than one fiber per 100 cubic centimeters of air inside the mask. Decontamination chambers will be required. Sealing off spaces with plastic and curtained doorways, airlocks, etc., will be required in work areas.

H. Clearance and area air samples will be conducted by the Owner's representative as further discussed within this specification. This does *not* alleviate the contractor from performing all applicable OSHA personnel monitoring. All sampling results conducted by the Contractor must be provided to the Owner and the Owner's Consultant at frequent intervals throughout the project (no more than 72 hours after occurrence of sampling activities) as required by OSHA and any other applicable regulations.

I. The Owner's Consultant reserves the right to discontinue the method of removal should just reason be shown through air testing or visual inspection that the Contractor's performance of these procedures is unsafe.

1.02 COORDINATION

A. It is the Contractor's responsibility to ensure that the asbestos abatement work, described within this section, is completed prior to the performance of any other work of this contract that would otherwise disturb or potentially disturb asbestos containing materials or contaminated surfaces.

B. The Contractor will be required to coordinate with the Owner, Owner's Consultant and other on-site contractors with regard to project related details including, but not limited to, safety issues, scheduling, timing, site access, and priority of abatement activities.

C. The Contractor shall notify the landfill in advance of dumping to allow an area to be set aside for the wastes. The Contractor shall provide to the Owner's Consultant certification that the landfill is an approved asbestos waste depository.

D. The Contractor shall meet or exceed all requirements required by federal, state, and local law and regulations. The contractor shall submit to the Owner's Consultant proof of possession of a current Kentucky asbestos license, in good standing, to perform asbestos related work issued by state regulatory agencies.

E. The Contractor must receive written "Notice to proceed" for abatement from the Owner and the Owner's Consultant. This notice will be provided at the Pre-abatement conference if all matters are in order.

1.03 DEFINITIONS

Aggressive method - means removal or disturbance of building material by sanding, abrading, grinding or other method that breaks, crumbles, or disintegrates intact ACM.

Air Monitoring Professional – Contractor selected representative not affiliated with abatement firm who will perform third party air monitoring and document project related activities.

Amended water - means water to which surfactant (wetting agent) has been added to increase the ability of the liquid to penetrate ACM.

Asbestos - includes chrysotile, amosite, crocidolite, tremolite asbestos, anthophyllite asbestos, actinolite asbestos, and any of these minerals that has been chemically treated and/or altered. For purposes of this standard, "asbestos" includes PACM, as defined below.

Asbestos-containing material (ACM) - means any material containing more than one percent asbestos.

Assistant Secretary - the Assistant Secretary of Labor for Occupational Safety and Health, U.S. Department of Labor, or designee.

Authorized person - any person authorized by the employer and required by work duties to be present in regulated areas.

Building/facility owner - is the legal entity, including a lessee, which exercises control over management and record keeping functions relating to a building and/or facility in which activities covered by this standard take place.

Certified Industrial Hygienist (CIH) – one who is certified in the practice of industrial hygiene by the American Board of Industrial Hygiene.

Class I asbestos work - activities involving the removal of TSI and surfacing ACM and PACM.

Class II asbestos work - activities involving the removal of ACM, which is not thermal system insulation or surfacing material. This includes, but is not limited to, the removal of asbestos-

containing wallboard, floor tile and sheeting, roofing and siding shingles, and construction mastics.

Class III asbestos work - repair and maintenance operations, where "ACM", including TSI and surfacing ACM and PACM, is likely to be disturbed.

Class IV asbestos work - maintenance and custodial activities during which employees contact but do not disturb ACM or PACM and activities to clean up dust, waste and debris resulting from Class I, II, and III activities.

Clean room - an uncontaminated room having facilities for the storage of employees' street clothing and uncontaminated materials and equipment.

Closely resemble - the major workplace conditions, which have contributed to the levels of historic asbestos exposure, are no more protective than conditions of the current workplace.

Competent person - in addition to the definition in 29 CFR 1926.32 (f), one who is capable of identifying existing asbestos hazards in the workplace and selecting the appropriate control strategy for asbestos exposure, who has the authority to take prompt corrective measures to eliminate them, as specified in 29 CFR 1926.32(f): in addition, for Class I and Class II work who is specially trained in a training course which meets the criteria of EPA's Model Accreditation Plan (40 CFR part 763) for supervisor, or its equivalent and, for Class III and Class IV work, who is trained in a manner consistent with EPA requirements for training of local education agency maintenance and custodial staff as set forth at 40 CFR 763.92 (a)(2).

Contractor – for the purposes of this document means the firm that will be performing asbestos abatement activities

Critical barrier - one or more layers of plastic sealed over all openings into a work area or any other similarly placed physical barrier sufficient to prevent airborne asbestos in a work area from migrating to an adjacent area.

Decontamination area - an enclosed area adjacent and connected to the regulated area and consisting of an equipment room, shower area, and clean room, which is used for the decontamination of workers, materials, and equipment that are contaminated with asbestos.

Demolition - the wrecking or taking out of any load-supporting structural member and any related razing, removing, or stripping of asbestos products.

Director - the Director, National Institute for Occupational Safety and Health, U.S. Department of Health and Human Services, or designee.

Disturbance - activities that disrupt the matrix of ACM or PACM, crumble or pulverize ACM or PACM, or generate visible debris from ACM or PACM. In no event shall the amount of ACM or PACM so disturbed exceed that which can be contained in one glove bag or waste bag which shall not exceed 60 inches in length and width.

Employee exposure - exposure to airborne asbestos that would occur if the employee were not using respiratory protective equipment.

Equipment room (change room) - a contaminated room located within the decontamination area that is supplied with impermeable bags or containers for the disposal of contaminated protective clothing and equipment.

Fiber - a particulate form of asbestos, 5 micrometers or longer, with a length-to-diameter ratio of at least 3 to 1.

Glovebag - not more than a 60x 60-inch impervious plastic bag-like enclosure affixed around an asbestos-containing material, with glove-like appendages through which material and tools may be handled.

High-efficiency particulate air (HEPA) filter - a filter capable of trapping and retaining at least 99.97 percent of all mono-dispersed particles of 0.3 micrometers in diameter.

Homogeneous area - an area of surfacing material or thermal system insulation that is uniform in color and texture.

Industrial hygienist - a professional qualified by education, training, and experience to anticipate, recognize, evaluate and develop controls for occupational health hazards.

Intact - ACM has not crumbled, been pulverized, or otherwise deteriorated so that the asbestos is no longer likely to be bound with its matrix.

LF - linear feet of thermal system insulation or other ACM

Micron – unit of measure equal to one millionth of a meter (1 meter = 39.37 inches)

Modification - a changed or altered procedure, material or component of a control system, which replaces a procedure, material or component of a required system. Omitting a procedure or component, or reducing or diminishing the stringency or strength of a material or component of the control system is not a "modification" for purposes of this section.

Negative Initial Exposure Assessment - a demonstration by the employer, which complies with the criteria in paragraph 29 CFR 1926.1101(f)(2)(iii), that employee exposure during an operation is expected to be consistently below the PELs.

NESHAP - National Emissions Standards for Hazardous Air Pollutants

NIOSH - National Institute for Occupational Safety and Health

OSHA - Occupational Safety and Health Administration

Permissible exposure limits (PELS):

(1) *Time-weighted average limit (TWA).* The employer shall ensure that no employee is exposed to an airborne concentration of asbestos in excess of 0.1 fiber per cubic centimeter of air as an eight (8) hour time-weighted average (TWA), as determined by the method prescribed in 29 CFR 1926.1101 Appendix A, or by an equivalent method.

(2) *Excursion limit.* The employer shall ensure that no employee is exposed to an airborne concentration of asbestos in excess of 1.0 fiber per cubic centimeter of air (1 f/cc) as averaged over a sampling period of thirty (30) minutes, as determined by the method prescribed in Appendix A to this section, or by an equivalent method.

PACM - "presumed asbestos containing material".

Presumed Asbestos Containing Material - thermal system insulation and surfacing material found in buildings constructed no later than 1980.

Project Designer - a person who has successfully completed the training requirements for an abatement project designer established by 40 U.S.C. 763.90(g).

Regulated area - an area established by the employer to demarcate areas where Class I, II, and III asbestos work is conducted, and any adjoining area where debris and waste from such asbestos work accumulate; and a work area within which airborne concentrations of asbestos, exceed or there is a reasonable possibility they may exceed the permissible exposure limit.

Removal - all operations where ACM and/or PACM is taken out or stripped from structures or substrates, and includes demolition operations.

Renovation - the modifying of any existing structure, or portion thereof.

Repair - overhauling, rebuilding, reconstructing, or reconditioning of structures or substrates, including encapsulation or other repair of ACM or PACM attached to structures or substrates.

SF - Square feet, which are units of measure for area

Standard For Air Clearance - 0.01 fibers per cubic centimeter of air (f/cc) for asbestos under an a aggressive environment

Surfacing material - material that is sprayed, troweled-on or otherwise applied to surfaces (such as acoustical plaster on ceilings and fireproofing materials on structural members, or other materials on surfaces for acoustical, fireproofing, and other purposes).

Surfacing ACM - surfacing material, which contains more than 1% asbestos.

Thermal system insulation (TSI) - ACM applied to pipes, fittings, boilers, breeching, tanks, ducts or other structural components to prevent heat loss or gain.

Thermal system insulation ACM - is thermal system insulation, which contains more than 1% asbestos.

USEPA - United States Environmental Protection Agency

WSR- Waste Shipment Records

Work Areas - Areas where asbestos containing or contaminated materials are scheduled for removal

1.04 DISPOSAL SITES

A. The asbestos materials and associated debris removed must be disposed of at an asbestos approved sanitary landfill. The Contractor selected for the work must make appropriate arrangements for disposal based on the notification requirements listed in subparagraph 1.07. The Contractor must also submit to the Owner and Owner's Consultant documentation stating the location of the disposed ACM in the landfill (degrees and minutes or sketch).

B. The hazardous materials removed must be segregated, characterized, removed and properly disposed of in accordance with all applicable local, state, and federal regulations. The demolition contractor must be trained to segregate, characterize, handle, transport, and dispose of the materials. Since limited amounts of lead-based paint are known to be present on the subject property, the contractor must conduct all onsite activities in compliance with the OSHA lead construction standard 29 CFR 1926.62. The Contractor must also submit to the Owner and the Owner's Consultant documentation of proper disposal including waste manifests and shipment documents of hazardous materials listed within Section 1.01.

1.05 QUALITY ASSURANCE and ABATEMENT CONTRACTOR RESPONSIBILITY

A. All asbestos removal and related work shall be accomplished by a Contractor specializing in, and having a record of, not less than two years successful experience in asbestos removal and related work. The Contractor's superintendent shall have not less than one year of full-time experience in responsible charge of asbestos removal operations within the 24-month period preceding the start of this project. The training of the superintendent and all workers shall be in compliance with current local (Louisville, Jefferson County, Kentucky), state (Kentucky Division for Air Quality), and federal (EPA/OSHA) regulations. The Abatement Contractor shall assume full responsibility and liability for compliance with all applicable Federal, State and Local regulations related to any and all aspects of the abatement project. The contractor is responsible for providing and maintaining training and personal protective equipment as required by applicable Federal, state and local regulations. The Abatement Contractor shall hold the LMHA harmless for any failure of the Contractor to comply with any applicable abatement

work, transporting, disposal, safety, health and environmental regulation /requirement on the part of himself, his employees, or his subcontractors. In the event of non/friable asbestos disturbance, the Abatement Contractor will incur all costs of the Consultant's Industrial Hygienist (IH) and Certified Industrial Hygienist (CIH), including all corrective abatement, sampling /analytical, and disposal costs to assure compliance with OSHA/EPA/State requirements.

B. Additionally, the Contractor must be acceptable to the Louisville Metro Air Pollution Control District (LMAPCD) as a qualified contractor in good standing.

1.06 REGULATORY REQUIREMENTS

A. All work shall be in strict compliance with the current issues of federal, state and local regulations, codes and standards including, but not limited to:

1. Asbestos/Lead Regulations:

   a. LMAPCD asbestos regulations;

   b. U.S. Environmental Protection Agency (EPA) Regulations for Asbestos (Code of Federal Regulations Title 40, Part 61, Sub-Part M);

   c. U.S. EPA National Emissions Standards for Hazardous Air Pollutants (NESHAP);

   d. Title 40, Code of Federal Regulations, Part 763, Asbestos;

   e. U.S. Department of Labor Occupational Safety and Health Administration (OSHA) Asbestos Regulations (Code of Federal Regulations Title 29, Part 1926, Section 1926.1101);

   f. Title 29, Code of Federal Regulations, Section 1910.1001. OSHA, U.S. Department of Labor;

   g. Title 29 CFR 1926 - Construction Standard Requirements - Demolition Work;

   h. Title 29 CFR 1910.38(a);(b) - Emergency Action Plan;

   i. Title 29 CFR 1910.132 - Personal Protective Equipment;

   j. Title 29 CFR 1910.20 - Access to Employee Exposure and Medical Records;

   k. Title 29 CFR 1910.1200 - Hazard Communication;

l. Title 29 CFR 1910.151 - Medical and First Aid;

m. Title 29, Code of Federal Regulations, Section 1910.134. OSHA Respiratory Protection Standards;

n. Section 6, Toxic Substance Control Act (TSCA);

o. Title 29, Section 1910.1000, Occupational Safety and Health Standards;

p. Title 29, Section 1910.120, Hazardous Waste Operations and Emergency Response;

q. American National Standard Institute (ANSI) Publications: Z9.2-79 Fundamentals Governing the Design and Operation of Local Exhaust Systems;

r. ANSI Publications: Z88.2-80 Practices for Respiratory Protection;

s. Hazard Communication - Title 29, Part 1910, Section 1200 of the Code of Federal Regulations;

t. Title 29, Code of Federal Regulations Section 1926.59, Construction Industry Standard for Hazard Communication;

u. Title 40 CFR 61 Subpart A and M (Revised Subpart B) - National Emission Standard for Hazardous Air Pollutants – Asbestos;

v. Title 40 CFR 763 - Asbestos Hazard Emergency Response Act (AHERA) and Asbestos School Hazard Abatement Reauthorization Act (ASHARA);

w. Specifications for Accident Prevention
Signs and Tags - Title 29, Part 1910, Section 145 of the Code of Federal Regulations;

x. U.S. Department of Transportation (DOT), included, but not limited to: Hazardous Substance - Title 49, Part 171 and 172 of the Codes of Federal Regulations;

y. All attachments, memorandums and information sheets submitted by Federal, State and Local agencies; and

z. All State, County, and City codes and ordinances as applicable. Provide one copy of EPA, OSHA, State, and City Regulations governing the work available for review at the site.

2. Asbestos Guidance Documents:

a. Asbestos-Containing Materials in School Buildings: A Guidance Document, Part 1. Office of Toxic Substances, U.S. EPA, Washington, D.C. 1979;

b. Asbestos-Containing Materials in School Buildings: A Guidance Document, Part 2. Office of Toxic Substances, U.S. EPA, Washington, D.C. 1979;

c. Guidance for Controlling Friable Asbestos-Containing Materials in Buildings: Washington, D.C. Office of Pesticides and Toxic Substances, U.S. EPA. 1983;

d. Guidance for Controlling Asbestos-Containing Materials in Buildings: Washington, D.C. Office of Pesticides and Toxic Substances, U.S. EPA. 1985;

e. Measuring Airborne Asbestos Following an Abatement Action: Washington, D. C., Office of Pesticides and Toxic Substances, U.S. EPA. 1985;

f. Asbestos Waste Management/Guidance: Generation, Transport, and Disposal: Washington, D.C., Office of Solid Waste, U.S. EPA. 1985;

g. Notification of Regulated Waste Activity. Office of Solid Waste (OS-312), Washington, D.C., U.S. EPA. 1990;

h. ANSI - American National Standards Institute, ANSI Z 9.2, Fundamentals Governing the Design and Operation of Local Exhaust Systems; and

i. NEC - National Electric Code. Any Work involving electrical equipment in a facility shall be performed in strict accordance with the National Electric Code.

1.07 SUBMITTALS

A. Meeting and Site walkover

1. At the time of notice to proceed, the Owner and Owner's Consultant will schedule a meeting at the subject property to discuss the project and allow the

selected contractor to conduct a site walk over for the purposes of the pending asbestos abatement.

2. Prior to the site walkover, the Owner's Consultant will supply the LMAPCD with appropriate documentation and laboratory results to identify and quantify ACM to be abated within the structure and other suspect materials indicating non-ACM results. It remains the responsibility of the Contractor to verify all quantities and locations for removal by performing a thorough site inspection prior to commencing work, including the obtaining of permits. The Owner and its representatives will not be held responsible for additional work caused by the Contractor not performing a thorough site inspection.

B. Documents

The selected contractor will supply the following documentation not fewer than ten (10) business days prior to commencement of work to the Owner for the Owner's Consultant's review:

1. Copies of documentation, permits, site location, completed and signed landfill letter (subparagraph 1.14) and arrangements for transport and disposal of asbestos containing or contaminated materials. Submit certification that proposed landfill site to be used meets all appropriate regulatory requirements.

2. A copy of the employers Emergency Action Plan including, but not limited to, emergency planning for consideration of asbestos exposure, fire, explosion, hazardous atmospheres, electrical hazards, slips/trips and falls, confined spaces, and heat stress illness, as needed. Written procedures for response to anticipated emergency situations shall be developed. Emergency procedures shall be in written form and prominently posted. All personnel must be trained prior to entering regulated areas in these procedures and sign that they understand the emergency procedures.

3. The Abatement Contractor shall apply for and have on-site all required permits and licenses to perform abatement work as required by Federal, State, and Local regulations.

4. Written description, sketch or combination thereof, of the plans for construction of a worker and barrier/equipment decontamination enclosure system and for isolation of the work areas in compliance with the Contract Documents and all applicable regulations.

5. Project specific asbestos abatement work procedures or practices to be utilized (Contractor's Work Plan).

6. Contractor's proof of experience with projects of this scope of work. A listing of asbestos abatement supervisory personnel (including foremen) and their experience, qualifications and training.

7. Individually signed and Notarized "Certificates of Workers Acknowledgment Forms" (subparagraph 1.13) for all workers intended for this project.

8. Individual documentation of the most recent respirator fit test (within previous six months) for each type of respiratory protection for each worker intended for this project. Physician's documentation that the worker is medically capable of wearing a respirator must also be submitted.

9. Product data and Safety Data Sheets (SDS) for any equipment or materials to be used.

10. Manufacturer's specifications for air cleaning, vacuum equipment, and air handling equipment, as well as any special tools or safety equipment to be utilized on this Project.

11. Medical exams, worker release forms, asbestos training certification forms, and respirator training documentation of all employees performing asbestos abatement on the Project. As new employees are considered for work at the project site, submit the above for those employees prior (minimum of two working days prior) to entry at the project.

12. A copy of all required Asbestos Contractor and Contractor personnel licenses required by the Louisville Metro Air Pollution Control District, and the Kentucky Division for Air Quality.

13. Certificates of Insurance showing evidence of Workers' Compensation, Liability Insurance, and Asbestos Liability Insurance coverage.

14. Descriptions of any asbestos hazard abatement activities conducted that have been prematurely terminated, including the circumstances surrounding the termination.

15. Descriptions of any asbestos hazard abatement activities conducted that have been prematurely terminated, including the circumstances surrounding the termination.

16. A list of any contractual penalties that the Contractor has paid for breach of or noncompliance with Contract Specifications for asbestos hazard abatement activities, such as overruns of completion time or liquidated damages.

17. Identification of any citations levied against the Contractor by any Federal, State, or local government agencies for violations related to asbestos hazard abatement, including the name or location of the project, the date(s), and how the allegations were resolved.

18. A description, in detail, of all legal proceedings, lawsuits, or claims that have been filed or levied against the Contractor or any of the Contractor's past or present employees for asbestos-related activities, and how the allegations were resolved.

NOTE: If any or all of Submittals 14 through 18 do not apply, the Contractor shall provide a written statement expressing the same.

19. Provide estimated schedule for complete abatement activities. Provide breakdown by work area, including, at a minimum, the number of man-hours anticipated, number of days, and any assumptions.

20. Provide a total cost estimate for completion of abatement activities. Please provide breakdown by work area and include unit rates for contingency purposes.

C. Pre-Job Commencement Activities and Post Contract Award

1. Submit written notice of impending commencement of removal of ACM work at least twenty (20) business days prior to project commencement to:

   Louisville Metro Air Pollution Control District
   701 West Ormsby Ave. #303
   Louisville, Kentucky 40203

   Comply with the applicable notice procedures set forth in EPA 40 CFR Part 61, National Emission Standards for Hazardous Air Pollutants; Appendix A to Subpart M of Part 61 – Interpretive Rule Governing Roof Removal Operations; Asbestos NESHAP Revision. Provide to the Owner and Owner's Consultant one copy of the notifications along with a Certified Mail Receipt (or equivalent) indicating the delivery of Notification to aforementioned agencies.

2. Upon receipt and review of LMAPCD Permit, provide copies to Owner and Owner's Consultant.

3. Conduct an additional pre-abatement meeting with Owner and Owner's Consultant to review LMAPCD Permit and project scope-of-work prior to commencement.

D. Post-Job Submittals

The selected contractor will supply the following documentation, during the project and/or following completion of the work, to the Owner and the Owner's Consultant's for review:

1. Asbestos waste log showing date, type of container removed from work area, signature of recorder, time of day, waste shipment records (WSRs), and a sketch or written description of the location of the waste material in the landfill.

2. Hazardous materials waste log showing date, type of container removed from work area, signature of recorder, time of day, waste shipment records (WSRs), and a sketch or written description of the location of the waste materials in the landfill and/or documentation showing proof of recycling.

3. A copy of the asbestos materials abatement Sign In/Out Log showing the following: date, name, last four digits of social security number, entering and leaving time, company or agency represented and reason for entry for all persons entering the controlled areas.

4. An alphabetical listing of asbestos abatement employees used on the Project and exact dates on which each employee was present in asbestos abatement work areas.

5. A copy of asbestos abatement area and employee air monitoring results relative to this section and to OSHA respiratory protection level compliance. This must be provided within one (1) working day following onsite monitoring to the Owner's Consultant.

6. Static pressure (monometer) readings collected throughout the project. This must be provided on a weekly basis to the Owner's Consultant.

7. The Contractor is responsible for submitting the Post-Job Submittal items to the Owner's Consultant within thirty days of project completion.

1.08 DELIVERY AND STORAGE

A. Coordinate with Owner and the Owner's Consultant to identify size of storage area required and location on site.

B. Deliver materials in the original packages, containers, or bundles bearing the name of the manufacturer and the brand name. SDS shall be required for all materials brought on site by the Contractor.

C. Store material subject to damage off the ground, away from wet or damp surfaces, and under cover sufficient to prevent damage or contamination.

D. Remove from the premises all damaged or deteriorating materials. Dispose of materials that become contaminated with asbestos in accordance with applicable regulatory standards.

1.09 GENERAL PROTECTION OF PERSONS

A. Prior to commencement of work all workers shall be instructed and shall be knowledgeable in appropriate procedures of personnel protection during asbestos materials removal.

B. Contractor shall be solely responsible for enforcing worker protection requirements.

C. Contractor shall provide workers with personally issued and marked respiratory equipment approved by NIOSH and meeting specifications of OSHA. This respiratory equipment shall be suitable for the asbestos exposure level in the work areas according to OSHA Standard 29 CFR 1926.1101. Provide disposable HEPA filters as required, with sufficient filters for replacement.

E. Contractor shall provide workers, the Owner, the Owner's Consultant and authorized visitors with sets of protective disposable clothing, head covers, gloves, eye protection and foot covers of sizes to properly fit individual workers and visitors whenever they are required to enter the work area. Provide a minimum of four sets per day for visitors and sufficient sets as required for workers and the Owner's Consultant. Eye protection, full body harness and lanyard, steel toe safety shoes and hard hats shall be provided as required by applicable safety regulations. Non-disposable protective clothing and footwear shall be left in the contaminated equipment room until the end of the abatement work, at which time such items shall be properly disposed.

F. In addition, due to the age of the structure, it is possible that painted surfaces contain lead-based paints. The Contractor must perform all abatement and subsequent demolition activities in accordance with applicable local, state, and federal regulations including OSHA regulations. (OSHA lead construction standard 29 CFR 1926.62)

G. Reporting Unusual Events: When an event of unusual and significant nature occurs at the site, prepare and submit a special report listing chain of events, persons participating, response and similar pertinent information. When such events are known or predictable in advance, advise the Owner's Consultant in advance, at the earliest possible date.

H. Reporting Accidents: Prepare and submit reports of significant accidents at site and anywhere else work is in progress. For this purpose, a significant accident is defined to include events where personal injury is sustained, or property loss of substance is sustained.

I. Post telephone numbers and locations of emergency services including, but not limited to, fire, ambulance and police at the entrance to the decontamination unit.

1.10 SIGN IN/OUT LOG

A. Contractor shall maintain a sign in/out log in the immediate vicinity of the change room of any decontamination area. Log shall be maintained from the time the first activity is performed involving the disturbance of asbestos containing materials until acceptance of the final air test results and removal of the enclosure. All persons entering the controlled area, including the Contractor's workers, Air Monitoring Professional, Owner and Government Officials shall be required to sign in and out each time upon entering and leaving the work area. All persons shall indicate name, time, company or agency represented and reason for entering the containment area.

B. Except for Governmental Inspectors having jurisdiction, no visitors shall be allowed in any controlled area, except as authorized by the Owner or Owner's Consultant.

1.11 SAFETY PROTECTION and OSHA COMPLIANCE

A. The Contractor warrants that he is familiar with the codes and requirements applicable to asbestos materials abatement work and demolition activities and shall give all notices and comply with all laws, ordinances, rules and regulations applicable to the work. If the Contractor observes that the specifications or plans are at variance therewith, he shall give written notice to the Owner via the Owner's Consultant describing such variance. If the Contractor performs any work knowing it to be contrary to such laws, ordinances, rules and regulations, and without written notice to the Owner/Owner's Consultant, he shall bear all costs arising there from.

The Contractor's particular attention is directed to the "Safety and Health Regulations for Construction" and subsequent amendments promulgated by the Department of Labor identified as Chapter XVII of Title 29, Code of Federal Regulations (CFR), Part 1926 and the necessity of complying with the regulations in the progress of his work. Failure or omission on the part of the Owner, Owner's Consultant or any of their representatives either to discover or to bring to the attention of the Contractor shall not be used as defense for failure on his part to fulfill such requirements.

B. The Contractor shall have a job superintendent present at <u>all</u> times work of this contract is in progress.

1. Superintendent shall be thoroughly familiar and experienced with asbestos removal and related work and shall be familiar with and enforce the use of all safety procedures guidelines. Proof of superintendent's qualifications shall be available upon request.

a. Proof of this instruction shall also be provided to the Owner and Consultant prior to the pre-abatement conference.

2. In addition to the superintendent, Contractor shall furnish one or more foreman (a minimum of one foreman per work area being abated at any one time) who are familiar and experienced with asbestos removal and its related work, safety procedures, and equipment. Foreman shall have a minimum of AHERA accredited supervisory training in the removal of asbestos from a recognized school or university, and applicable certification from the Kentucky Division for Air Quality.

   a. Proof of foreman's experience shall be provided to the Owner and Consultant prior to the pre-abatement conference.

3. It shall be required that the superintendent and/or one or more foreman be inside each work area at all times work is in progress and that either of them be outside the work area at all times or available to authorize persons outside the work area.

4. All workers shall be duly certified and/or accredited according to Kentucky Department for Air Quality Regulations. No workers will be allowed on the job site without prior verification by the Consultant of these accreditations/certifications.

1.12 SPECIFIC PROTECTION OF WORKERS

A. Exposure assessments and monitoring

1. General Monitoring Criteria:

   a. All exposure and personnel monitoring is the responsibility of the Contractor.
   b. Appropriate and required monitoring associated with the removal of hazardous materials is the responsibility of the Contractor.

   c. The Contractor who has a workplace or work operation where exposure monitoring is required under this section shall perform monitoring to determine accurately the airborne concentrations of asbestos to which workers may be exposed.

   d. Determinations of employee exposure shall be made from breathing zone air samples that are representative of the 8-hour TWA and 30-minute short-term exposures of each worker.

   e. Representative 8-hour TWA worker exposure shall be determined on the basis of one or more samples representing full-shift exposure for

workers in each work area. Representative 30-minute short-term worker exposures shall be determined on the basis of one or more samples representing 30 minute exposures associated with operations that are most likely to produce exposures above the excursion limit for workers in each work area.

f. The Owner shall employ an independent air monitoring consultant for outside work area air monitoring and clearance testing if deemed necessary.

g. The use of an Owner furnished air monitoring consultant to conduct the specified clearance testing and ambient area monitoring does not relieve the Contractor of his responsibility for providing tests required by codes, regulations, and standards for the protection and safety of his employees and for any other purpose.

h. Copies of all test results by the Contractor testing laboratory shall be provided to the Owner without cost. Contractor shall be provided, by the air monitoring consultant, copies of all air monitoring and clearance test results without cost.

2. Initial Exposure Assessment:

a. The Contractor who has a workplace or work operation covered by this standard shall ensure that a "competent person" conducts an exposure assessment immediately before or at the initiation of the operation to ascertain expected exposures during that operation or workplace. The assessment must be completed in time to comply with requirements which are triggered by exposure data or the lack of a "negative exposure assessment," and to provide information necessary to assure that all control systems planned are appropriate for that operation and will work properly.

b. Basis of Initial Exposure Assessment: Unless a negative exposure assessment has been made, the initial exposure assessment shall, if feasible, be based on monitoring conducted pursuant to paragraph (c) of General Monitoring Criteria. The assessment shall take into consideration the monitoring results and all observations, information or calculations which indicate employee exposure to asbestos, including any previous monitoring conducted in the workplace, or of the operations of the employer which indicate the levels of airborne asbestos likely to be encountered on the job. For Class I asbestos work, until the Contractor conducts exposure monitoring and documents that workers on that job will not be exposed in excess of the PELs, or otherwise makes a negative exposure assessment, the worker shall presume that workers are exposed in excess of the TWA and excursion limit.

3. Negative Exposure Assessment

    a. 29 CFR 1926.1101 states for any one specific asbestos job which will be performed by workers who have been trained in compliance with the standard, the Contractor may demonstrate that worker exposures will be below the PELs by data which conform to the following criteria;

        i. Objective data demonstrating that the product or material containing asbestos minerals or the activity involving such product or material cannot release airborne fibers in concentrations exceeding the TWA and excursion limit under those work conditions having the greatest potential for releasing asbestos; or

        ii. Where the Contractor has monitored prior asbestos jobs for the PEL and the excursion limit within 12 months of the current or projected job, the monitoring and analysis were performed in compliance with the asbestos standard in effect; and the data were obtained during work operations conducted under workplace conditions "closely resembling" the processes, type of material, control methods, work practices, and environmental conditions used and prevailing in the Contractor's current operations, the operations were conducted by employees whose training and experience are no more extensive than that of employees performing the current job, and these data show that under the conditions prevailing and which will prevail in the current workplace there is a high degree of certainty that worker exposures will not exceed the TWA and excursion limit; or

        iii. The results of initial exposure monitoring of the current job made from breathing zone air samples that are representative of the 8-hour TWA and 30-minute short-term exposures of each employee covering operations which are most likely during the performance of the entire asbestos job to result in exposures over the PELs.

B. The Contractor shall provide workers with approved respirators, as listed below. Non-disposable half-mask respirators with HEPA filters will be considered the minimum acceptable equipment for asbestos abatement and may only be used during controlled area preparation involving Class 1 (TSI or Surfacing) removal. Powered Air Purifying Respirators will be considered the minimum acceptable equipment during Class 1 ACM removal process, if Class 1 removal is being performed. The Contractor shall also provide a sufficient quantity of filters approved for asbestos work so that workers can change filters

during the workday. Filters shall not be used any longer than one (1) work day or after they have been wetted in decontamination shower or until they become clogged by particles during work activities. The respirator filters may be stored at the job site but shall be totally protected from exposure to asbestos prior to their use.

1. Respirator Requirements:	MAXIMUM ALLOWABLE FIBER CONCENTRATIONS
- Half Mask with HEPA Cartridge	<0.5 f/cc
- Full Mask with HEPA Cartridge	<1.0 f/cc
- Powered Air Purifying Respirator (PAPR) with HEPA Cartridge	<2.5 f/cc
- Full Face Supplied Air Operating in Continuous Flow Mode	<10.0 f/cc
- Full Face Supplied Air Operating Positive Pressure Mode	<100.0 f/cc
- Full Face Supplied Air Operating in Positive Pressure Mode with Auxiliary Self-Contained Breathing Apparatus	>100.0 f/cc

C. In all ACM Removal Areas

1. Workers shall always wear a respirator properly fitted on the face while in the removal areas. Workers wearing tight-fitting face pieces shall be clean-shaven to the extent that the hair does not interfere with the sealing surface of the respirator. This must be documented by a standard respirator fit test.

2. The Contractor shall instruct and train workers in proper respirator use.

3. Workers shall wear disposable, full-body cover-alls and disposable head covers and footwear suitable for asbestos work in the removal areas.

4. Workers shall not eat, drink, smoke, chew gum and/or apply cosmetics in the removal areas.

5. The Contractor shall provide a fit tested respirator and disposable cover-alls, head cover, and footwear to any official representative of the Owner or Owner's Consultant who inspects the project.

6. All persons entering the removal areas shall wear an approved respirator and disposable cover-alls, head cover and footwear.

7. The Contractor shall instruct and train workers in the nature of asbestos, and the hazards related to asbestos exposure during abatement work.

8. The Contractor shall set up a decontamination unit consisting of separate male and female change rooms, shower and equipment room, enclosed and separated by triple-flap polyethylene air locks, connected to the controlled areas. This shall be done in accordance with OSHA Regulations 29 CFR 1926.1101. All workers, without exception, shall:

    a. Remove and properly store street clothes in the change room and put on new disposable cover-alls, head covers, footwear and cleaned respirators before entering the decontamination chamber entrance to the work area.

    b. Remove gross contamination from clothing before leaving the work area. Remove the disposable cover-alls, head covers and footwear in the equipment room and dispose of them in an appropriate waste container. Still wearing their respirators, workers shall proceed naked to the shower and clean the respirator with soap and water while showering; remove their respirators while thoroughly showering with soap and tempered water. Wetted HEPA respirator cartridges shall be disposed of in appropriate containers. The inside of the respirator face piece should be washed and rinsed. Water from the shower shall be filtered with an acceptable asbestos filtering system prior to discharge to the sewer

    c. Following showering and drying off, each worker and authorized visitor shall proceed directly to the clean change room and dress in clean clothes at the end of each day's work, or before eating or drinking.

    d. This procedure shall be followed each time a worker enters or leaves the work area.

    e. Contaminated work footwear shall be stored in the equipment room when not in use in the work area. After the asbestos abatement process is completed, footwear shall be disposed of as contaminated waste or cleaned thoroughly inside and out with soap and water before being removed from the work area.

    f. Workers shall be fully protected with respirators and protective clothing immediately prior to the first disturbance of asbestos or contaminated material, and until final cleanup is completed and approved.

9. The Contractor shall set up an equipment decontamination unit consisting of a washroom, constituting an airlock, with a curtained doorway to a designated area of the work area and a curtained doorway to the holding area. This area shall be the same as the equipment room in the worker decontamination enclosure system. The washroom wastewater shall be

drained, collected, and filtered through a system with at least 5 to 10 micron particle size collection capability. **NOTE:** A system containing a series of several filters with progressively smaller pore sizes is recommended to avoid rapid clogging of filtration system by large particles. All expended filters shall be discarded as contaminated waste. Filtered water may be discharged to a sanitary or storm sewer drain. This shall be done in accordance with OSHA Regulations 29 CFR 1926.1101. All workers, without exception, shall:

a. Remove waste containers from the equipment decontamination enclosure by entering the holding area from outside wearing a respirator and dressed in clean coveralls. Workers shall not use this system as a means to leave or enter the work area.

b. Clean external surfaces of contaminated containers and equipment thoroughly by wet mopping, or using a HEPA-filtered vacuum before moving such items into the decontamination enclosure system washroom for final cleaning and removal to uncontaminated areas. Ensure that personnel do not leave work areas through the equipment decontamination enclosure system.

1.13 CERTIFICATE OF WORKER'S ACKNOWLEDGMENT

PROJECT NAME_____
DATE_____
PROJECT ADDRESS_____
CONTRACTOR'S NAME_____

WORKING WITH ASBESTOS CAN BE DANGEROUS. INHALING ASBESTOS FIBERS HAS BEEN LINKED WITH VARIOUS TYPES OF DISEASES. IF YOU SMOKE AND INHALE ASBESTOS FIBERS, THE CHANCE THAT YOU WILL DEVELOP AN ASBESTOS RELATED DISEASE IS GREATER THAN THAT OF THE NON-SMOKING PUBLIC.

Your employer's contract with the Owner for the above project requires that: You be supplied with the proper respirator and be trained in its use. You will be trained in safe work practices and in the use of the equipment found on the job. You will receive a medical examination. These things are to have been done at no cost to you. By signing this certificate, you are assuring the Owner that your employer has met these obligations to you.

RESPIRATOR PROTECTION: I have been trained in the proper use of respirators, and informed of the type respirator to be used on the above-referenced project. I have a copy of the written respiratory protection manual issued by my employer. I have been equipped, at no cost, with the respirator to be used on the above project.

TRAINING COURSE: I have been trained in the dangers inherent in handling asbestos and breathing asbestos fibers and in proper work procedures, and personal and area protective measures. The topics covered in the course included the following:

- physical characteristics of asbestos
- health hazards associated with asbestos
- respiratory protection
- negative air systems
- work practices including hands-on or on-job training
- personal decontamination procedures
- air monitoring, personnel and area

MEDICAL EXAMINATION: I have had a medical examination within the past 12-months, which was paid for by employer. This examination included: health history, pulmonary function tests, and may have included an evaluation of chest X-ray. I have been notified of the results of my examination.

Signature _____
Printed Name _____
Social Security Number ***-**_____
Witness _____

1.14 LANDFILL LETTER

Date

[Name of Disposal Facility]

RE: [PROJECT NAME] ("Project Site")

Dear Sir/Madam:

In accordance with the requirements of the Louisville Metro Housing Authority ("LMHA") environmental insurance policy, we must verify certain basic factual information concerning facilities to which wastes or other materials are delivered. Therefore, before material is delivered to [Name of Facility] (the "Facility"), we need to confirm the following:

1. The Facility has received and reviewed the following documents regarding characterization of the soil/waste at the [Project Name] to be delivered to the Facility.

[list documents here or attach copies of relevant data tables or laboratory results]

2. Based upon the documentation described in the above paragraph, the Facility will accept soil/waste for purposes of:

_____ Disposal
_____ Treatment
_____ Daily Cover
_____ Recycling
_____ Other (explain below)

_____

3. The Facility is operating under valid permits, licenses, and other regulatory approvals which allow the Facility to lawfully accept the soil/waste for the purposes stated above.

4. The Facility is not insolvent or in bankruptcy.

5. The Facility is not subject to any action under CERCLA or a similar state action.

6. The Facility has never been listed and is not currently listed on the federal National Priorities List (NPL) or any state superfund list.

7. The Facility will promptly notify LMHA in writing if any of circumstances 2 through 6 change during the time that soil/waste from project site is being delivered to the Facility. Such notification will be made to me at the above-referenced address via first class mail.

If statements 2 through 7 above are true and accurate, please acknowledge by signing and dating the Acknowledgment following my signature on this page and return to me in the stamped, self-addressed envelope. Again, we are unable to deliver any material to the Facility until such time as this acknowledgment is received, so please return it at your earliest convenience.

Very truly,

ACKNOWLEDGED AND AGREED:

_____ Date _____
Name and Title
[Signature of a Corporate Officer or Manager of the Facility]

cc: Suzanne Arnzen, TriEco
LaTasha Kilgore, LMHA
Norma Ward, LMHA

PART 2: PRODUCTS

2.01 MATERIAL

A. 6-mil Polyethylene sheets in sizes to minimize the frequency of joints.

B. Tape: Glass fiber or other type capable of sealing joints of adjacent plastic sheets and for attachment of plastic sheet to finished or unfinished surfaces of dissimilar materials under both dry and wet conditions.

C. Surfactant (Wetting Agent): Shall consist of materials, which are non-toxic and non-irritating to skin and eyes, and non carcinogenic. The wetting agent shall be 50-percent polyoxyethylene ester and 50-percent polyyethylene ether (AQUA-GRO), or equivalent, in a concentration of one (1) ounce in five (5) gallons of water.

D. Sealant: For substrates other than structural steel, the following products have been accepted for use in asbestos removal areas:

1. American Coating Corporation - Cable Coating No. 22P.

2. Arpin Engineering, Inc. - Asbestite 2000.

3. H. B. Fuller Co., Foster Products Division - Protektor 32-22.

4. Matheson Chemical Corporation - Dust-Set Asbestos Encapsulant.

5. National Cellulose Corporation - SK-13.

E. Impermeable Containers: Air and water-tight, suitable to receive and retain any asbestos containing or contaminated materials until disposal at an approved site, and labeled in accordance with OSHA Regulation 29 CFR 1910.1001 and 29 CFR 1926.1101, as well as EPA regulation 40 CFR Part 61 (asbestos), 29 CFR 1910.145, and 49 CFR 171, 172, 173, 178 and 179. Two types of impermeable containers shall be used:

1. Six mil plastic bags sized to fill within the drum.

2. Metal or fiber drums with tightly fitting lids.

F. Warning Labels and Signs: In conformance with OSHA regulation 29 CFR 1926.1101 (asbestos), DOT regulation 49 CFR 171, 172, 173, 178 and 179 Regulations for Labeling, Mailing and Transporting Hazardous Waste, EPA regulation 40 CFR 260, 261, 262, 263, 264 and 265 Hazardous Waste Regulations, and EPA regulation 40 CFR, Part 61, Subpart M.

G. Other Materials: Provide all other materials, such as lumber, nails, and hardware, which may be required to construct and dismantle the decontamination area and the barriers that isolate the controlled area.

H. Air Purifying Equipment: Equipped with HEPA filters for pulling fresh air from the building, through the decontamination chamber, into the containment area where asbestos fibers are becoming airborne during removal, through the HEPA filters where 99.97 percent of asbestos fibers greater than 0.3 microns in length are removed and exhausted to the atmosphere outside the building. No air movement system or air filtering equipment shall discharge unfiltered air outside the enclosure at any time. The equipment shall remain in operation twenty-four hours a day until decontamination of the work area and final air sampling and analysis is completed

I. Scaffolding: Provide all scaffolding, ladders and/or staging, etc., as necessary to accomplish the work of this contract. Scaffolding may be suspension type; or standing type such as metal tube and coupler, tubular welded frame, pole or outrigger type or cantilever type. The type, erection and use of all scaffolding shall comply with all applicable OSHA provisions.

PART 3: EXECUTION

3.01 WORK AREA DEFINITIONS

The following two (2) categories of Controlled Areas may exist during the execution of this contract. The categories and the asbestos containing materials that may be removed under each category are mandated by all applicable local, state, and federal regulations.

A. Full Containment

B. Partial Containment

3.02 WORK AREA PREPARATION

A. In **ALL** Controlled Areas, the Contractor shall:

1. Ensure that all ventilating systems or any other system bringing air into or out of the work area is disabled. Disable systems by disconnecting wires, removing circuit breakers, lockable switches or other positive means that will prevent accidental restarting of the equipment.

2. Lockout power to circuits running through the work area whenever possible by switching off all breakers or removing fuses serving these circuits. Label breakers with tape over breaker with notation, "DANGER circuits being worked on." Lock panel and have all keys under control of Contractor's superintendent. If circuits cannot be shut down for any reason, label at

intervals 4-feet 0-inches on center with tags reading, "DANGER live electric circuit. Electrocution Hazard." Label circuits that are in hidden locations but which may be affected by the work in a similar manner. Provide ground fault circuit interrupters (GFCI) receptacles for equipment used in the work areas.

3. Isolate the controlled area to prevent entry by unauthorized personnel into the area by placing opaque polyethylene barriers at each entrance to the area and by providing warning signs at each locked door leading into the work area. The signs shall be 1'-2" X 1'-8" in dimension, and shall read as follows:

LEGEND

DANGER

ASBESTOS

CANCER AND LUNG DISEASE HAZARD
RESPIRATORS AND PROTECTIVE CLOTHING ARE REQUIRED
IN THIS AREA

The graphic symbol for "No Admittance," which depicts a circled open hand, shall be attached near the "Danger" command on this sign.

4. Construct any and all necessary, temporary walls to completely isolate the area of asbestos disturbance.

5. Critical Barriers: Seal all openings (doors, windows, vents, duct, floor drains, and other openings within the work area, etc.) **with two (2) independent** layers of 6-mil (minimum) polyethylene containment barrier to prevent leakage of air into the outside environment or other portions of the building.

6. Pre-clean immovable objects, such as mechanical and electrical equipment within any proposed removal area, using HEPA vacuum equipment and/or wet cleaning methods as appropriate.

7. Carefully dismantle any fan covers, grilles or other mechanical items necessary to remove or clean asbestos-containing or contaminated finishes. Place the removed items back in their appropriate locations after removal is completed unless otherwise instructed by the Air Monitoring Professional.

8. Prior to placing plastic sheeting, clean the work area(s) using HEPA vacuum equipment or wet cleaning methods as appropriate. Do not use methods that raise dust such as broom or standard vacuum sweeping.

9. Seal off all openings to areas not receiving asbestos removal with plastic sheeting sealed with tape. Seal electrical panels with two layers of plastic prior to placement of wall plastic.

B. In Full Containment areas, the Contractor shall prepare the area in accordance with the following procedures:

1. Cover the floor of the Work Area with a minimum of two (2) individual layers of clear polyethylene sheeting, each at least 6-mil in thickness with seams overlapping at least 12 inches and turned up walls at least 12 inches. Form a sharp right angle bend at junction of floor and wall so that there is no radius which could be stepped on causing the wall attachment to be pulled loose. Both spray-glue and duct tape all seams in floor covering. Locate seams in top layer six feet from, or at right angles to, seams in bottom layer. Install sheeting so that top layer can be removed independently of bottom layer.

2. Cover all walls in the Work Area, including "Critical Barrier" sheet plastic barriers, with a minimum of two (2) layers of polyethylene sheeting, at least 6-mil in thickness with seams overlapping at least 12 inches and mechanically supported and sealed with duct tape. Tape all joints including the joints joining with the floor covering with duct or fiber tape. Install sheeting so that the layers can be removed independently.

3. Stairs and Ramps: Do not cover stairs or ramps with unsecured sheet plastic. Where stairs or ramps are covered with plastic, provide 3/4-inch exterior grade plywood treads securely held in place, over plastic. Do not cover rungs or rails with any type of protective materials.

4. The Contractor shall set up a decontamination facility connected to the work area that will consist of a change room, shower area and equipment area. This shall be done in accordance with OSHA Regulations 29 CFR 1926.1101. Water from the shower shall be filtered with an acceptable asbestos filtering system prior to discharge to the sewer

5. Provide sufficient HEPA air filtration units to maintain an airflow of at least four complete air changes per hour in the removal area and a static pressure of greater than or equal to 0.02 inches of water. All pressure differential manometer (or equivalent) readings shall be documented prior to removal of any ACM and continually throughout the duration of the removal. Collection of this data is the sole responsibility of the Contractor.

6. The Contractor shall establish emergency exits and procedures for the removal area, satisfactory to fire officials.

7. Ensure that barriers and plastic enclosures remain effectively sealed and taped. Inadvertent tears in plastic shall be repaired with fiber tape and the tear covered by plastic applied with spray adhesive, overlapping the tear by six inches on all sides.

C. In Partial Containment areas, the Contractor shall prepare the area in accordance with the following procedures:

1. Place a layer of 4-mil (minimum) polyethylene on all wall surfaces of the contained area, exposing only the asbestos-containing or contaminated materials. Wall polyethylene should extend to the floor level and be completely taped down with water resistant duct or fiber tape. Spray adhesive is recommended to assist hanging of wall plastic.

2. The Contractor shall set up a decontamination facility outside of the work area that will consist of a change room, shower area and equipment area. This shall be done in accordance with OSHA Regulations 29 CFR 1926.1101. Water from the shower shall be filtered with an acceptable asbestos filtering system prior to discharge to the sewer.

3. Provide sufficient HEPA air filtration units to maintain an airflow of at least four complete air changes per hour in the removal area, or a static pressure of greater than or equal to 0.02 inches of water. All pressure differential manometer (or equivalent) readings shall be documented prior to removal of any ACM and continually throughout the duration of the removal. Collection of the data is the sole responsibility of the Contractor.

4. The Contractor shall establish emergency exits and procedures for the removal area, satisfactory to fire officials.

5. Ensure that barriers and plastic enclosures remain effectively sealed and taped. Inadvertent tears in plastic shall be repaired with fiber tape and the tear covered by plastic applied with spray adhesive, overlapping the tear by six inches on all sides.

3.03 ASBESTOS REMOVAL

A. In Full Containment areas, the Contractor shall:

1. The Contractor shall provide the Air Monitoring Professional and Owner's Consultant with at least 24 hours prior notice to conduct an inspection of the work areas prior to removal activities.

2. Thoroughly wet asbestos-containing materials prior to removal to reduce fiber dispersal into the air. Accomplish wetting by using a fine spray (mist) of amended water or removal encapsulant. Mist the area sufficiently to wet the

material without causing excessive dripping or breaking. Allow time for water or removal encapsulant to penetrate material thoroughly.

3. If amended water is used, spray material repeatedly during the work process to maintain a continuously wet condition. If a removal encapsulant is used, apply in strict accordance with manufacturer's written instructions.

4. If applicable, perforate the outer covering of any material that has been painted and/or jacketed in order to allow penetration of amended water, or where necessary, carefully strip away the outer covering while simultaneously spraying amended water on the insulation, to minimize dispersal of asbestos fibers into the air.

5. Remove materials in a manner, which will minimize breakage. Materials should not be sanded or sawed.

6. Mist the entire work area during removal procedures with amended water to reduce airborne fiber levels.

7. Remove wetted asbestos-containing materials in small sections. Do not allow the ACM to dry out. Upon removal, immediately place the ACMs and associated debris into a 6-mil bag with asbestos "Danger" labels on the outside surface, and seal the bag opening with tape.

8. Evacuate air from disposal bags with HEPA filtered vacuum cleaner before sealing. Twist neck of bags, bend over (goose neck) and seal with minimum three wraps of duct tape.

B. In Partial Containment areas, the Contractor shall:

1. The Contractor shall provide the Air Monitoring Professional and the Owner’s Consultant with at least 24 hours prior notice to conduct an inspection of the work areas prior to removal activities.

2. Utilize water delivered in a fine mist from a hose or garden sprayer during removal of the materials. The mist should cover the immediate removal areas and should not be excessive to a point where standing or ponding water is present.

3. Remove materials in a manner which will minimize breakage. Materials should not be sanded or sawed.

4. Mist the work area continuously with amended water to reduce airborne fiber levels.

5. Upon removal, immediately place the ACMs and associated debris into a 6-mil bag with asbestos "Danger" labels on the outside surface. Twist neck of bags, bend over (goose neck) and seal with minimum three wraps of duct tape. Do not allow the material to dry out.

6. Remove the mastic adhesive by mechanical devices or use of a non-toxic mastic remover.

7. After removal of the ACMs, surface shall be wet-cleaned and wire brushed to remove residual accumulated material. After wet-cleaning, surface shall appear free to visible material.

3.04 CLEAN-UP FOR CONTROLLED AREAS

A. The asbestos containing materials shall be sealed in plastic bags or shall be wrapped in a minimum of two (2) polyethylene sheets (6-mil minimum). Initial bagging of waste shall be supplemented by a secondary containment, either by use of a second bag (6-mil minimum) or by use of a fiber or metal drum. If it appears likely that the waste material will tear the plastic, the bag must be placed into a drum for disposal. Bags and drums shall be marked with the OSHA label prescribed by the OSHA Regulations referenced in this section. The outside of all containers shall be cleaned before leaving the work area.

B. The Contractor shall again provide the Owner’s Consultant with at least 24 hours prior notice to conduct the inspection of the work areas after removal operations have been completed but prior to application of the lockdown sealant. The Air Monitoring Professional shall perform a visual inspection of the areas. Upon completion of the inspection, and subsequent approval, final air clearance shall be performed by the Air Monitoring Professional. When the Air Monitoring Professional is ready to conduct the final air clearance testing according to the pre-established schedule, but is prevented from testing due to incompleteness of the work, all extra charges attributable to the delay shall be borne by the Contractor.

C. Controlled areas and all other decontamination areas and cleaned areas shall be considered clean when air testing performed (following 24-hour waiting period) by the Air Monitoring Professional, and reviewed by the Owner’s Consultant, shows .01 fibers per cubic centimeter (f/cc) or less of air (under an aggressive environment) using standard test methods of Phase Contrast Microscopy (PCM) for the asbestos. All air samples must comply with the above referenced standard of clearance.

Note: An aggressive environment is accomplished by the use of a leaf blower which will agitate the air. Airflow shall begin at floor level and shall extend to the ceiling at each corner of the area. This procedure shall continue for 30-minutes, at which time final air clearance sampling shall begin.

D. Areas which do not comply with the standard of cleaning for final clearance on the first clearance test shall be completely re-cleaned. Upon approval by the Owner's Consultant, a second clearance air test shall be performed by the Owner's Consultant, using standard test methods of PCM. The Contractor shall reimburse the Owner for any additional clearance testing required beyond the first clearance test. This procedure shall continue until clearance levels are achieved.

E. When the standards of cleaning are achieved and an inspection determines that the area has been visually decontaminated, the decontamination enclosure systems shall be removed, the area thoroughly wet cleaned (wet mopping and/or wiping), and materials from the equipment room and shower disposed of as contaminated waste. The remaining barriers between contaminated and clean areas and all seals on openings into the work area shall be removed and disposed of as contaminated waste.

F. All plastic sheeting tape, cleaning material, clothing, and all other disposable material used in the asbestos removal operation or items used in the work area shall be packed into sealable plastic bags (6-mil minimum). These bags must be marked with the OSHA label prescribed by the OSHA Regulations.

3.05 FIELD QUALITY CONTROL

A. The Owner’s Consultant will perform pre-abatement, during abatement, and final clearance air monitoring throughout the duration of the project. The *Contractor* must perform necessary tests required by regulations or codes and standards for the protection of his workers, or other purpose. These tests include but are not limited to 8-hr and Excursion personal air monitoring during abatement activities. Prior to any work the Contractor shall also provide an Exposure Assessment to the Air Monitoring Professional. The Contractor’s testing firm must be approved by the Owner’s Consultant prior to any work.

B. For the purposes of confirmation and quality control, the Contractor will supply the Owner’s Consultant with representative, duplicate samples of not less than 10 percent of the total samples collected by the Owner's Consultant, under Chain-of-Custody for testing. Testing conducted by the Owner’s Consultant will be at Owner’s expense. Owner’s Consultant will report testing results to the Owner and the Contractor’s Superintendent, along with recommendations, if necessary.

C. Test results shall be reported in terms of f/cc for asbestos and collected in accordance with EPA, OSHA, and NIOSH-recommended sampling volumes for appropriate detection limits. All results must be posted at the job site no later than 24 hours from sample collection.

D. Testing Laboratory shall perform all air testing according to the method prescribed by Section 1910.1001, 1926.1101 and 1926.62 of OSHA CFR Title 29 and analyzed in accordance with procedures outlined in NIOSH 7400 Method (PCM).

E. The Owner reserves the right to perform its own air monitoring at any time during the project without notifying the Contractor.

F. Air Sampling Schedule

During Work Activities, Per Shift

Minimum of 2 air sample inside the work areas

Minimum of 2 exterior air samples

Minimum of 1 HEPA exhaust sample

Blanks - 10% of total

Final Clearance (PCM)

Minimum of 5 samples per work area

Blanks - 10% of total

NOTE: All locations of air tests are subject to review and change by the Air Monitoring Professional.

3.06 SCHEDULE

A. The Owner will provide details with regard to required schedule for completion.

B. All work shifts shall be done during administrative hours (7:00 AM to 5:00 PM) Monday-Friday excluding observed Holidays as described within the front end documents. Any change in the work schedule must be approved in writing by the Owner.

C. The Contractor will be required to coordinate abatement activities with other redevelopment activities (that do not disturb asbestos or hazardous material) being performed simultaneously.

END OF SECTION

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 PREINSTALLATION MEETINGS

A. Predemolition Conference: Conduct conference at Project site.

1.4 INFORMATIONAL SUBMITTALS

A. Engineering Survey: Submit engineering survey of condition of building.

B. Proposed Protection Measures: Submit report, including Drawings, that indicates the measures proposed for protecting individuals and property, for environmental protection, for dust control and, for noise control. Indicate proposed locations and construction of barriers.

C. Schedule of selective demolition activities with starting and ending dates for each activity.

D. Predemolition photographs or video.

E. Statement of Refrigerant Recovery: Signed by refrigerant recovery technician.

1.5 CLOSEOUT SUBMITTALS

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

1.6 QUALITY ASSURANCE

A. Refrigerant Recovery Technician Qualifications: Certified by an EPA-approved certification program.

1.7 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.

C. Notify Architect of discrepancies between existing conditions and Drawings before proceeding with selective demolition.

D. Hazardous Materials: It is expected that hazardous materials will be encountered in the Work.

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.

G. Arrange selective demolition schedule so as not to interfere with Owner's operations.

1.8 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.

3.2 PREPARATION

A. Refrigerant: Before starting demolition, remove refrigerant from mechanical equipment according to 40 CFR 82 and regulations of authorities having jurisdiction.

3.3 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. Owner will arrange to shut off indicated services/systems when requested by Contractor.
2. Arrange to shut off utilities with utility companies.
3. 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.

3.4 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.

3.5 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 (24) 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.

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. 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 cleaned and reinstalled in their original locations after selective demolition operations are complete.

3.6 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 Section 017419 "Construction Waste Management and Disposal."

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. Comply with requirements specified in Section 017419 "Construction Waste Management and Disposal."

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

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 Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes joint sealants for the following applications, including those specified by reference to this Section:

1.3 PERFORMANCE REQUIREMENTS

A. Provide elastomeric joint sealants that establish and maintain watertight and airtight continuous joint seals without staining or deteriorating joint substrates.

B. Provide joint sealants for interior applications that establish and maintain airtight and water-resistant continuous joint seals without staining or deteriorating joint substrates.

1.4 SUBMITTALS

A. Samples for Initial Selection: Manufacturer's color charts consisting of strips of cured sealants showing the full range of colors available for each product exposed to view.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: Manufacturer's authorized Installer who is approved or licensed for installation of elastomeric sealants required for this Project.

B. Source Limitations: Obtain each type of joint sealant through one source from a single manufacturer.

1.6 PROJECT CONDITIONS

A. Do not proceed with installation of joint sealants under the following conditions:

1. When ambient and substrate temperature conditions are outside limits permitted by joint-sealant manufacturer or are below 40 deg F (5 deg C).
2. When joint substrates are wet.

3. Where joint widths are less than those allowed by joint-sealant manufacturer for applications indicated.
4. Contaminants capable of interfering with adhesion have not yet been removed from joint substrates.

PART 2 - PRODUCTS

2.1 MATERIALS, GENERAL

A. Compatibility: Provide joint sealants, backings, and other related materials that are compatible with one another and with joint substrates under conditions of service and application, as demonstrated by sealant manufacturer, based on testing and field experience.

B. VOC Content of Interior Sealants: Provide interior sealants and sealant primers that comply with the following limits for VOC content when calculated according to 40 CFR 59, Subpart D (EPA Method 24):

1. Sealants: 250 g/L.
2. Sealant Primers for Nonporous Substrates: 250 g/L.
3. Sealant Primers for Porous Substrates: 775 g/L.

C. Colors of Exposed Joint Sealants: As selected by Architect from manufacturer's full range.

2.2 ELASTOMERIC JOINT SEALANTS

A. Elastomeric Sealants: Comply with ASTM C 920 and other requirements indicated for each liquid-applied chemically curing sealant specified, including those referencing ASTM C 920 classifications for type, grade, class, and uses related to exposure and joint substrates.

B. Stain-Test-Response Characteristics: Where elastomeric 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.

2.3 JOINT-SEALANT BACKING

A. General: Provide sealant backings of material and type that are nonstaining; are compatible with joint substrates, sealants, primers, and other joint fillers; and are approved for applications indicated by sealant manufacturer based on field experience and laboratory testing.

B. Elastomeric Tubing Sealant Backings: Neoprene, butyl, EPDM, or silicone tubing complying with ASTM D 1056, nonabsorbent to water and gas, and capable of remaining resilient at temperatures down to minus 26 deg F (minus 32 deg C). Provide

products with low compression set and of size and shape to provide a secondary seal, to control sealant depth, and to otherwise contribute to optimum sealant performance.

C. Bond-Breaker Tape: Polyethylene tape or other plastic tape recommended by sealant manufacturer for preventing sealant from adhering to rigid, inflexible joint-filler materials or joint surfaces at back of joint where such adhesion would result in sealant failure. Provide self-adhesive tape where applicable.

2.4 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, free of oily residues or other substances capable of staining or harming joint substrates and adjacent nonporous surfaces in any way, and formulated to promote optimum adhesion of sealants to joint substrates.

C. Masking Tape: Nonstaining, nonabsorbent material compatible with joint sealants and surfaces adjacent to joints.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine joints indicated to receive joint sealants, with Installer present, for compliance with requirements for joint configuration, installation tolerances, and other conditions affecting joint-sealant performance.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Surface Cleaning of Joints: Clean out joints immediately before installing joint sealants to comply with joint-sealant manufacturer's written instructions and the following requirements:

1. Remove all foreign material from joint substrates that could interfere with adhesion of joint sealant, including dust, paints (except for permanent, protective coatings tested and approved for sealant adhesion and compatibility by sealant manufacturer), old joint sealants, oil, grease, waterproofing, water repellents, water, surface dirt, and frost.
2. Clean porous joint substrate surfaces by brushing, grinding, blast cleaning, mechanical abrading, or a combination of these methods to produce a clean, sound substrate capable of developing optimum bond with joint sealants. Remove loose particles remaining after cleaning operations above by vacuuming

or blowing out joints with oil-free compressed air. Porous joint substrates include the following:

a. Concrete.
b. Masonry.
c. Unglazed surfaces of ceramic tile.

3. Remove laitance and form-release agents from concrete.
4. Clean nonporous surfaces with chemical cleaners or other means that do not stain, harm substrates, or leave residues capable of interfering with adhesion of joint sealants. Nonporous joint substrates include the following:

a. Metal.
b. Glass.
c. Porcelain enamel.

B. Joint Priming: Prime joint substrates, where recommended by joint-sealant manufacturer, based on 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 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.

3.3 INSTALLATION OF JOINT SEALANTS

A. General: Comply with joint-sealant manufacturer's written installation instructions for products and applications indicated, unless more stringent requirements apply.

B. Sealant Installation Standard: Comply with recommendations in ASTM C 1193 for use of joint sealants as applicable to materials, applications, and conditions indicated.

C. Install sealant backings of type 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.

D. Install bond-breaker tape behind sealants where sealant backings are not used between sealants and backs of joints.

E. 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.

F. Tooling of Nonsag Sealants: Immediately after sealant application and before skinning or curing begins, tool sealants according to requirements specified 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 configuration per Figure 5A in ASTM C 1193, unless otherwise indicated.
4. Provide flush joint configuration where indicated per Figure 5B in ASTM C 1193.
5. Provide recessed joint configuration of recess depth and at locations indicated per Figure 5C in ASTM C 1193.

    a. Use masking tape to protect surfaces adjacent to recessed tooled joints.

3.4 CLEANING

A. 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.

3.5 PROTECTION

A. Protect joint sealants during and after curing period from contact with contaminating substances and from damage resulting from construction operations or other causes so sealants are without deterioration or damage at time of Substantial Completion. If, despite such protection, damage or deterioration occurs, cut out and remove damaged or deteriorated joint sealants immediately so installations with repaired areas are indistinguishable from original work.

3.6 JOINT-SEALANT SCHEDULE

A. Provide joint sealants of the type are indicated and locations noted:

1. Type and Grade: S (single component) and NS (nonsag).
2. Class: 25.
3. Use Related to Exposure: NT (nontraffic) and T (traffic) for use intended.

B. PROVIDE SILICONE CAULK AT INTERIOR JOINTS:

1. Water closet base to floor.

2. Perimeter of mop sink.
3. Vanity top and side/ backsplashes.
4. Plumbing piping.
5. Bottom of Door frames at floor.
6. Other joints as noted.

C. PROVIDE PAINTABLE SILICONIZED ACRYLIC LATEX CAULK AT INTERIOR JOINTS:

1. Window frame to drywall return and window sill.
2. Door frame to drywall.
3. Perimeter of drywall partitions.
4. Other joints as noted.

D. PROVIDE URETHANE CAULK AT EXTERIOR JOINTS:

1. Window frame perimeter
2. Other joints as noted.

E. Provide caulking per requirements associated with energy, thermal and environmental performance requirements, such as sealing of slab penetrations, sealing of exterior wall penetrations for air infiltration, and sealing of exterior wall, floor and joint penetrations to prevent pest entry and pipe, duct, cable and conduit penetrations.

END OF SECTION

SECTION 081113- STANDARD STEEL DOORS AND FRAMES

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Pressed steel hollow metal doors and frames.
   2. Fire-rated hollow metal doors and frames.

1.2 REFERENCES

A. ANSI A250.8-1998/SDI-100 - Recommended Specifications - Standard Steel Doors and Frames, Steel Door Institute, unless herein specified.

B. UL 10C-98 and UBC 7-2 – Positive Pressure Fire Tests of Door Assemblies.

C. NFPA-80-1999 – Standard for Fire Doors and Windows.

D. NFPA-101-1997 – Life Safety Code.

E. NFPA-105 – Standard for Smoke and Draft Control Assemblies.

F. ASTM-A 366-95A – Specification for Steel, Sheet, Carbon, Cold-Rolled, Commercial Quality.

ASTM-A 568-95 – Specification for Steel, Sheet, Carbon, and High Strength, Low-Alloy, Hot-Rolled, and Cold-Rolled.

G. ASTM-A 569-91a – Specification for Steel, Carbon, (0.15 maximum percent), Hot-Rolled Sheet and Strip Commercial Quality.

H. ASTM-A 924-95 – General Requirements for Steel Sheet, Metallic Coated by the Hot-Dip Process.

I. SDI-105-92 – Recommended Erection Instructions for Steel Frames.

J. ANSI A115.1-.18 - Specification for Door and Frame Preparation for Hardware.

K. ANSI A156.7 - Standard Template Hinge Dimensions.

1.3 SUBMITTALS

A. Shop Drawings: Submit in accordance with General Requirements. Indicate general construction, configurations, jointing methods, reinforcements, and location of hardware and cutouts for glass and louvers.

1.4 QUALITY ASSURANCE

A. Applicable Standards: Specifications and standards of SDI 100-98.

B. Supplier Qualification: Qualified direct distributor of products to be furnished. The distributor shall have in their regular employment an A.H.C./C.D.C. or person of equivalent experience who will be available at reasonable times to consult with the Architect, Contractor and/or Owner regarding any matters affecting the total door and frame openings.

C. Installer Qualification: Experienced professionals certified by the manufacturer of the product they are installing. Installers must have a minimum of 5 years experience in mechanical and electrified commercial door hardware.

D. Fire-Rated Door Assemblies: Where fire-rated door assemblies are indicated or required, provide fire-rated door and frame assemblies that comply with NFPA 80 "Standard for Fire Doors and Windows", and have been tested, listed, and labeled in accordance with ASTM E152 "Standard Methods of Fire Tests of Door Assemblies" by nationally recognized independent testing and inspection agency acceptable to authorities having jurisdiction.
   1. Oversize Fire-Rated Door Assemblies: For door assemblies required to be fire-rated and exceeding sizes of tested assemblies, provide certificate or label from approved independent testing and inspection agency, indicating that door and frame assembly conforms to requirements of design, materials and construction as established by individual listings for tested assemblies.
   2. Temperature Rise Rating: At stairwell enclosures, provide doors which have Temperature Rise Rating of 450 degrees F maximum in 30 minutes of fire exposure.

1.5 PRODUCT HANDLING

A. Deliver hollow metal doors in manufacturer's protective covering. Handle hollow metal with care to prevent damage using manufacturers handling instructions.

B. Door Storage: Store doors in upright position, under cover. Place doors on at least 4 inch (101.6) high wood sills or on floors in manner that will prevent rust and damage. Do not use non-vented plastic or canvas shelters which create humidity chamber and promote rusting. If corrugated wrapper on door becomes wet, or moisture appears, remove wrapping immediately. Provide 1/4 inch (6.3) space between doors to promote air circulation.

C. Frame Storage: Store frames under cover on 4 inch wood sills on floors in manner that will prevent rust and damage. Do not use non-vented plastic or canvas shelters which create humidity chamber and promote rusting. Store assembled frames in vertical position, 5 units maximum in stack. Provide 1/4 inch space between frames to promote air circulation.

1.6 SEQUENCING AND SCHEDULING

A. Deliver doors and frames to the jobsite in a timely manner so as not to delay progress of other trades.

PART 2 PRODUCTS

2.1 HOLLOW METAL

A. Acceptable Manufacturers:
   1. Ceco
   2. Curries
   3. Steelcraft

B. Cold Rolled Steel Sheets: Commercial quality, stretcher leveled flatness, cold-rolled steel, free from scale, pitting or other surface defects, complying with ASTM A366 and A568 general requirements.

C. Minimum gauges of hollow metal are specified below. Provide heavier gauge if required by details or specific condition. Entire frame and sidelight shall be of same gauge. Gauges of steel are listed below:

1. 14 gauge: Labeled frames.
2. 16 gauge: Interior doors.

D. Coating Materials, primer: Use manufacturer's standard rust inhibiting primer conforming to ANSI-A224.1-1990.

E. All hollow metal frames and doors must come from the same manufacturer, who is a current member of SDI in good standing.

2.2 RELATED MATERIALS

A. Steel Reinforcing: ASTM A36.

B. Door Bumpers or Silencers: Per ANSI A156.16.

2.3 HOLLOW METAL FRAMES

A. General: Form to profiles indicated. Where necessary, alternate details will be considered provided design intent is maintained. Consider and provide for erection methods.

B. Typical Reinforcing: Provide minimum hinge reinforcement 3/16 inch by 1-1/2 inch by 10 inch. Provide similar reinforcement for hardware items as required to adequately withstand stresses, minimum 12 gauge, including channel reinforcement for door closers and closer arms, door holders and similar items. Provide reinforcement and clearances for concealed in-head door closers and for mortise locks.

C. Cover Plates: For hinge and strike plate cutouts, provide fully enclosed pressed steel cover boxes spot welded to frames behind mortises.

D. Hardware: Mortise, reinforce, drill and tap for mortise hardware, except drilling and tapping for surface door closers, door closer brackets and adjusters shall be done in field.

E. Anchorage: Provide standard and special anchorage items as required. Provide formed steel channel spreader at bottom of frames, removable without damaging frame

F. Silencers: Provide specified silencers, except where stop does not occur and at smoke gasketed openings, 3 per jamb at single door and one for each door at double doors.

G. Extensions: Reinforce transom bars or mullions as necessary to provide rigid installation. Where required (as at multiple openings) to stabilize large frames, provide frame or mullion extensions to anchor to structure above, proper size to fit within overhead construction. Provide angle clips to fasten to structure.

H. Clearances: Provide proper clearances at metal frames, including for weatherstripping, soundstripping and smoke gasketing.

I. Stops: Set with countersunk or Jackson head screws.

J. Labeled Frames: Construct in accordance with requirements for labeled work. Attach proper U.L. label, Warnok Hersey. "B" labeled frames shall be 1-1/2 hour construction.

K. Joinings: Furnish frames mitered, or coped, and continuously face welded. Grind smooth, and conceal joints for a seamless appearance. Touch up welded surfaces with manufacturer's standard prime paint.

L. Workmanship: Fabricate so no grind marks, hollow or other out-of-plane areas are visible. At joints of intermediate members (such as mullions and transom bars), provide tight joining, neatly accomplished without holes, burned out spots, weld build up or other defacing work. Fill to close cracks and to preserve shapes. Tightly fit loose stops, to hairline joints.

M. Finish: Clean frames by degreasing process and apply thorough coating of baked-on primer, covering inside as well as outside surfaces. At galvanealed frames, coat welds and other disrupted surface with zinc-rich paint containing not less than 90 percent zinc dust by weight.

2.4 HOLLOW METAL DOORS

A. Flush Doors: Reinforce, stiffen and sound deaden. Provide cut-outs for glass with stops as shown. Provide flush steel closure at top of exterior and interior doors and at bottom of exterior doors with drain holes in bottom closure. Provide welded seamless edge. Following door construction types are acceptable.

1. Composite Core for Interior Doors: Furnish flush panels, polystyrene core permanently laminated to inside face sheets.

B. Labeled Doors: Insulate as required by Underwriters Laboratories. Build in special hardware and provide astragals as indicated. At 1 hour and at 1-1/2 hour doors at enclosures, maximum transmitted temperature end point shall not exceed 450 degrees F above ambient at end of 30 minutes of fire exposure per U.L.

C. Typical Reinforcement: Provide as required for hardware items. For lock reinforcement, provide manufacturer's standard reinforcement. Provide 12 gauge reinforcement for escutcheons or roses. centering clips to hold lock case in alignment. For door checks, provide 3/16 inch channel type reinforcements, 3-1/2 inch deep by 14 inches long, or as required. Hinge reinforcement minimum 7 gauge by 1-1/2 inch by 9 inch bar. Weld reinforcing to door. Reinforce doors for surface items such as surface and semi-concealed closers, brackets, surface holders and door stops. Drilling and tapping installation of these surface items shall be done in field by hardware installer.

D. Special Reinforcing: At exterior doors, reinforce inside of door on hinge side with high frequency hinge preparation, or full continuous channel welded to door.

E. Hardware: Mortise, reinforce, drill and tap for hardware furnished under Section 08710 - Hardware, except drilling and tapping for surface door closers, door closer brackets and adjusters shall be done in field. Obtain templates from hardware supplier.

F. Finish: Thoroughly clean off rust, grease and other impurities. Grind welds smooth, no marks shall show. Apply metallic filler as required to fill cracks and joints and to level any weld areas or similar imperfections. Sand filler coat smooth.

2.5 FASTENINGS

A. Provide fastenings, anchors and clips as required to secure hollow metal work in place. Provide Jackson head screws, or flatter. Dimple metal work to receive screw heads. Set stops and other non-structural fastenings with #6 Jackson head self-tapping screws.

PART 3 EXECUTION

3.1 EXAMINATION

A. Examine supporting structure and conditions under which hollow metal is to be installed. Do not proceed with installation until unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Install hollow metal in accordance with reviewed shop drawings and manufacturer's printed instructions. Securely fasten and anchor work in place without twists, warps, bulges or other unsatisfactory or defacing workmanship. Set hollow metal plumb, level, square to proper elevations, true to line and eye. Set clips and other anchors with Ramset "shot" anchors or drill in anchors as approved. Units and trim shall be fastened tightly together, with neat, uniform and tight joints.

B. Placing Frames: Set frames accurately in position, plumbed, aligned, and braced securely until permanent anchors are set. After wall construction is complete, remove temporary braces and spreaders leaving surfaces smooth and undamaged. In masonry construction, building-in of anchors and grouting of frames with mortar is specified in Section 04810 - Unit Masonry. At in-place concrete or masonry construction, set frames and secure in place using countersunk bolts and expansion shields, with bolt heads neatly filled with metallic putty, ground smooth and primed.

C. Place fire-rated frames in accordance with NFPA Standard #80.

D. Door Installation: Fit hollow metal doors accurately in their respective frames, within following clearances: Jambs and head 3/32 inch, meeting edges pair of doors 1/8 inch, sill where no threshold or carpet 1/4 inch above finished floor, sill at threshold 3/4 inch maximum above finished floor, sill at carpet 1/4 inch above carpet. Place fire-rated doors with clearances as specified in NFPA Standard #80.

E. Protection Removal: Immediately before final inspection, remove protective wrappings from doors and frames.

END OF SECTION

SECTION 084113 – ALUMINUM FRAMED ENTRANCES & STOREFRONTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes the following:

1. Exterior manual-swing aluminum doors and window assembly.

1.3 PERFORMANCE REQUIREMENTS

A. General: Provide aluminum-framed doors, including anchorage, capable of withstanding, without failure, the effects of the following:

1. Structural loads.
2. Thermal movements.
3. Movements of supporting structure indicated on Drawings including, but not limited to, story drift and deflection from uniformly distributed and concentrated live loads.
4. Dimensional tolerances of building frame and other adjacent construction.
5. Failure includes the following:

a. Deflection exceeding specified limits.
b. Thermal stresses transferred to building structure.
c. Framing members transferring stresses, including those caused by thermal and structural movements, to glazing.
d. Noise or vibration created by wind and thermal and structural movements.
e. Loosening or weakening of fasteners, attachments, and other components.
f. Sealant failure.
g. Failure of operating units to function properly.

B. Structural Loads:

1. Wind Loads: .

C. Deflection of Framing Members:

1. Deflection Normal to Wall Plane: Limited to 1/175 of clear span for spans up to 13 feet 6 inches (4.1 m) or an amount that restricts edge deflection of individual glazing lites to 3/4 inch (19 mm), whichever is less.

2. Deflection Parallel to Glazing Plane: Limited to 1/360 of clear span or 1/8 inch (3.2 mm), whichever is smaller.

D. Structural-Test Performance: Provide aluminum-framed doors tested according to ASTM E 330 as follows:

1. When tested at positive and negative wind-load design pressures, systems do not evidence deflection exceeding specified limits.
2. When tested at 150 percent of positive and negative wind-load design pressures, systems, including anchorage, do not evidence material failures, structural distress, and permanent deformation of main framing members exceeding 0.2 percent of span.
3. Test Durations: As required by design wind velocity but not less than 10 seconds.

E. Thermal Movements: Provide aluminum-framed systems that allow for thermal movements resulting from the following maximum change (range) in ambient and surface temperatures. Base engineering calculation on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.

1. Temperature Change (Range): 120 deg F (67 deg C), ambient; 180 deg F (100 deg C), material surfaces.

F. Air Infiltration: Provide aluminum-framed systems with maximum air leakage through fixed glazing and framing areas of 0.06 cfm/sq. ft. (0.03 L/s per sq. m) of fixed wall area when tested according to ASTM E 283 at a minimum static-air-pressure difference of 1.57 lbf/sq. ft. (75 Pa).

G. Water Penetration Under Static Pressure: Provide aluminum-framed systems that do not evidence water penetration through fixed glazing and framing areas when tested according to ASTM E 331 at a minimum static-air-pressure difference of 20 percent of positive wind-load design pressure, but not less than 6.24 lbf/sq. ft. (300 Pa).

H. Condensation Resistance: Provide aluminum-framed systems with fixed glazing and framing areas having condensation-resistance factor (CRF) of not less than 45 when tested according to AAMA 1503.

I. Average Thermal Conductance: Provide aluminum-framed systems with fixed glazing and framing areas having average U-factor of not more than 0.69 Btu/sq. ft. x h x deg F (3.92 W/sq. m x K) when tested according to AAMA 1503.

1.4 SUBMITTALS

A. Product Data: Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for each type of product indicated.

B. Shop Drawings: For aluminum-framed doors. Include plans, elevations, sections, details, and attachments to other work.

1. Include structural analysis data signed and sealed by the qualified professional engineer responsible for their preparation.
2. Include details of provisions for system expansion and contraction and for draining moisture occurring within the system to the exterior.
3. For entrances, coordinate with Division 8 Section “Door Hardware” hardware schedule and indicate operating hardware types, functions, quantities, and locations.

C. Samples for Verification: For each type of exposed finish required, in manufacturer's standard sizes.

D. Fabrication Details: An isometric drawing of each vertical-to-horizontal intersection of systems, showing details of the following:

1. Joinery.
2. Anchorage.
3. Glazing.
4. Drainage.

E. Welding certificates.

F. Qualification Data: For Installer and testing agency.

G. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, for aluminum-framed systems.

H. Field quality-control test and inspection reports.

I. Maintenance Data: For aluminum-framed systems to include in maintenance manuals.

J. Warranties: Special warranties specified in this Section.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: Capable of assuming engineering responsibility and performing work of this Section and who is acceptable to manufacturer.

1. Engineering Responsibility: Preparation of data for aluminum-framed systems including Shop Drawings based on testing and engineering analysis of manufacturer's standard units in assemblies similar to those indicated for this Project and submission of reports of tests performed on manufacturer's standard assemblies.

B. Testing Agency Qualifications: An independent agency qualified according to ASTM E 699 for testing indicated.

C. Product Options: Information on Drawings and in Specifications establishes requirements for systems' aesthetic effects and performance characteristics. Aesthetic effects are indicated by dimensions, arrangements, alignment, and profiles of components and assemblies as they relate to sightlines, to one another, and to

adjoining construction. Performance characteristics are indicated by criteria subject to verification by one or more methods including preconstruction testing, field testing, and in-service performance.

1. Do not modify intended aesthetic effects, as judged solely by Architect, except with Architect's approval. If modifications are proposed, submit comprehensive explanatory data to Architect for review.

D. Accessible Entrances: Comply with the U.S. Architectural & Transportation Barriers Compliance Board's "Americans with Disabilities Act (ADA), Accessibility Guidelines for Buildings and Facilities (ADAAG)."

E. Welding: Qualify procedures and personnel according to AWS D1.2, "Structural Welding Code--Aluminum."

1.6 PROJECT CONDITIONS

A. Measurements: Verify actual sizes of door opening measurements with Glazed Aluminum Curtainwall Supplier before fabrication and indicate measurements on Shop Drawings.

1. Established Dimensions: Where field measurements cannot be made without delaying the Work, establish dimensions and proceed with fabricating aluminum-framed systems without field measurements. Coordinate construction to ensure that actual dimensions correspond to established dimensions.

1.7 WARRANTY

A. Special Assembly Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of aluminum-framed systems that do not comply with requirements or that deteriorate as defined in this Section within specified warranty period.

1. Failures include, but are not limited to, the following:

a. Structural failures including, but not limited to, excessive deflection.
b. Noise or vibration caused by thermal movements.
c. Water leakage through fixed glazing and framing areas.
d. Failure of operating components to function properly.

2. Warranty Period: Two years from date of Final Completion.

B. Special Finish Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components on which finishes fail within specified warranty period. Warranty does not include normal weathering.

1. Warranty Period: 5 years from date of Final Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. Kawneer, or equal.

2.2 MATERIALS

A. Aluminum: Alloy and temper recommended by manufacturer for type of use and finish indicated.

1. Sheet and Plate: ASTM B 209 (ASTM B 209M).
2. Extruded Bars, Rods, Profiles, and Tubes: ASTM B 221 (ASTM B 221M).
3. Extruded Structural Pipe and Tubes: ASTM B 429.
4. Structural Profiles: ASTM B 308/B 308M.
5. Welding Rods and Bare Electrodes: AWS A5.10/A5.10M.

B. Steel Reinforcement: With manufacturer's standard corrosion-resistant primer complying with SSPC-PS Guide No. 12.00 applied immediately after surface preparation and pretreatment. Select surface preparation methods according to recommendations in SSPC-SP COM and prepare surfaces according to applicable SSPC standard.

1. Structural Shapes, Plates, and Bars: ASTM A 36/A 36M.
2. Cold-Rolled Sheet and Strip: ASTM A 1008/A 1008M.
3. Hot-Rolled Sheet and Strip: ASTM A 1011/A 1011M.

2.3 GLAZING SYSTEMS

A. Glazing: As specified in Division 8 Section "Glazing."

B. Glazing Gaskets: Manufacturer's standard compression types, replaceable, molded or extruded, that maintain uniform pressure and watertight seal.

C. Spacers and Setting Blocks: Manufacturer's standard elastomeric types.

2.4 DOORS

A. Doors: Manufacturer's standard glazed doors, for manual swing operation.

1. Door Construction:

a. Interior: 1-3/4-inch overall thickness, with minimum 0.125-inch- (3.2-mm-) thick, extruded-aluminum tubular rail and stile members. Mechanically fasten corners with reinforcing brackets that are deep penetration and fillet welded or that incorporate concealed tie rods.

b. Thermal Construction (Exterior): High-performance plastic connectors separate aluminum members exposed to the exterior from members exposed to the interior.

2. Door Design: As indicated.

a. Accessible Doors: Smooth surfaced for width of door in area within 10 inches (255 mm) above floor or ground plane.

3. Glazing Stops and Gaskets: Square, snap-on, extruded-aluminum stops and preformed gaskets.

a. Provide nonremovable glazing stops on outside of door.

4. Provide insulated glazing where indicated.

B. Door Hardware: As specified in Division 8 Section "Door Hardware."

1. Provide reinforcement in doors as required.

2. Thresholds: Field verify depth needed to cover joints between differing floor conditions.

C. Insulated Spandrel Panels:

1. Laminated, metal-faced flat panels with no deviations in plane exceeding 0.8 percent of panel dimension in width or length.

a. Overall Panel Thickness: As indicated.
b. Exterior Skin: Aluminum.

1) Thickness: Manufacturer's standard for finish and texture indicated.
2) Finish: Match framing system.
3) Texture: Smooth.
4) Backing Sheet: Manufacturer’s standard.

c. Interior Skin: Same as above

d. Thermal Insulation Core: Manufacturer's standard.
e. Surface-Burning Characteristics: Comply with ASTM E84; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.

1) Flame-Spread Index: 25 or less.
2) Smoke-Developed Index: 450 or less.

2.5 FABRICATION

A. Form aluminum shapes before finishing.

B. Weld in concealed locations to greatest extent possible to minimize distortion or discoloration of finish. Remove weld spatter and welding oxides from exposed surfaces by descaling or grinding.

C. Framing Members, General: Fabricate components that, when assembled, have the following characteristics:

1. Profiles that are sharp, straight, and free of defects or deformations.
2. Accurately fitted joints with ends coped or mitered.
3. Means to drain water passing joints, condensation occurring within framing members, and moisture migrating within the system to exterior.
4. Physical and thermal isolation of glazing from framing members.
5. Accommodations for thermal and mechanical movements of glazing and framing to maintain required glazing edge clearances.
6. Provisions for field replacement of glazing from interior.
7. Fasteners, anchors, and connection devices that are concealed from view to greatest extent possible.

D. Mechanically Glazed Framing Members: Fabricate for flush glazing (without projecting stops).

E. Doors: Reinforce doors as required for installing hardware.
1. At exterior doors, provide weather sweeps applied to door bottoms.

F. Hardware Installation: Factory install hardware to the greatest extent possible. Cut, drill, and tap for factory-installed hardware before applying finishes.

G. After fabrication, clearly mark components to identify their locations in Project according to Shop Drawings.

2.6 ALUMINUM FINISHES

A. General: Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.

B. Finish designations prefixed by AA comply with the system established by the Aluminum Association for designating aluminum finishes.

C. High-Performance Organic Finish (2-Coat Fluoropolymer): AA-C12C40R1x (Chemical Finish: cleaned with inhibited chemicals; Chemical Finish: conversion coating; Organic Coating: manufacturer's standard 2-coat, thermocured system consisting of specially formulated inhibitive primer and fluoropolymer color topcoat containing not less than 70 percent polyvinylidene fluoride resin by weight). Prepare, pretreat, and apply coating to exposed metal surfaces to comply with AAMA 2604 and with coating and resin manufacturers' written instructions.

1. Color and Gloss: Match existing.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of work.

1. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. General:

1. Comply with manufacturer's written instructions.
2. Do not install damaged components.
3. Fit joints to produce hairline joints free of burrs and distortion.
4. Rigidly secure nonmovement joints.
5. Install anchors with separators and isolators to prevent metal corrosion and electrolytic deterioration.
6. Seal joints watertight, unless otherwise indicated.

B. Metal Protection:

1. Where aluminum will contact dissimilar metals, protect against galvanic action by painting contact surfaces with primer or by applying sealant or tape or installing nonconductive spacers as recommended by manufacturer for this purpose.

C. Install components to drain water passing joints, condensation occurring within framing members, and moisture migrating within the system to exterior.

D. Install components plumb and true in alignment with established lines and grades, without warp or rack.

E. Install glazing as specified in Division 8 Section "Glazing."

F. Entrances: Install to produce smooth operation and tight fit at contact points.

1. Exterior Entrances: Install to produce tight fit at weather stripping and weathertight closure.
2. Field-Installed Hardware: Install surface-mounted hardware according to hardware manufacturers' written instructions using concealed fasteners to greatest extent possible.

G. Erection Tolerances: Install aluminum-framed systems to comply with the following maximum tolerances:

1. Location and Plane: Limit variation from true location and plane to 1/8 inch in 12 feet (3 mm in 3.7 m); 1/4 inch (6 mm) over total length.
2. Alignment:

a. Where surfaces abut in line, limit offset from true alignment to 1/16 inch (1.5 mm).
b. Where surfaces meet at corners, limit offset from true alignment to 1/32 inch (0.8 mm).

3. Diagonal Measurements: Limit difference between diagonal measurement to 1/8 inch (3 mm).

3.3 FIELD QUALITY CONTROL

A. Testing Agency: Engage a qualified independent testing and inspecting agency to perform field tests and inspections and prepare test reports.

B. Testing Services: Testing and inspecting of representative areas to determine compliance of installed systems with specified requirements shall take place as follows and in successive stages as indicated on Drawings. Do not proceed with installation of the next area until test results for previously completed areas show compliance with requirements.

1. Air Infiltration: Areas shall be tested for air leakage of 1.5 times the rate specified for laboratory testing under Part 1 "Performance Requirements" Article, but not more than 0.09 cfm/sq. ft. (0.03 L/s per sq. m), of fixed wall area when tested according to ASTM E 783 at a minimum static-air-pressure difference of 6.24 lbf/sq. ft. (300 Pa).
2. Water Spray Test: Before installation of interior finishes has begun, a minimum area of 75 feet (23 m) by 1 story of aluminum-framed systems designated by Architect shall be tested according to AAMA 501.2 and shall not evidence water penetration.

C. Repair or remove work where test results and inspections indicate that it does not comply with specified requirements.

D. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.

3.4 ADJUSTING

A. Entrances: Adjust operating hardware for smooth operation according to hardware manufacturers' written instructions.

END OF SECTION

SECTION 087100 – FINISH HARDWARE

PART 1 GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SUMMARY

A. This Section includes furnishing and installing items known commercially as finish or door hardware and automatic door operators that are required for swing, sliding, and folding doors, except special types of unique hardware specified in the same sections as the doors and door frames on which they are installed.

1. Butt Hinges
2. Cylinders
3. Locks and Latches
4. Closers
5. Protection Plates
6. Door Stops
7. Gasketing
8. Silencers

1.03 REFERENCES

A. Applicable publications: The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by the basic designation only.

B. American National Standards Institute (ANSI)

1. ANSI A117.1-1998, Providing Accessibility and Usability for Physically Handicapped People
2. ANSI/BHMA A156.1-1997, Butts and Hinges
3. ANSI/BHMA A156.4-1992, Door Controls-Closers
4. ANSI/BHMA A156.6-2001, Architectural Door Trim
5. ANSI/BHMA A156.7-1997, Template Hinge Dimensions
6. ANSI/BHMA A156.13-1994, Locks & Latches, Mortise
7. ANSI/BHMA A156.18-1993, Materials and Finishes
8. ANSI/BHMA A156.21-1996, Thresholds
9. ANSI/BHMA A156.22-1996, Door Gasketing Systems

C. American Society for Testing and Materials (ASTM)

1. ASTM E 283-84	Test Method for Rate of Air Leakage Through Exterior Windows, Curtain Walls and Doors
2. ASTM-E2074-2001	Standard Test Method for Fire Tests of Door Assemblies, Including Positive Pressure Testing of Side-Hinged and Pivoted Swinging Door Assemblies

D. Americans with Disabilities Act Accessibility Guidelines(ADAAG)
   1. ICC/ANSI A117.1, JULY 1998

E. Door and Hardware Institute (DHI)
   1. Keying Systems and Nomenclature, 1989 edition.
   2. Hardware for Labeled Fire Doors, January 1996 edition.
   3. Sequence and Format for the Hardware Schedule, January 1996 edition.
   4. Abbreviations and Symbols, September 1983 edition.

F. National Fire Protection Association (NFPA)
   1. NFPA 80 Standard for Fire Doors and Windows, 1999 edition.
   2. NFPA 101 Life Safety Code, 2003 edition.
   3. NFPA 105 Recommended Practice for the Installation of Smoke-Control Door Assemblies, 1999 edition.
   4. NFPA 252 Standard Methods of Fire Tests of Door Assemblies, 1995 edition.

G. Steel Door Institute (SDI)
   1. SDI 100 Recommended Specifications for Standard Steel Doors and Frames, 1998 edition.

H. Underwriter's Laboratories, Inc. (UL) - UL Standards for Safety:
   1. UL 10C-Positive Pressure Fire Tests of Door Assemblies
   2. UL 228 Door Closer-Holders, With or Without Integral Smoke Detectors
   3. UL 1784-90 Air Leakage Tests of Door Assemblies

1.04 SUBMITTALS

A. General: Each requirement listed under headings below shall be submitted in relation to all items specified in this section. The submittal for each heading shall be compiled by the Contractor and submitted complete and in its entirety.

B. Shop Drawings: Submit binder with label on the front cover and spine indicating job name, date, Contractor's name and the title "DOOR HARDWARE". Binder shall contain all of the door hardware shop drawings with largest sheets 11" x 17" (279 x 432 mm). Punch and fold largest sheets to fit in binder. Separate items in binder with tabbed reinforced index sheets indicating contents in each section. Use door references same as contract documents. Highlight items on shop drawings in question with yellow marker for Architect's review and response. Submit complete hardware schedule, catalog cut sheets, templates, and specifications for all hardware set items.

1. Final Hardware Schedule Content: Based on hardware indicated, organize schedule in vertical format "hardware sets" indicating complete designations of every item required for each door or opening. Hardware schedule to be in the DHI vertical format as per DHI publication Sequence and Format for the Hardware Schedule. Use specification Heading numbers with any variations suffixed a, b, etc. Include the following information:
    a) Type, style, function, size, hand, and finish of each hardware item.
    b) Name and manufacturer of each item.
    c) Fastenings and other pertinent information.
    d) Location of each hardware set cross-referenced to indications on Drawings both on floor plans and in door and frame schedule.
    e) Index and explanation of all abbreviations, symbols, and codes contained in schedule.
    f) Mounting locations for hardware.
    g) Door and frame sizes and materials.
    h) Keying information.
    i) Cross-reference numbers used within schedule deviating from those specified.
        1) Column 1: State specified item and manufacturer.
        2) Column 2: State prior approved substituted item and its manufacturer.

2. Production and Delivery Schedule: Submit a production and delivery schedule as well as all templates to be forwarded to other trades involved in hardware preparation work.

3. Templates: Templates for doors, frames, and other work specified to be factory prepared for the installation of door hardware. Check shop drawings of other work to confirm that adequate provisions are made for locating and installing door hardware to comply with indicated requirements.

4. Operations and Maintenance Data: The manufacturer shall furnish the owner a OPERATIONS AND MAINTENANCE MANUAL. Information shall be bound in a 3-ring loose-leaf binder with project name and address on the front cover and spine. Submit in accordance with Section 01770 Closeout Procedures. In this manual are to be one copy of each of the following:
    a. Name, address, phone and fax for the Finish Hardware supplier.
    b. Name, address, phone and fax number for the local manufacturers representative for each manufacturers who's products have been used on this project.
    c. Specification Section 08710 Finish Hardware.
    d. "AS BUILT" Door and Frame Schedule.
    e. "AS BUILT" Finish Hardware schedule.
    f. "AS BUILT" Keying Schedule.
    g. Hardware manufacturers maintenance instructions, if any.
    h. Fully executed Warranty(s) for finish hardware.

i. Specifications for related sections.

5. Abbreviations: Use abbreviations per DHI publication Abbreviations and Symbols.

6. Keying Schedule: Keying schedule is to be formatted as per DHI publication Keying Systems and Nomenclature. Supplier shall submit a keying schedule after meeting with Owner and Architect as specified.

1.05 QUALITY ASSURANCE

A. Manufacturers Requirements: Repair or replace damaged or defective materials prior to shipment. If product is repaired it is to meet all QA requirements for said product.

B. Fully Functional Openings: It is understood by submitting a bid and upon receiving a purchase order that all hardware required for a fully functional opening that complies with all local, state and national codes is the responsibility of the successful bidder rather specified in the hardware sets or not.

C. Supplier Qualifications: A recognized architectural door hardware supplier, with office and warehousing facilities in the Project's vicinity, that has a record of successful in-service performance for supplying door hardware similar in quantity, type, and quality to that indicated for this Project and that employs an experienced architectural hardware consultant (AHC), who is available to Owner, Architect, and Contractor, at reasonable times during the course of the Work, for consultation, or a person of equilavent experience. Supplier to be a regular authorized distributor of the products he or she intends to furnish. Supplier to maintain an inventory of the manufacturers specified in this section. Supplier to meet with Owner to finalize keying requirements and to obtain final instructions in writing.

D. Installer Qualifications: An installer cerified by the maufacturer of the products specified in this section. The installer is to provide proof of this certification, by submitting a letter, from the manufacturer, on the manufacturer’s letterhead, stating these requirements. This certification letter will pertain to locksets, exit devices, and door closers.

E. Regulatory Requirements: Comply with requirements of NFPA 80, NFPA101 and NFPA 252 in providing hardware for fire rated openings.

F. Product Standards:

1. Hinges, Mortise Locks and Latches, Closers, Thresholds, Trim, Finishes and other miscellaneous hardware: Complying with requirements of ANSI A156 standards for quality, construction, performance and operation applicable for specified hardware.

G. Substitutions: Submit requests for substitution no less than ten days prior to bid date and accordance with the requirements set fourth in Division 1.

H. Keying Meeting: The supplier will be responsible for scheduling, coordinating and documenting a keying meeting to establish requirements for the project.

1.06 DELIVERY AND STORAGE

A. Tag each item or package according to the approved finish hardware schedule, and include manufacturers installation instructions with each item or package.

B. Deliver hardware in manufacturers original packaging.

C. Inventory door hardware jointly with representatives of hardware supplier and hardware installer until each is satisfied that count is correct.

D. Deliver individually packaged door hardware items to the jobsite according to the progress of construction. No drop shipments will be accepted.

E. Provide secure lock-up for door hardware delivered to the Project, but not yet installed. Control handling and installation of hardware items that are not immediately replaceable so that completion of the Work will not be delayed by hardware losses both before and after installation.

F. Store Finish Hardware per manufacturers recommendations.

1.07 WARRANTY

A. Warranty to comply with requirements set fourth in Division 1. Warranty to commence at date of acceptance. Furnish manufacturers' limited warranty covering defects in materials and workmanship for the minimum periods indicated below. Furnish warranties free of maintenance and written on the manufacturer's letter head.
Continuous Hinges: Lifetime
Door Closers: Minimum Ten years
Locksets: Minimun Five years
Exit Devices: Minimum Five years
All other hardware: Minimum One year

1.08 MAINTENANCE

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. These tools are limited to tools that are

manufactured by the hardware manufacturers for the products used on this project .ie spanner wrenches, closer adjustment tools.

B. Extra Materials: The following is a list of parts and materials that shall be furnished:
   1. Furnish 2 screw packages, or fasteners, for each hardware item.
   2. Furinsh 1 additional lockset. Same model as furnished.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Manufacturers listed have products specified in this section. Only the manufacturers' products specifically listed are acceptable, subject to meeting or exceeding the requirements specified.

B. Acceptable manufacturers listed as follows are referred to in this section hereinafter by their first or common trade names:
   1. Hager
   2. LCN
   3. Locknetics
   4. McKinney
   5. PBB
   6. Pemko Mfg. Co.
   7. Precision
   8. Reese Enterprises, Inc.
   9. Rockwood Mfg. Co
   10. Rutherford Controls.
   11. Sargent Mfg. Corp.
   12. Schlage
   13. Trimco
   14. Von Duprin

2.02 HINGES

A. Full Mortise Butt Hinges:
   Provide templated hinges. Furnish flathead screws with each hinge. Finish screw heads to match surface of hinges. Provide steel threaded, to the head, wood screws. Provide out-swing exterior doors with non-removable pins. Out -Swing Corridor Doors with locks with non-removable pins, and interior door with non-rising pins. All hinges to have flat button and matching plug. Size hinges in accordance with specified manufacturer’s published recommendations. Furnish one pair

of hinges for all doors up to 5'0" high. Furnish one hinge for each additional 2-1/2 feet or fraction thereof. Furnish heavy weight hinges for doors over 3'-4", or doors that are frequently used. Furnish non-ferrous hinges on exterior doors, doors in wet areas, and in areas where doors that are exposed to heavy corrosion.

1. Acceptable manufacturers and products:

   a. Steel Five Knuckle Full Mortise Butt Hinges:

MFG.	Std.Wt.	Heavy Wt.
MCKINNEY	TA2714	T4A3786
Hager	BB1279	BB1168
PBB	BB81	4B81
STANLEY	FBB179	FBB168

2.03 KEY CYLINDERS AND KEYING

A. Key Cylinders: Provide six-pin or seven pin interchangable core cylinders meeting ANSI Grade 1 Security. **Match the owners existing keyway**. Supply manufacturer's standard size cylinder as required to accommodate specified hardware. Include security cylinder rings, extensions and collars as required to accommodate installation. Provide factory original keys of nickel silver.

B. Acceptable manufacturers and products:
Best, Dorma, Sargent, Schlage

C. Keying:

1. Key Systems: Match owners existing master key system for this project. System to be large enough to encompass the owner's existing building plus 300% more for future expansion.
2. Key Quantities: Provide number of keys indicated. Quantities indicated shall be used as the basis for adjustments, if required, after keying is established with Owner.
   a. Provide 2 each Change Keys per lock.
   b. Provide 6 each Master Keys
   c. Provide 6 each Grand Master Keys

3. Key Control: Owner or hardware manufacturer shall produce pinning chart and all cylinders shall be factory keyed.. All keys shall be accounted for at all times and delivered to the designated personnel as directed by Owner. Index, tag and

deliver keys in sealed containers; shipped direct to Owner by prepaid registered mail or other secure method acceptable to Owner. All keys assigned to Contractor shall be surrendered to Owner upon completion of the project. If at any time a key cannot be accounted for, the lock cylinder shall be re-keyed, or the entire lock replaced if re-keying is not possible, at no additional cost to the Owner.

4. Key Identification: Each key shall be stamped or engraved with the key set per the approved key schedule in addition to the manufacturer's standard markings and the corresponding door number assigned.

2.04 BORED LOCKS AND LATCHSETS:

A. Furnish a standard-duty key in lever bored lockset designed to exceed the requirements of ANSI 156.2, Series 4000, Grade 1. Provide a 4-7/8" curved lip strike plate for all hollow metal frames. Furnish brass latchbolts with a ½" minimum throw and 2-3/4" backset. Furnish locksets with a 3-3/8" minimum rose and a lever not to exceed 5" from the center of the lock to the end of the lever. Furnish locksets with a straight lever that returns to the door.

Acceptable manufacturers:

Schlage ND Series RHO design,

Sargent 10-Line LL design.

BEST 93K Seriers 15D Design

Dorma C800 Series LRC Design

2.05 DOOR CLOSERS

A. Door closers shall have fully hydraulic, full rack and pinion action. Furnish a universal closer body where all arms are interchangeable with the same body. All closers shall utilize a stable all weather fluid without seasonal adjustment of closer speed to properly close the door. Closers for fire-rated doors shall be provided with temperature stabilizing fluid that complies with standards UBC 7-2 (1997) and UL 10C, as required. Closers shall be multi sized 1 thru 6, and non-handed. Provide full closer cover. Stake or captivate all closer adjustment valves. Closers to be installed to allow door swing as shown on plans. Doors swinging into exit corridors shall provide for corridor clear width as required by code. Where possible, mount closers inside rooms. Provide closer variants conforming to ADA ANSI-A117.1. Furnish the necessary brackets and spacers for the correct operation of the closer rather specified or not. Furnish heavy duty thumb turn hold open arms where specified.

B. Acceptable manufacturers and products:

Manufacturer	Heavy Duty
Sargent	351 Series
LCN	4041 Series
Dorma	8900 Series

2.06 PROTECTIVE PLATES

Protective plates to be .050" thick (U.S. 18 gage) stainless steel. Counter sink for mechanical fasteners. Fasten with pan head oval stainless steel sheet metal screws provided by protective plate manufacturer. Bevel all four sides.

A. Kick Plates: Kick plates are to be mounted on push side of door and to be 10" in height and 2" LDW, unless otherwise specified. Where the bottom rail will not allow for the full 10" in height, furnish the maxium height that will protect the bottom rail.

B. Acceptable manufacturers and products:

Manufacturer	Kick Plate
Rockwood	K1050
Trimco	K0050

2.07 WALL STOPS

A. Wall Stops: Provide convex wall stops with concealed combo pack fasteners. Use toggle fasteners in drywall and machine screws and rawl plugs in masonry and concrete walls. Furnish wall stops with an anti-vandal flat washer.

B. Acceptable manufacturers and products, no substitutions:

Manufacturer	Wall
Trimco	1278 Series

2.08 DOOR SEALS/GASKETING/THRESHOLDS/AUTO.DOOR BOTTOMS

Aluminum extrusions to be T-6063 or T-6463 with a minimum hardness of T-5. Provide mechanical fasteners. Use only manufacturer supplied fasteners.

A. Door Seals and Gasketing:
Fasteners shall be stainless steel sheet metal screws. Furnish UL listed gasketing for all fire-rated doors.

1. Perimeter Seals:
Provide bulb seal at head and jambs. Seal to be polyurethane or high grade neoprene. Fasten with manufacturer's recommended and supplied fasteners.

2. Thresholds & Automatic Door Bottoms:

Furnish thresholds 4” longer than the door width. Provide only manufacturer supplied fasteners. Secure thresholds and safety treads with stainless steel wood screws and plastic anchors. Secure automatic door bottoms with stainless steel sheet metal screws.

a. Thresholds: Provide .125” thick material for ¼” rise saddle thresholds and .200” material for ½” rise saddle thresholds.
b. Furnish all thresholds with anti-slip surface similar to “PemKote”
c. Furnish extra heavy duty 3/8” thick cast aluminum thresholds where specified.
d. Omit any thresholds specified at vestibule locations.
e. Acceptable manufacturers and products:

Manufacturer	Weatherstrip	½” Rise x ADA Panic	½” Rise Saddle	Gasket
NGP	162S	896S	424SIA	5050
Pemko	297APK	2005AT	170AK	S88D
Reese	815A	S483AP	S404PG	797

2.09 SILENCERS

A. Provide punch in silencers. Manufactured of rubber, neoprene or silicone types of pneumatic design for mounting to metal door frames. Silencers to meet the requirements of ANSI A156.16.

B. Acceptable manufacturers and products:

Manufacturer	Open Section Frame	Closed Section Frame
Rockwood	608	608
Trimco	1229A	1229A

C. Provide three for each single doors; two for pairs of doors.

2.10 MATERIALS AND FABRICATION

A. Base Metals: Produce hardware units of basic metal and forming method indicated, using manufacturer's standard metal alloy, composition, temper, and hardness, but in no case of lesser (commercially recognized) quality than specified for applicable hardware units by applicable ANSI/BHMA A156 series standards for each type of hardware item and with ANSI/BHMA A156.18 for finish designations indicated. Do not furnish "optional" materials or forming methods for those indicated, except as otherwise specified.

B. Fasteners: Provide hardware manufactured to conform to published templates, generally prepared for machine screw installation.

1. Do not provide hardware that has been prepared for self-tapping sheet metal screws, except as specifically indicated.
2. Furnish screws for installation with each hardware item. Provide Phillips flat-head screws except as otherwise indicated. Finish exposed (exposed under any condition) screws to match hardware finish or, if exposed in surfaces of other work, to match finish of this other work as closely as possible including "prepared for paint" surfaces to receive painted finish.
3. Provide concealed fasteners for hardware units that are exposed when door is closed except to the extent no standard units of type specified are available with concealed fasteners.
4. Do not use thru-bolts or sex bolts for installation where bolt head or nut on opposite face is exposed in other work unless their use is the only means of adequately fastening the hardware, or otherwise found in Headings. Coordinate with wood doors and metal doors and frames where thru-bolts are used as a means of reinforcing the work, provide sleeves for each thru-bolt or use sex screw fasteners.

2.11 HARDWARE FINISHES

A. Match items to the manufacturer's standard color and texture finish for the latch and lock sets (or push-pull units if no latch of lock sets).

B. Provide finishes that match those established by ANSI or, if none established, match the Architect's sample.

C. 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.

D. The designations used to indicate hardware finishes are those listed in ANSI/BHMA A156.18, "Materials and Finishes," including coordination with the traditional U.S. finishes shown by certain manufacturers for their products.

1.	Hinges (Exterior)	626/Clear Anodized
2.	Hinges (Interior)	USP
3.	Locks	626
4.	Exit Devices	630
5.	Door Closers	689
6.	Protective Plates	630
7.	Door Stops	630/626
8.	Thresholds/Weatherstripping	Mill Finish Aluminum

PART 3 EXECUTION

3.01 INSTALLATION

A. USE ONLY MANUFACTURER SUPPLIED FASTENERS. USE OF ANY OTHER FASTENERS WILL VOID LABEL AND WARRANTY.

B. Install hardware per manufacturers instructions and in compliance with:
1. NFPA-80
2. NFPA-101
3. NFPA-105
4. NFPA-252
5. ANSI A117.1
6. Local building code requirements
7. Approved Shop Drawings
8. Approved Finish Hardware Schedule

C. Install each hardware item in compliance with the manufacturer's instructions and recommendations. Where cutting and fitting is required to install hardware onto or into surfaces that are later to be painted or finished in another way, coordinate removal, storage, and reinstallation or application of surface protection with finishing work specified in the Division 9 Sections. Do not install surface-mounted items until finishes have been completed on the substrates involved.

D. Set units level, plumb, and true to line and location. Adjust and reinforce the attachment substrate as necessary for proper installation and operation.

E. Drill and countersink units that are not factory prepared for anchorage fasteners. Space fasteners and anchors in accordance with industry standards.

F. Set thresholds for exterior doors in full bed of butyl-rubber or polyisobutylene mastic sealant complying with requirements specified in Division 7 Section “Joint Sealers”.

G. Weatherstripping and Seals: Comply with manufacturer's instructions and recommendations to the extent installation requirements are not otherwise indicated.

3.02 FIELD QUALITY CONTROL

Hardware shall be inspected for correct function, operation, and comply with the code standards listed in this section, and in Division 1. A certified architectural hardware consultant shall prepare a detailed report, bringing any discrepancies in function, operation, or mis-installed hardware, to the attention of the Architect, General Contractor, and Installer, in writing.

3.03 ADJUSTING, CLEANING, AND DEMONSTRATING

A. Adjusting: Hardware installer to adjust and check each operating item of hardware and each door to ensure proper operation or function of every unit. Replace units that cannot be adjusted to operate freely and smoothly or as intended for the application made.

1. Where door hardware is installed more than one month prior to acceptance or occupancy of a space or area, return to the installation during the week prior to acceptance or occupancy and make final check and adjustment of all hardware items in such space or area. Clean operating items as necessary to restore proper function and finish of hardware and doors. Adjust door control devices to function properly with final operation of heating and ventilating equipment.

B. Cleaning: General Contractor to:

1. Clean adjacent surfaces soiled by hardware installation.
2. Clean finish hardware per manufacturers instructions after installer makes final adjustments and prior to final acceptance. Remove all mortar, dry wall mud, paint over spray and foreign materials from hardware. Replace at no cost to owner items that can not be cleaned to manufacturers level of finish quality.

C. Demonstrating: Prior to final acceptance, the Door Hardware Supplier and Hardware Installer shall:

1. Conduct a training class for the building maintenance personnel in the adjustment, operation and maintenance of mechanical and electrified finish hardware. At the start of this class the installer is to turn over all special tools for finish hardware, that were provided with hardware, by the hardware manufacturer, to the building maintenance supervisor.

3.04 HARDWARE SCHEDULE-THESE SETS ARE TYPICAL PER FLOOR.

Hardware Set #1 **Apt. Main Entry Door**

3ea.	Hinges	FBB179 4.5 X 4
1ea.	Passage	93KON15DS3
1ea.	Deadlock	8T3KSTK
1ea.	Cylinder	Match Existing
1ea.	Closers	4041 Cush
1ea.	Kickplates	KO050 8 X 34
1ea.	Knocker/Viewer	1278CXCP
1ea.	Gasketing	797B

Hardware Set #2 **Balcony Door**

3ea.	Hinges	FBB179 5 X 4
1ea.	Passage	93KON15DS3
1ea.	Deadlock	8T3KSTK
1ea.	Cylinder	Match Existing
1ea.	Wall Stop	1278CXCP
3ea.	Silencers	1229A

Hardware Set #3 **Janitor's Closet**

3ea.	Hinges	FBB179 4.5 X 4
1ea.	Lockset	93K7D15DS3
1ea.	Cylinder	Match Existing
1ea.	Closers	4041 Cush
1ea.	Kickplates	KO050 12 X 34
1ea.	Gasketing	797B

Hardware Set #4 **Trash Cart Alcove**

6ea.	Hinges	FBB179 4.5 X 4
1ea.	Lockset	93K7D15DS3
1ea.	Cylinder	Match Existing
2ea.	Flushbolts	3917 x 12"
2ea.	O.H Stops	901H
2ea.	Kickplates	KO050 12 X 1" LDW
2ea.	Silencers	1229A

Note: Door supplier to provide a "Z" astragal.

END OF SECTION

SECTION 088000 - GLAZING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes glazing for the following products and applications, including those specified in other Sections where glazing requirements are specified by reference to this Section:

1. Windows.
2. Doors.
3. Storefront framing.

1.3 DEFINITIONS

A. Manufacturers of Glass Products: Firms that produce primary glass, fabricated glass, or both, as defined in referenced glazing publications.

B. Glass Thicknesses: Indicated by thickness designations in millimeters according to ASTM C 1036.

C. Interspace: Space between lites of an insulating-glass unit that contains dehydrated air or a specified gas.

D. Deterioration of Coated Glass: Defects developed from normal use that are attributed to the manufacturing process and not to causes other than glass breakage and practices for maintaining and cleaning coated glass contrary to manufacturer's written instructions. Defects include peeling, cracking, and other indications of deterioration in metallic coating.

E. Deterioration of Insulating Glass: Failure of hermetic seal under normal use that is attributed to the manufacturing process and not to causes other than glass breakage and practices for maintaining and cleaning insulating glass contrary to manufacturer's written instructions. Evidence of failure is the obstruction of vision by dust, moisture, or film on interior surfaces of glass.

1.4 PERFORMANCE REQUIREMENTS

A. General: Provide glazing systems capable of withstanding normal thermal movement and wind and impact loads (where applicable) without failure, including loss or glass breakage attributable to the following: defective manufacture, fabrication, and installation; failure of sealants or gaskets to remain watertight and airtight; deterioration of glazing materials; or other defects in construction.

B. Glass Design: Glass thickness designations indicated are minimums and are for detailing only. Confirm glass thicknesses by analyzing Project loads and in-service conditions. Provide glass lites in the thickness designations indicated for various size openings, but not less than thicknesses and in strengths (annealed or heat treated) required to meet or exceed the following criteria:

1. Glass Thicknesses: Select minimum glass thicknesses to comply with ASTM E 1300, according to the following requirements:

a. Minimum Glass Thickness for Exterior Lites: As noted on the drawings.

C. Thermal Movements: Provide glazing that allows for thermal movements resulting from the following maximum change (range) in ambient and surface temperatures acting on glass framing members and glazing components. Base engineering calculation on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.

1. Temperature Change (Range): 120 deg F (67 deg C), ambient; 180 deg F (100 deg C), material surfaces.

1.5 SUBMITTALS

A. Product Data: Submit manufacturer's product data, including performance characteristics and installation instructions.

B. Shop Drawings: Submit manufacturer's or fabricator's shop drawings, including plans, elevations, sections, and details, indicating glass dimensions, tolerances, types, thicknesses, and coatings.

C. Product Certificates: Signed by manufacturers of glass and glazing products certifying that products furnished comply with requirements.

1. For low-e-coated glass, provide documentation demonstrating that manufacturer of coated glass is certified by coating manufacturer.

D. Fabricator's Certification: Submit fabricator's certification by manufacturer.

E. Preconstruction Adhesion and Compatibility Test Report: From glazing sealant manufacturer indicating glazing sealants were tested for adhesion to glass and glazing channel substrates and for compatibility with glass and other glazing materials.

F. Product Test Reports: For each of the following types of glazing products:

1. Insulating glass.
2. Glazing sealants.
3. Glazing gaskets.

G. Warranties: Special warranties specified in this Section.

1.6 QUALITY ASSURANCE

A. Installer Qualifications: An experienced installer who has completed glazing similar in material, design, and extent to that indicated for this Project; whose work has resulted in glass installations with a record of successful in-service performance; and who employs glass

installers for this Project who are certified under the National Glass Association's Certified Glass Installer Program.

B. Source Limitations for Glass: Obtain the following through one source from a single manufacturer for each glass type: clear float glass and insulating glass.

C. Source Limitations for Glass Sputter-Coated with Low-E Coatings: Where solar-control low-e coatings of a primary glass manufacturer that has established a certified fabricator program is specified, obtain sputter-coated solar-control low-e-coated glass in fabricated units from a manufacturer that is certified by coated-glass manufacturer.

D. Source Limitations for Glazing Accessories: Obtain glazing accessories through one source from a single manufacturer for each product and installation method indicated.

E. Glass Product Testing: Obtain glass test results for product test reports in "Submittals" Article from a qualified testing agency based on testing glass products.

1. Glass Testing Agency Qualifications: An independent testing agency with the experience and capability to conduct the testing indicated, as documented according to ASTM E 548.
2. Glass Testing Agency Qualifications: An independent testing agency accredited according to the NFRC CAP 1 Certification Agency Program.

F. Preconstruction Adhesion and Compatibility Testing: Submit to elastomeric glazing sealant manufacturers, for testing indicated below, samples of each glazing material type, tape sealant, gasket, glazing accessory, and glass-framing member that will contact or affect elastomeric glazing sealants:

1. Use ASTM C 1087 to determine whether priming and other specific joint preparation techniques are required to obtain rapid, optimum adhesion of glazing sealants to glass, tape sealants, gaskets, and glazing channel substrates.
2. Submit not fewer than eight pieces of each type of material, including joint substrates, shims, joint-sealant backings, secondary seals, and miscellaneous materials.
3. Schedule sufficient time for testing and analyzing results to prevent delaying the Work.
4. For materials failing tests, obtain sealant manufacturer's written instructions for corrective measures, including the use of specially formulated primers.
5. Testing will not be required if elastomeric glazing sealant manufacturers submit data based on previous testing of current sealant products for adhesion to, and compatibility with, glazing materials matching those submitted.

G. Safety Glazing Products: Comply with testing requirements in 16 CFR 1201.

1. Subject to compliance with requirements, obtain safety glazing products permanently marked with certification label of the Safety Glazing Certification Council or another certification agency or manufacturer acceptable to authorities having jurisdiction.
2. Where glazing units, including Kind FT glass and laminated glass, are specified in Part 2 articles for glazing lites more than 9 sq. ft. (0.84 sq. m) in exposed surface area of one side, provide glazing products that comply with Category II materials, for lites 9 sq. ft. (0.84 sq. m) or less in exposed surface area of one side, provide glazing products that comply with Category I or II materials, except for hazardous locations where Category II materials are required by 16 CFR 1201 and regulations of authorities having jurisdiction.

H. Glazing Publications: Comply with published recommendations of glass product manufacturers and organizations below, unless more stringent requirements are indicated. Refer to these publications for glazing terms not otherwise defined in this Section or in referenced standards.

1. GANA Publications: GANA's "Glazing Manual."
2. IGMA Publication for Insulating Glass: SIGMA TM-3000, "Glazing Guidelines for Sealed Insulating Glass Units."

I. Insulating-Glass Certification Program: Permanently marked either on spacers or on at least one component lite of units with appropriate certification label of the following testing and inspecting agency:

1. Insulating Glass Certification Council.
2. Associated Laboratories, Inc.

J. Preinstallation Conference: Conduct conference at Project site to comply with requirements in Division 01 Section "Project Management and Coordination."

1.7 DELIVERY, STORAGE, AND HANDLING

A. Protect glazing materials according to manufacturer's written instructions and as needed to prevent damage to glass and glazing materials from condensation, temperature changes, direct exposure to sun, or other causes.

1.8 PROJECT CONDITIONS

A. Environmental Limitations: Do not proceed with glazing when ambient and substrate temperature conditions are outside limits permitted by glazing material manufacturers and when glazing channel substrates are wet from rain, frost, condensation, or other causes.

1. Do not install liquid glazing sealants when ambient and substrate temperature conditions are outside limits permitted by glazing sealant manufacturer or below 40 deg F (4.4 deg C).

1.9 WARRANTY

A. Manufacturer's Special Warranty on Insulating Glass: Manufacturer's standard form, made out to Owner and signed by insulating-glass manufacturer agreeing to replace insulating-glass units that deteriorate as defined in "Definitions" Article, f.o.b. the nearest shipping point to Project site, within specified warranty period indicated below.

1. Warranty Period: 10 years from date of Final Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Guardian Industries Corp., 14600 Romine Road, Carleton, Michigan 48117. Toll Free (800) 521-9040. Phone (734) 654-6264. Fax (734) 654-0935. Web Sites www.guardian.com, www.sunguardglass.com.

B. Substitutions:
1. PPG Industries, Inc (R100 #2 Surface, Sungate 600 #4 Surface).
2. Viracon (VRE38 #2 Surface).

3. Pilkington (Energy Advantage #4 Surface).

2.2 FABRICATORS

A. Sealed Insulating Glass Units, Heat-Strengthened Glass, Tempered Glass:

1. Acceptable Fabricators: Certified by Guardian Industries Corp. to fabricate SunGuard Solar Control Coated Glass products.

B. Acceptable Fabricators:

1. Oldcastle Building Envelope.
2. Trulite Glass & Aluminum Solutions.
3. Glenny Glass.
4. Viracon.

2.3 GLASS PRODUCTS

A. Annealed Float Glass: ASTM C 1036, Type I (transparent flat glass), Quality-Q3; of class indicated.

B. Heat-Treated Float Glass: ASTM C 1048; Type I (transparent flat glass); Quality-Q3; of class, kind, and condition indicated.

1. Fabrication Process: By horizontal (roller-hearth) process with roll-wave distortion parallel to bottom edge of glass as installed, unless otherwise indicated.
2. For uncoated glass, comply with requirements for Condition A.
3. Provide Kind FT (fully tempered) float glass in place of annealed or Kind HS (heat-strengthened) float glass where safety glass is indicated.

C. Double-Glazed Sputter-Coated Insulating Glass Vision Units:

1. Conformance: ASTM E 2190, Class CBA.
2. Outboard Lite: Sputter-coated clear float glass.
   a. Annealed clear Float Glass: ASTM C 1036, Type 1, Class 2, Quality q3.
   b. Vacuum Deposition Sputtered Coating: ASTM C 1376.
   c. Coating on Surface No. 2: SunGuard SNR 43.
   d. Glass Thickness: 6 mm (1/4 inch).
   e. Heat Treatment: Heat-strengthened (ASTM C 1048, Kind HS) where Tempered (ASTM C 1048 Kind FT; CPSC 16CFR-1201; ANSI Z 97) is not required for safety.
3. Air Space: 12 mm (1/2 inch) wide, hermetically sealed, dehydrated air space.
4. Inboard Lite: Clear float glass.
   a. Annealed Clear Float Glass: ASTM C 1036, Type 1, Class 1, Quality q3.
   b. Vacuum Deposition Sputtered Coating: ASTM C 1376.
   c. Coating on Surface No. 4: SunGuard IS20.
   d. Glass Thickness: 6 mm (1/4 inch).
   e. Heat Treatment: Heat-strengthened (ASTM C 1048, Kind HS) where Tempered (ASTM C 1048 Kind FT; CPSC 16CFR-1201; ANSI Z 97) is not required for safety.
5. Glass Unit Performance Characteristics:
   a. Visible Light Transmittance: 42 percent
   b. Visible Light Reflectance Outdoors: 28 percent

c. Direct Solar Energy Transmittance: 18 percent
d. Direct Solar Energy Reflectance Outdoors: 42 percent
e. Winter U-Value Nighttime: 0.32
f. Summer U-Value Daytime: 0.32
g. Solar Heat Gain Coefficient: 0.4

6. Edge Seals: ASTM E 773, with aluminum spacers and silicone sealant for glass-to-spacer seals.
7. Sealant: Approved by glass manufacturer.

2.4 GLAZING GASKETS

A. Dense Compression Gaskets: Molded or extruded gaskets of material indicated below, complying with standards referenced with name of elastomer indicated below, and of profile and hardness required to maintain watertight seal:

1. Neoprene, ASTM C 864.

2.5 GLAZING SEALANTS

A. General: Provide products of type indicated, complying with the following requirements:

1. Compatibility: Select glazing sealants that are compatible with one another and with other materials they will contact, including glass products, seals of insulating-glass units, and glazing channel substrates, under conditions of service and application, as demonstrated by sealant manufacturer based on testing and field experience.
2. Suitability: Comply with sealant and glass manufacturers' written instructions for selecting glazing sealants suitable for applications indicated and for conditions existing at time of installation.
3. Colors of Exposed Glazing Sealants: As selected by Architect from manufacturer's full range.

B. Elastomeric Glazing Sealant Standard: Provide manufacturer’s standard chemically curing, elastomeric sealants of base polymer indicated that comply with ASTM C 920 requirements indicated on each Elastomeric Glazing Sealant Product Data Sheet at the end of this Section, including those referencing ASTM classifications for Type, Grade, Class and Uses.

1. Additional Movement Capability: Where additional movement capability is specified in Elastomeric Glazing Sealant Product Data Sheet, provide products, when tested for adhesion and cohesion under maximum cyclic movement per ASTM C 719, with the capability to withstand the specified percentage change in the joint width existing at time of installation and remain in compliance with other requirements of ASTM C 920 for uses indicated.

2.6 GLAZING TAPES

A. Back-Bedding Mastic Glazing Tapes: Preformed, butyl-based elastomeric tape with a solids content of 100 percent; nonstaining and nonmigrating in contact with nonporous surfaces; with or without spacer rod as recommended in writing by tape and glass manufacturers for application indicated; packaged on rolls with a release paper backing; and complying with ASTM C 1281 and AAMA 800 for products indicated below:

1. AAMA 804.1.

B. Expanded Cellular Glazing Tapes: Closed-cell, PVC foam tapes; factory coated with adhesive on both surfaces; packaged on rolls with release liner protecting adhesive; and complying with AAMA 800 for the following types:

2.7 MISCELLANEOUS GLAZING MATERIALS

A. General: Provide products of material, size, and shape complying with referenced glazing standard, requirements of manufacturers of glass and other glazing materials for application indicated, and with a proven record of compatibility with surfaces contacted in installation.

B. Cleaners, Primers, and Sealers: Types recommended by sealant or gasket manufacturer.

C. Setting Blocks: Elastomeric material with a Shore, Type A durometer hardness of 85, plus or minus 5.

D. Spacers: Elastomeric blocks or continuous extrusions with a Shore, Type A durometer hardness required by glass manufacturer to maintain glass lites in place for installation indicated.

E. Edge Blocks: Elastomeric material of hardness needed to limit glass lateral movement (side walking).

F. Cylindrical Glazing Sealant Backing: ASTM C 1330, Type O (open-cell material), of size and density to control glazing sealant depth and otherwise produce optimum glazing sealant performance.

G. Perimeter Insulation for Fire-Resistive Glazing: Identical to product used in test assembly to obtain fire-resistance rating.

2.8 FABRICATION OF GLAZING UNITS

A. Fabricate glazing units in sizes required to glaze openings indicated for Project, with edge and face clearances, edge and surface conditions, and bite complying with written instructions of product manufacturer and referenced glazing publications, to comply with system performance requirements.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine framing glazing, with Installer present, for compliance with the following:

1. Manufacturing and installation tolerances, including those for size, squareness, and offsets at corners.
2. Presence and functioning of weep system.
3. Minimum required face or edge clearances.
4. Effective sealing between joints of glass-framing members.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Clean glazing channels and other framing members receiving glass immediately before glazing. Remove coatings not firmly bonded to substrates.

3.3 GLAZING, GENERAL

A. Comply with combined written instructions of manufacturers of glass, sealants, gaskets, and other glazing materials, unless more stringent requirements are indicated, including those in referenced glazing publications.

B. Glazing channel dimensions, as indicated on Drawings, provide necessary bite on glass, minimum edge and face clearances, and adequate sealant thicknesses, with reasonable tolerances. Adjust as required by Project conditions during installation.

C. Protect glass edges from damage during handling and installation. Remove damaged glass from Project site and legally dispose of off Project site. Damaged glass is glass with edge damage or other imperfections that, when installed, could weaken glass and impair performance and appearance.

D. Apply primers to joint surfaces where required for adhesion of sealants, as determined by preconstruction sealant-substrate testing.

E. Install setting blocks in sill rabbets, sized and located to comply with referenced glazing publications, unless otherwise required by glass manufacturer. Set blocks in thin course of compatible sealant suitable for heel bead.

F. Do not exceed edge pressures stipulated by glass manufacturers for installing glass lites.

G. Provide spacers for glass lites where length plus width is larger than 50 inches (1270 mm) as follows:

1. Locate spacers directly opposite each other on both inside and outside faces of glass. Install correct size and spacing to preserve required face clearances, unless gaskets and glazing tapes are used that have demonstrated ability to maintain required face clearances and to comply with system performance requirements.
2. Provide 1/8-inch (3-mm) minimum bite of spacers on glass and use thickness equal to sealant width. With glazing tape, use thickness slightly less than final compressed thickness of tape.

H. Provide edge blocking where indicated or needed to prevent glass lites from moving sideways in glazing channel, as recommended in writing by glass manufacturer and according to requirements in referenced glazing publications.

I. Set glass lites in each series with uniform pattern, draw, bow, and similar characteristics.

J. Where wedge-shaped gaskets are driven into one side of channel to pressurize sealant or gasket on opposite side, provide adequate anchorage so gasket cannot walk out when installation is subjected to movement.

K. Square cut wedge-shaped gaskets at corners and install gaskets in a manner recommended by gasket manufacturer to prevent corners from pulling away; seal corner joints and butt joints with sealant recommended by gasket manufacturer.

3.4 TAPE GLAZING

A. Position tapes on fixed stops so that, when compressed by glass, their exposed edges are flush with or protrude slightly above sightline of stops.

B. Install tapes continuously, but not necessarily in one continuous length. Do not stretch tapes to make them fit opening.

C. Cover vertical framing joints by applying tapes to heads and sills first and then to jambs. Cover horizontal framing joints by applying tapes to jambs and then to heads and sills.

D. Place joints in tapes at corners of opening with adjoining lengths butted together, not lapped. Seal joints in tapes with compatible sealant approved by tape manufacturer.

E. Do not remove release paper from tape until just before each glazing unit is installed.

F. Apply heel bead of elastomeric sealant.

G. Center glass lites in openings on setting blocks and press firmly against tape by inserting dense compression gaskets formed and installed to lock in place against faces of removable stops. Start gasket applications at corners and work toward centers of openings.

H. Apply cap bead of elastomeric sealant over exposed edge of tape.

3.5 GASKET GLAZING (DRY)

A. Fabricate compression gaskets in lengths recommended by gasket manufacturer to fit openings exactly, with allowance for stretch during installation.

B. Insert soft compression gasket between glass and frame or fixed stop so it is securely in place with joints miter cut and bonded together at corners.

C. Center glass lites in openings on setting blocks and press firmly against soft compression gasket by inserting dense compression gaskets formed and installed to lock in place against faces of removable stops. Start gasket applications at corners and work toward centers of openings. Compress gaskets to produce a weathertight seal without developing bending stresses in glass. Seal gasket joints with sealant recommended by gasket manufacturer.

D. Install gaskets so they protrude past face of glazing stops.

3.6 SEALANT GLAZING (WET)

A. Install continuous spacers, or spacers combined with cylindrical sealant backing, between glass lites and glazing stops to maintain glass face clearances and to prevent sealant from extruding into glass channel and blocking weep systems until sealants cure. Secure spacers or spacers and backings in place and in position to control depth of installed sealant relative to edge clearance for optimum sealant performance.

B. Force sealants into glazing channels to eliminate voids and to ensure complete wetting or bond of sealant to glass and channel surfaces.

C. Tool exposed surfaces of sealants to provide a substantial wash away from glass.

3.7 CLEANING AND PROTECTION

A. Protect exterior glass from damage immediately after installation by attaching crossed streamers to framing held away from glass. Do not apply markers to glass surface. Remove nonpermanent labels, and clean surfaces.

B. Protect glass from contact with contaminating substances resulting from construction operations, including weld splatter. If, despite such protection, contaminating substances do come into contact with glass, remove substances immediately as recommended by glass manufacturer.

C. Examine glass surfaces adjacent to or below exterior concrete and other masonry surfaces at frequent intervals during construction, but not less than once a month, for buildup of dirt, scum, alkaline deposits, or stains; remove as recommended in writing by glass manufacturer.

D. Remove and replace glass that is broken, chipped, cracked, or abraded or that is damaged from natural causes, accidents, and vandalism, during construction period.

E. Wash glass on both exposed surfaces in each area of Project not more than four days before date scheduled for inspections that establish date of Final Completion. Wash glass as recommended in writing by glass manufacturer.

PRIMARY CLEAR FLOAT GLASS PRODUCT DATA SHEET

A. Class: Class 1 clear float glass, quality q3 (glazing select).

B. Provide products by one of the manufacturers listed below:

1. AGC Flatglass North America, Inc.
2. Pilkington Building Products North America
3. PPG Industries, Inc.

INSULATING GLASS PRODUCT DATA SHEET

A. Classification of Units: Per ASTM E 774.

B. Air Space Width: Nominal 1/2 inch (12 mm) measured perpendicularly from surfaces of glass lites at unit's edge.

C. Sealing System: Dual seal, primary and secondary sealants: polyisobutylene and silicone.

D. Spacer Specifications: Aluminum with mill or clear-anodized finish.

1. Desiccant: Either molecular sieve or silica gel or blend of both.
2. Corner Construction: Manufacturer's standard corner construction.

E. Glass Specifications: Comply with the following requirements specified above for insulating units.

F. Refer to clear float glass product data sheet for acceptable manufacturers of insulating units.

END OF SECTION

SECTION 092600 - GYPSUM BOARD ASSEMBLIES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes the following:

1. Interior gypsum wallboard.
2. Non-load-bearing steel framing.

1.3 DEFINITIONS

A. Gypsum Board Terminology: Refer to ASTM C 11 for definitions of terms for gypsum board assemblies not defined in this Section or in other referenced standards.

1.4 SUBMITTALS

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

1.5 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials in original packages, containers, or bundles bearing brand name and identification of manufacturer or supplier.

B. Store materials inside under cover and keep them dry and protected against damage from weather, direct sunlight, surface contamination, corrosion, construction traffic, and other causes. Stack gypsum panels flat to prevent sagging.

1.6 PROJECT CONDITIONS

A. Environmental Limitations: Comply with ASTM C 840 requirements or gypsum board manufacturer's written recommendations, whichever are more stringent.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. Steel Framing and Furring:

a. Clark Steel Framing Systems.
b. Dietrich Industries, Inc.
c. National Gypsum Company.
d. Scafco Corporation.
e. Unimast, Inc.
f. Western Metal Lath & Steel Framing Systems.

2. Gypsum Board and Related Products:

a. American Gypsum Co.
b. G-P Gypsum Corp.
c. National Gypsum Company.
d. United States Gypsum Co.

2.2 STEEL PARTITION AND SOFFIT FRAMING

A. Components, General: As follows:

1. Comply with ASTM C 754 for conditions indicated.
2. Steel Sheet Components: Complying with ASTM C 645 requirements for metal and with manufacturer's standard corrosion-resistant zinc coating.

B. Steel Studs and Runners: ASTM C 645.

1. Minimum Base Metal Thickness: As recommended by manufacturer.
2. Depth: As indicated.

C. Fasteners for Metal Framing: Of type, material, size, corrosion resistance, holding power, and other properties required to fasten steel members to substrates.

2.3 INTERIOR GYPSUM WALLBOARD

A. Panel Size: Provide in maximum lengths and widths available that will minimize joints in each area and correspond with support system indicated.

B. Gypsum Wallboard: ASTM C 36.

1. Provide type as indicated in drawings.

a. Thickness: As indicated.
b. Long Edges: Tapered.

2.4 TRIM ACCESSORIES

A. Interior Trim: ASTM C 1047.

1. Material: Galvanized or aluminum-coated steel sheet. Plastic not allowed
2. Shapes:

a. Cornerbead: Use at outside corners.

2.5 JOINT TREATMENT MATERIALS

A. General: Comply with ASTM C 475.

B. Joint Tape:

1. Interior Gypsum Wallboard: Paper.

C. Joint Compound for Interior Gypsum Wallboard: For each coat use formulation that is compatible with other compounds applied on previous or for successive coats.

1. Prefilling: At open joints and damaged surface areas, use setting-type taping compound.
2. Embedding and First Coat: For embedding tape and first coat on joints, fasteners, and trim flanges, use setting-type taping compound.

a. Use setting-type compound for installing paper-faced metal trim accessories.

3. Fill Coat: For second coat, use drying-type, all-purpose compound.
4. Finish Coat: For third coat, use drying-type, all-purpose compound.

2.6 AUXILIARY MATERIALS

A. General: Provide auxiliary materials that comply with referenced installation standards and manufacturer's written recommendations.

B. Laminating Adhesive: Adhesive or joint compound recommended for directly adhering gypsum panels to continuous substrate.

C. Steel Drill Screws: ASTM C 1002, unless otherwise indicated.

1. Use screws complying with ASTM C 954 for fastening panels to steel members from 0.033 to 0.112 inch (0.84 to 2.84 mm) thick.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas and substrates, with Installer present, and including welded hollow-metal frames, cast-in anchors, and structural framing, for compliance with requirements and other conditions affecting performance. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLING STEEL FRAMING, GENERAL

A. Installation Standards: ASTM C 754, and ASTM C 840 requirements that apply to framing installation.

B. Install supplementary framing, blocking, and bracing at terminations in gypsum board assemblies to support fixtures, equipment services, heavy trim, furnishings, or similar construction. Comply with details indicated and with gypsum board manufacturer's written recommendations or, if none available, with United States Gypsum's "Gypsum Construction Handbook."

C. Isolate steel framing from building structure to prevent transfer of loading imposed by structural movement.

D. Do not bridge building control and expansion joints with steel framing or furring members. Frame both sides of joints independently.

3.3 INSTALLING STEEL FRAMING

A. Install tracks (runners) at floors, ceilings, and structural walls and columns where gypsum board assemblies abut other construction.

1. Where studs are installed directly against exterior walls, install asphalt-felt or foam-gasket isolation strip between studs and wall.

B. Installation Tolerance: Install each steel framing and furring member so fastening surfaces vary not more than 1/8 inch (3 mm) from the plane formed by the faces of adjacent framing.

C. Extend partition framing full height to structural supports or substrates above suspended ceilings, except where partitions are indicated to terminate at suspended ceilings. Continue framing over frames for doors and openings.

1. Cut studs 1/2 inch (13 mm) short of full height to provide perimeter relief.

D. Install steel studs so flanges point in the same direction and leading edge or end of each panel can be attached to open (unsupported) edges of stud flanges first.

E. Frame openings to comply with GA-600 and with gypsum board manufacturer's applicable written recommendations, unless otherwise indicated.

3.4 APPLYING AND FINISHING PANELS, GENERAL

A. Gypsum Board Application and Finishing Standards: ASTM C 840 and GA-216.

B. Install gypsum panels with face side out. Butt panels together for a light contact at edges and ends with not more than 1/16 inch (1.5 mm) of open space between panels. Do not force into place.

C. Locate edge and end joints over supports, except in ceiling applications where intermediate supports or gypsum board back-blocking is provided behind end joints. Do not place tapered edges against cut edges or ends. Stagger vertical joints on opposite sides of partitions. Do not make joints other than control joints at corners of framed openings.

D. Attach gypsum panels to steel studs so leading edge or end of each panel is attached to open (unsupported) edges of stud flanges first.

E. Attach gypsum panels to framing provided at openings and cutouts.

F. Cover both faces of steel stud partition framing with gypsum panels in concealed spaces (above ceilings, etc.), except in chases braced internally.

G. Isolate perimeter of non-load-bearing gypsum board partitions at structural abutments, except floors. Provide 1/4- to 1/2-inch- (6.4- to 12.7-mm-) wide spaces at these locations, and trim edges with U-bead edge trim where edges of gypsum panels are exposed. Seal joints between edges and abutting structural surfaces with acoustical sealant.

H. Space fasteners in gypsum panels according to referenced gypsum board application and finishing standard and manufacturer's written recommendations.

1. Space screws a maximum of 12 inches (304.8 mm) o.c. for vertical applications.

I. Space fasteners in panels that are tile substrates a maximum of 8 inches (203.2 mm) o.c.

3.5 PANEL APPLICATION METHODS

A. Single-Layer Application:
1. On partitions/walls, apply gypsum panels vertically (parallel to framing), unless otherwise indicated or required by fire-resistance-rated assembly, and minimize end joints.

a. Stagger abutting end joints not less than one framing member in alternate courses of board.

B. Single-Layer Fastening Methods: Apply gypsum panels to supports with steel drill screws.

3.6 INSTALLING TRIM ACCESSORIES

A. General: For trim with back flanges intended for fasteners, attach to framing with same fasteners used for panels. Otherwise, attach trim according to manufacturer's written instructions.

3.7 FINISHING GYPSUM BOARD ASSEMBLIES

A. General: Treat gypsum board joints, interior angles, edge trim, control joints, penetrations, fastener heads, surface defects, and elsewhere as required to prepare gypsum board surfaces for decoration. Promptly remove residual joint compound from adjacent surfaces.

B. Prefill open joints, rounded or beveled edges, and damaged surface areas.

C. Apply joint tape over gypsum board joints, except those with trim having flanges not intended for tape.

D. Gypsum Board Finish Levels: Finish panels to levels indicated below, according to ASTM C 840, for locations indicated:

1. Level 4: Embed tape and apply separate first, fill, and finish coats of joint compound to tape, fasteners, and trim flanges at panel surfaces that will be exposed to view, unless otherwise indicated.

3.8 FIELD QUALITY CONTROL

A. Above-Ceiling Observation: Before Contractor installs gypsum board ceilings, Architect will conduct an above-ceiling observation and report deficiencies in the Work observed. Do not proceed with installation of gypsum board to ceiling support framing until deficiencies have been corrected.

END OF SECTION

SECTION 096519 - RESILIENT TILE FLOORING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes Vinyl composition floor tile (standard VCT).

1.3 SUBMITTALS

A. General: Submit the following in accordance with Conditions of Contract and Division 1 Specification Sections.

B. Product data for each type of product specified.

1. Provide certification by tile manufacturer that products supplied for tile installation comply with local regulations controlling use of volatile organic compounds (VOC's).
2. Provide certification by the tile manufacturer that products supplied are “FloorScore” certified.

C. Provide samples for selection purposes in form of manufacturer's tiles showing full range of colors and patterns available.

D. Product certificates, in lieu of laboratory test reports when permitted by Architect, signed by manufacturer certifying that each product complies with requirements.

E. Maintenance data for resilient floor tile, to include in Operating and Maintenance Manual specified in Division 1.

1.4 QUALITY ASSURANCE

A. Single-Source Responsibility for Floor Tile: Obtain each type, color, and pattern of tile from a single source with resources to provide products of consistent quality in appearance and physical properties without delaying progress of the Work.

B. Fire Performance Characteristics: Provide resilient floor tile with the following fire performance characteristics as determined by testing products per ASTM test method indicated below by UL or another testing and inspecting agency acceptable to authorities having jurisdiction.

1. Critical Radiant Flux: 0.45 watts per sq. cm or more per ASTM E 648.
2. Smoke Density: Less than 450 per ASTM E 662.

C. At concrete floor slabs, General Contractor to protect concrete floor slabs from moisture including external rain and ponding water, to the full extent possible. All ponding water to be removed from concrete floor slab(s) as soon as possible, do not allow ponding water to stand or to evaporate. Contractors are advised ponding water on concrete floor slabs will increase the concrete floor slab drying time and humidity levels and increase the time required for environmetal conditioning for the finishes.

E. At concrete floor slabs, floor finish contractor to advise the General Contractor in writing, the time frame required by the floor finish and adhesive manufacturers for controlled environmental conditions, air temperature and humidity levels, prior to floor testing and installation.

1. Floor finish contractor to develop and maintain logs of environmental conditions, temperature and humidity levels, within the building prior to floor finish installations and shall advise the general contractor or construction manager in writing if environmental conditions are not adequate or are not maintained as required for floor finishes following installation. Logs are to be submitted with floor finish warranty and closeout documents

2. Construction schedules shall be developed to include time requirements for environmental conditioning of spaces scheduled to receive adhered floor finish materials.

3. During adhered floor finish installations floor finish contractor to document and log daily environmental conditions within areas (rooms) being worked in. Logs to include temperature and humdity levels presnt at time of installation. Logs are to be submitted with floor finish warranty and close out documents

F. Floor finish contractor to remove all adhesives, oils, residue, and concrete surface contaminates that will interefere with new finishes and adhesives, include light floor sanding.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Deliver tiles and installation accessories to Project site in original manufacturer's unopened cartons and containers each bearing names of product and manufacturer, Project identification, and shipping and handling instructions.

B. Store flooring materials in dry spaces protected from the weather, with ambient temperatures maintained per manufacturer’s printed instructions and recommendations.

C. Store tiles on flat surfaces. Move tiles and installation accessories into spaces where they will be installed at least 48 hours in advance of installation.

1.6 PROJECT CONDITIONS

A. Maintain minimum temperature as stated in manufacturer’s printed instructions and recommendations

B. Do not install tiles until they are at the same temperature as the space where they are

to be installed, or as stated in manufacturer's printed instructions and recommendations.

C. Close spaces to traffic during tile installation.

1.7 SEQUENCING AND SCHEDULING

A. Install tiles and accessories after other finishing operations, including painting, have been completed.

1.8 EXTRA MATERIALS

A. Deliver extra materials to Owner. Furnish extra materials matching products installed as described below, packaged with protective covering for storage and identified with labels clearly describing contents. Contractor shall coordinate with the Owner for delivery and receipt.

1. Furnish not less than 2 boxes for each color selected.

1.9 WARRANTIES

A. Special adhered flooring installation Warranty: Flooring contractor to provide special 2 year floor finish installation warranty beginning on the date of substantial completion, warranting the floor finish installations from adhesive failure, full or partial, resulting from conditions present at the time of installation.

PART 2 - PRODUCTS

2.1 RESILIENT TILE

A. Vinyl Composition Floor Tile: Products complying with requirements specified in vinyl composition floor tile product data sheet at the end of this section.

2.2 INSTALLATION ACCESSORIES

A. Trowelable Underlayments and Patching Compounds: Latex-modified, portland-cement-based formulation provided or approved by tile manufacturer for applications indicated.

B. Adhesives (Cements): Water-resistant type recommended by tile manufacturer to suit resilient floor tile products and substrate conditions indicated.

PART 3 - EXECUTION

3.1 EXAMINATION

A. General: Examine areas where installation of tiles will occur, with Installer present, to verify that substrates and conditions are satisfactory for tile installation and comply with tile manufacturer's requirements and those specified in this Section.

B. Do not proceed with installation until unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. General: Comply with manufacturer's installation specifications to prepare substrates indicated to receive tile.

B. Use trowelable leveling and patching compounds per tile manufacturer's directions to fill cracks, holes, and depressions in substrates.

C. Remove coatings, including curing compounds, and other substances that are incompatible with flooring adhesives and that contain soap, wax, oil, or silicone, by using a terrazzo or concrete grinder, a drum sander, or a polishing machine equipped with a heavy-duty wire brush.

D. Broom or vacuum clean substrates to be covered by tiles immediately before tile installation. Following cleaning, examine substrates for moisture, alkaline salts, carbonation, or dust.

3.3 INSTALLATION

A. General: Comply with tile manufacturer's installation directions and other requirements indicated that are applicable to each type of tile installation included in Project.

B. Lay out tiles from center marks established with principal walls, discounting minor offsets, so tiles at opposite edges of room are of equal width. Adjust as necessary to avoid using cut widths at perimeter that equal less than one-half of a tile. Install tiles square with room axis, unless otherwise indicated.

C. Match tiles for color by selecting tiles from cartons in same sequence as manufactured and packaged, if so numbered. Discard broken, cracked, chipped, or deformed tiles.

D. Scribe, cut, and fit tiles to butt tightly to permanent fixtures, pipes, outlets, edgings, thresholds, etc.

E. Extend tiles into door reveals, closets, under cabinets and similar openings.

F. Maintain reference markers, holes, or openings that are in place or plainly marked for future cutting by repeating on finish flooring as marked on subfloor. Use chalk or other nonpermanent marking device.

G. Adhere tiles to flooring substrates without producing open cracks, voids, raising and puckering at joints, telegraphing of adhesive spreader marks, or other surface imperfections in completed tile installation.

H. Use full spread of adhesive applied to substrate in compliance with tile manufacturer's directions including those for trowel notching, adhesive mixing, and adhesive open and working times.

I. Hand roll tiles where required by tile manufacturer.

3.4 INSTALLATION ACCESSORIES

A. At existing concrete floor slabs, flooring adhesives shall be as reccomended by floor finish manufacturer for accepted field or accepted environmental conditions present at the time of installation but not less than RH 85 adhesives.

B. At concrete floor slabs, Floor finish contractor to provide basic slab cleaning and preparation including limited patching, leveling materials and labor as required to achieve a quality finish installation.

3.5 CLEANING AND PROTECTION

A. Perform the following operations immediately after completing tile installation:

1. Remove visible adhesive and other surface blemishes using cleaner recommended by tile manufacturers.
2. Sweep or vacuum floor thoroughly.
3. Do not wash floor until after time period recommended by resilient floor tile manufacturer.
4. Damp-mop tile to remove black marks and soil.

B. Protect flooring against mars, marks, indentations, and other damage from construction operations and placement of equipment and fixtures during remainder of construction period. Use protection methods indicated or recommended by tile manufacturer.

1. Apply protective floor polish to tile surfaces that are free from soil, visible adhesive, and surface blemishes.

    a. Use commercially available, metal, cross-linked acrylic product acceptable to tile manufacturer.
    b. Coordinate selection of floor polish with Owner's maintenance service.

2. Cover tiles with undyed, untreated building paper until inspection for Final Completion.
3. Do not move heavy and sharp objects directly over tiles. Place plywood or hardboard panels over tiles and under objects while they are being moved. Slide or roll objects over panels without moving panels.

C. Clean tiles not more than 4 days prior to dates scheduled for inspections intended to establish date of Final Completion in each area of Project. Clean tiles using method recommended by manufacturer.

1. Strip protective floor polish that was applied after completing installation prior to cleaning.
2. Reapply 2 coats of “buffable” floor polish after cleaning.

VINYL COMPOSITION FLOOR TILE PRODUCT DATA SHEET

Vinyl Composition Floor Tile Designation: Type IV, Composition 1, free of asbestos.

Wearing Surface: Smooth

Thickness: 1/8 inch

Size: 12-by-12 inches

Color: As selected by Architect from manufacturers' full range.

Available Products: Armstrong, or equal.

END OF SECTION

SECTION 096780 - RESILIENT WALL BASE AND ACCESSORIES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes the following:

1. Resilient wall base

1.3 SUBMITTALS

A. General: Submit the following in accordance with Conditions of Contract and Division 1 Specification Sections.

B. Product data for each type of product specified.

C. Samples for selection purposes of manufacturer's standard sample sets in form of pieces cut from each type of product specified showing full standard range of colors and patterns available.

D. Product certificates, in lieu of laboratory test reports when permitted by Architect, signed by manufacturer certifying that each product complies with requirements.

1.4 QUALITY ASSURANCE

A. Single-Source Responsibility for Products: Obtain each type and color of product specified from a single source with resources to provide products of consistent quality in appearance and physical properties without delaying progress of the Work.

B. Fire Performance Characteristics: Provide products with the following fire performance characteristics as determined by testing products per ASTM test method indicated below by UL or another testing and inspecting agency acceptable to authorities having jurisdiction.

1. Critical Radiant Flux: 0.45 watts per sq. cm or more per ASTM E 648.
2. Smoke Density: Less than 450 per ASTM E 662.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Deliver products to Project site in original manufacturer's unopened cartons and containers, each bearing names of product and manufacturer, Project identification, and shipping and handling instructions.

B. Store products in dry spaces protected from the weather with ambient temperatures maintained between 50 deg F (10 deg C) and 90 deg F (32 deg C).

C. Move products into spaces where they will be installed at least 48 hours in advance of installation.

1.6 PROJECT CONDITIONS

A. Maintain a minimum temperature of 70 deg F (21 deg C) in spaces to receive products specified in this Section for at least 48 hours prior to installation, during installation, and for not less than 48 hours after installation. After this period, maintain a temperature of not less than 55 deg F (13 deg C).

B. Do not install products until they are at the same temperature as that of the space where they are to be installed.

C. Close spaces to traffic during installation of products specified in this Section.

1.7 SEQUENCING AND SCHEDULING

A. Sequence installing products specified in this Section with other construction to minimize possibility of damage and soiling during remainder of construction period.

1.8 EXTRA MATERIALS

A. Deliver extra materials to Owner. Furnish extra materials matching products installed as described below, packaged with protective covering for storage, and identified with labels clearly describing contents.

1. Furnish not less than 12 linear feet for each 500 linear feet or fraction thereof of each different type and color of resilient wall base installed.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Available Products: Subject to compliance with requirements, products that may be incorporated in the Work include, but are not limited to, those specified in each Product Data Sheet at end of this Section.

2.2 INSTALLATION ACCESSORIES

A. Trowelable Underlayments and Patching Compounds: Latex-modified, portland-cement-based formulation provided or approved by flooring manufacturer for applications indicated.

B. Adhesives: Water-resistant type recommended by manufacturer to suit resilient flooring product and substrate conditions indicated.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas where installation of products specified in this Section will occur, with Installer present, to verify that substrates and conditions are satisfactory for

installation and comply with manufacturer's requirements and those specified in this Section.

3.2 PREPARATION

A. General: Comply with manufacturer's installation specifications for preparing substrates indicated to receive products indicated.

B. Use trowelable leveling and patching compounds per manufacturer’s directions to fill cracks, holes, and depressions in substrates.

C. Remove coatings, including curing compounds, and other substances that are incompatible with adhesives and that contain soap, wax, oil, or silicone.

D. Broom or vacuum clean substrates to be covered immediately before installing products specified in this Section. Following cleaning, examine substrates for moisture, alkaline salts, carbonation, or dust.

3.3 INSTALLATION

A. General: Install products specified in this Section using methods indicated according to manufacturer's installation directions.

B. Apply resilient wall base to casework, and other permanent fixtures in rooms and areas where base is required. Install wall base in lengths as long as practicable. Tightly adhere wall base to substrate throughout length of each piece, with base in continuous contact with horizontal and vertical substrates.

1. Install inside and exterior corners before installing straight pieces.
2. Form inside corners on job from straight pieces of maximum lengths possible by cutting an inverted V-shaped notch in toe of wall base at the point where corner is formed. Shave back of base where necessary to produce snug fit to substrate.
3. Form outside corners on job from straight pieces of maximum lengths possible by shaving back of base at point where bending will occur. Remove a strip perpendicular to length of base and only deep enough to produce a snug fit without bends whitening or removal of more than half the thickness of wall base.

C. Place resilient accessories so they are butted to adjacent materials of type indicated and bond to substrates with adhesive. Install reducer strips at edges of flooring that otherwise would be exposed.

3.4 CLEANING AND PROTECTION

A. Perform the following operations immediately after completing installation:

1. Remove visible adhesive and other surface blemishes using cleaner recommended by manufacturers of resilient product involved.
2. Damp-mop resilient accessories to remove black marks and soil.

B. Protect accessories against mars, marks, indentations, and other damage from construction operations and placement of equipment and fixtures during remainder of construction period. Use protection methods recommended by manufacturer of resilient product involved.

C. Clean products specified in this Section not more than 4 days prior to dates scheduled for inspections intended to establish date of Final Completion in each area of Project. Clean products using method recommended by manufacturer.

VINYL WALL BASE PRODUCT DATA SHEET

Style: Cove with top-set toe.

Minimum Thickness: 1/8 inch.

Height: 4 inches.

Lengths: Coils in lengths standard with manufacturer but not less than 96 feet.

Surface Characteristics: Smooth.

Color and Pattern: As selected by OWNER from manufacturer's full range of colors and patterns produced for vinyl accessories complying with requirements indicated. Selections may vary from unit to unit.

Available Products: Flexco or equal.

END OF SECTION

SECTION 099100 - PAINTING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes surface preparation, painting, and finishing of exposed interior and exterior items and surfaces.

1. Surface preparation, priming, and finish coats specified in this Section are in addition to shop-priming and surface treatment specified under other Sections.

B. Paint exposed surfaces whether or not colors are designated in schedules, except where a surface or material is specifically indicated not to be painted or is to remain natural. Where an item or surface is not specifically mentioned, paint the same as similar adjacent materials or surfaces. If color or finish is not designated, the Architect will select from standard colors or finishes available.

C. Painting is not required on prefinished items, finished metal surfaces, concealed surfaces, operating parts, and labels.

1. Labels: Do not paint over Underwriters Laboratories, Factory Mutual or other code-required labels or equipment name, identification, performance rating, or nomenclature plates.

1.3 SUBMITTALS

A. General: Submit the following according to Conditions of the Contract and Division 1 Specification Sections.
B. Product data for each paint system specified and primers.

1. Provide the manufacturer's technical information including label analysis and instructions for handling, storage, and application of each material proposed for use.
2. List each material and cross-reference the specific coating, finish system, and application. Identify each material by the manufacturer's catalog number and general classification.
3. Certification by the manufacturer that products supplied contain NO volatile organic compounds (VOCs).

C. Samples for color selection in the form of manufacturer's color charts.

1. After color selection, the Architect will furnish color chips for surfaces to be coated. Some color selections have been inserted in this specification for design intent purposes. Submit manufacturer’s color charts.

1.4 QUALITY ASSURANCE

A. Applicator Qualifications: Engage an experienced applicator that has completed painting system applications similar in material and extent to those indicated for the Project that have resulted in a construction record of successful in-service performance.

B. Single-Source Responsibility: Provide primers and undercoat paint produced by the same manufacturer as the finish coats.

C. Field Samples: On wall surfaces and other exterior and interior components, duplicate finishes of prepared samples. Provide full-coat finish samples on at least 100 sq. ft. of surface until required sheen, color, and texture are obtained; simulate finished lighting conditions for review of in-place work.

1. Final acceptance of colors will be from job-applied samples.
2. The Architect will select one room as field mock-up to represent surfaces and conditions for each type of coating and substrate to be painted. Apply coatings in this room or surface according to the schedule or as specified to be used as standard of quality for remainder of project.

a. After finishes are accepted, this room or surface will be used to evaluate coating systems of a similar nature.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials to the job site in the manufacturer's original, unopened packages and containers bearing manufacturer's name and label, and the following information:

1. Product name or title of material.
2. Product description (generic classification or binder type).
3. Manufacturer's stock number and date of manufacture.
4. Contents by volume, for pigment and vehicle constituents.
5. Thinning instructions.
6. Application instructions.
7. Color name and number.

B. Store materials not in use in tightly covered containers in a well-ventilated area at a minimum ambient temperature of 45 deg F (7 deg C). Maintain containers used in storage in a clean condition, free of foreign materials and residue.

1. Protect from freezing. Keep storage area neat and orderly. Remove oily rags and waste daily. Take necessary measures to ensure that workers and work areas are protected from fire and health hazards resulting from handling, mixing, and application.

1.6 JOB CONDITIONS

A. Apply water-based paints only when the temperature of surfaces to be painted and surrounding air temperatures are between 50 deg F (10 deg C) and 90 deg F (32 deg C).

B. Apply solvent-thinned paints only when the temperature of surfaces to be painted and surrounding air temperatures are between 45 deg F (7 deg C) and 95 deg F (35 deg C).

C. Do not apply paint in snow, rain, fog, or mist; or when the relative humidity exceeds 85 percent; or at temperatures less than 5 deg F (3 deg C) above the dew point; or to damp or wet surfaces.

1. Painting may continue during inclement weather if surfaces and areas to be painted are enclosed and heated within temperature limits specified by the manufacturer during application and drying periods.

1.7 EXTRA MATERIALS

A. Not Required.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated in the Work include, but are not limited to, the following:

1. Sherwin Williams or equal.

2.2 PAINT MATERIALS, GENERAL

A. Material Compatibility: Provide primers, finish coat materials, and related materials that are compatible with one another and the substrates indicated under conditions of service and application, as demonstrated by the manufacturer based on testing and field experience.

B. Material Quality: Provide the manufacturer's best-quality trade sale paint material of the various coating types specified. Paint material containers not displaying manufacturer's product identification will not be acceptable.

1. Proprietary Names: Use of manufacturer's proprietary product names to designate colors or materials is not intended to imply that products named are required to be used to the exclusion of equivalent products of other manufacturers. Furnish the manufacturer's material data and certificates of performance for proposed substitutions.

C. Colors: Provide color selections made by the Architect from the manufacturer's full range of standard colors.

D. Provide No VOC paint product, with product documentation stating volatile organic compounds, less exempt solvents at or below 150 g/L for non-flat and 50 g/L for flat, as identified by the Green Seal Standard GS-11.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and conditions under which painting will be performed for compliance with paint application requirements. Surfaces receiving paint must be thoroughly dry before paint is applied.

1. Do not begin to apply paint until unsatisfactory conditions have been corrected.
2. Start of painting will be construed as the Applicator's acceptance of surfaces and conditions within a particular area.

B. Coordination of Work: Review other Sections in which primers are provided to ensure compatibility of the total system for various substrates. On request, furnish information on characteristics of finish materials to ensure use of compatible primers.

1. Notify the Architect about anticipated problems using the materials specified over substrates primed by others.

3.2 PREPARATION

A. General: Remove hardware and hardware accessories, plates, machined surfaces, lighting fixtures, and similar items already installed that are not to be painted, or provide surface-applied protection prior to surface preparation and painting. Remove these items, if necessary, to completely paint the items and adjacent surfaces. Following completion of painting operations in each space or area, have items reinstalled by workers skilled in the trades involved.

B. Cleaning: Before applying paint or other surface treatments, clean the substrates of substances that could impair the bond of the various coatings. Remove oil and grease prior to cleaning. Schedule cleaning and painting so dust and other contaminants from the cleaning process will not fall on wet, newly painted surfaces.

C. Surface Preparation: Clean and prepare surfaces to be painted according to the manufacturer's instructions for each particular substrate condition and as specified.

1. Provide barrier coats over incompatible primers or remove and reprime. Notify Architect in writing about anticipated problems using the specified finish-coat material with substrates primed by others.
2. Ferrous Metals: Clean ferrous metal surfaces that have not been shop-coated; remove oil, grease, dirt, loose mill scale, and other foreign substances. Use solvent or mechanical cleaning methods that comply with recommendations of the Steel Structures Painting Council (SSPC).

a. Treat bare and sandblasted or pickled clean metal with a metal treatment wash coat before priming.

b. Touch up bare areas and shop-applied prime coats that have been damaged. Wire-brush, clean with solvents recommended by the paint manufacturer, and touch up with the same primer as the shop coat.

3. Galvanized Surfaces: Clean galvanized surfaces with non-petroleum-based solvents so that the surface is free of oil and surface contaminants. Remove pretreatment from galvanized sheet metal fabricated from coil stock by mechanical methods.

D. Materials Preparation: Carefully mix and prepare paint materials according to manufacturer's directions.

1. Maintain containers used in mixing and applying paint in a clean condition, free of foreign materials and residue.

2. Stir material before application to produce a mixture of uniform density; stir as required during application. Do not stir surface film into material. Remove film and, if necessary, strain material before using.
3. Use only thinners approved by the paint manufacturer and only within recommended limits.

E. Tinting: Tint each undercoat a lighter shade to facilitate identification of each coat where multiple coats of the same material are applied. Tint undercoats to match the color of the finish coat, but provide sufficient differences in shade of undercoats to distinguish each separate coat.

3.3 APPLICATION

A. General: Apply paint according to manufacturer's directions. Use applicators and techniques best suited for substrate and type of material being applied.

B. Do not paint over dirt, rust, scale, grease, moisture, scuffed surfaces, or conditions detrimental to formation of a durable paint film.

1. Paint colors, surface treatments, and finishes are indicated in the schedules.
2. Provide finish coats that are compatible with primers used.
3. The number of coats and the film thickness required are the same regardless of the application method. Do not apply succeeding coats until the previous coat has cured as recommended by the manufacturer. Sand between applications where sanding is required to produce a smooth even surface according to the manufacturer's directions.
4. Apply additional coats if undercoats, stains, or other conditions show through final coat of paint until paint film is of uniform finish, color, and appearance. Give special attention to ensure that surfaces, including edges, corners, crevices, welds, and exposed fasteners, receive a dry film thickness equivalent to that of flat surfaces.
5. The term exposed surfaces includes areas visible when permanent or built-in fixtures, and similar components are in place. Extend coatings in these areas, as required, to maintain the system integrity and provide desired protection.
6. Paint surfaces behind movable equipment and furniture the same as similar exposed surfaces. Before the final installation of equipment, paint surfaces behind permanently fixed equipment or furniture with prime coat only.
7. Finish doors on tops, bottoms, and side edges same as exterior faces.
8. Omit primer on metal surfaces that have been shop-primed and touch-up painted.

C. Scheduling Painting: Apply first coat to surfaces that have been cleaned, pretreated, or otherwise prepared for painting as soon as practicable after preparation and before subsequent surface deterioration.

1. Allow sufficient time between successive coats to permit proper drying. Do not recoat until paint has dried to where it feels firm, does not deform or feel sticky under moderate thumb pressure, and where application of another coat of paint does not cause the undercoat to lift or lose adhesion.

D. Application Procedures: Apply paints and coatings by brush, roller, spray, or other applicators according to the manufacturer's directions.

1. Brushes: Use brushes best suited for the material applied.
2. Rollers: Use rollers of carpet, velvet back, or high-pile sheep's wool as recommended by the manufacturer for the material and texture required.
3. Spray Equipment: Use airless spray equipment with orifice size as recommended by the manufacturer for the material and texture required.

E. Minimum Coating Thickness: Apply materials no thinner than the manufacturers recommended spreading rate. Provide the total dry film thickness of the entire system as recommended by the manufacturer.

F. Prime Coats: Before applying finish coats, apply a prime coat of material, as recommended by the manufacturer, to material that is required to be painted or finished and that has not been prime-coated by others. Recoat primed and sealed surfaces where evidence of suction spots or unsealed areas in first coat appears, to ensure a finish coat with no burn-through or other defects due to insufficient sealing.

G. Stipple Enamel Finish: Roll and redistribute paint to an even and fine texture. Leave no evidence of rolling such as laps, irregularity in texture, skid marks, or other surface imperfections.

H. Pigmented (Opaque) Finishes: Completely cover to provide a smooth, opaque surface of uniform finish, color, appearance, and coverage. Cloudiness, spotting, holidays, laps, brush marks, runs, sags, ropiness, or other surface imperfections will not be acceptable.

I. Completed Work: Match approved samples for color, texture, and coverage. Remove, refinish, or repaint work not complying with specified requirements.

3.4 FIELD QUALITY CONTROL

A. The Owner reserves the right to invoke the following test procedure at any time and as often as the Owner deems necessary during the period when paint is being applied:

1. The Owner will engage the services of an independent testing agency to sample the paint material being used. Samples of material delivered to the Project will be taken, identified, sealed, and certified in the presence of the Contractor.
2. The testing agency will perform appropriate tests for the following characteristics as required by the Owner:

a. Quantitative materials analysis.
b. Abrasion resistance.
c. Apparent reflectivity.
d. Flexibility.
e. Washability.
f. Absorption.
g. Accelerated weathering.
h. Dry opacity.
i. Accelerated yellowness.
j. Recoating.
k. Skinning.
l. Color retention.
m. Alkali and mildew resistance.

3. If test results show material being used does not comply with specified requirements, the Contractor may be directed to stop painting, remove noncomplying paint, pay for testing, repaint surfaces coated with rejected paint, and remove rejected paint from previously painted surfaces if, upon repainting with specified paint, the two coatings are incompatible.

3.5 CLEANING

A. Cleanup: At the end of each work day, remove empty cans, rags, rubbish, and other discarded paint materials from the site.

1. After completing painting, clean glass and paint-spattered surfaces. Remove spattered paint by washing and scraping. Be careful not to scratch or damage adjacent finished surfaces.

3.6 PROTECTION

A. Protect work of other trades, whether being painted or not, against damage by painting. Correct damage by cleaning, repairing or replacing, and repainting, as acceptable to Architect.

B. Provide "Wet Paint" signs to protect newly painted finishes. Remove temporary protective wrappings provided by others to protect their work after completing painting operations.

1. At completion of construction activities of other trades, touch up and restore damaged or defaced painted surfaces.

3.7 INTERIOR PAINT SCHEDULE

A. General: Provide the following paint systems for the various substrates, as indicated.

B. Gypsum Drywall Systems:

1. Latex, Eggshell: Two coats over primer.

a. Prime Coat: Latex primer sealer.
b. Bottom and Top Coat: Latex, Low Lustre Enamel, 1.3 DFM.

B. Interior Metals:

1. Semi-Gloss Enamel Finish: Two coats over primer with total dry film thickness not less than 2.5 mils.

a. Primer: Synthetic, quick-drying rust inhibitor.
b. Undercoat: Interior enamel undercoat.
c. Finish Coat: Interior, semi-gloss, odorless, alkyd enamel. Semi-Gloss Enamel.

END OF SECTION

SECTION 200100 - GENERAL PROVISIONS - MECHANICAL

1. GENERAL

A. The Advertisement for Bids, Instructions to Bidders, Bidding Requirements, General, Special and Supplementary Conditions, and all other contract documents shall apply to the Contractor's work as well as to each of his Sub-Contractor's work. All manufacturers, suppliers, fabricators, contractors, etc. submitting proposals to any part if for work, services, materials or equipment to be used on or applied to this project are hereby directed to familiarize themselves with all documents pertinent to this Contract. In case of conflict between these General Provisions and the General and/or Special Conditions, the affected Contractor shall contact the Engineer for clarification and final determination.

B. Each Proposer shall also be governed by any unit prices and Addenda insofar as they may affect his part of the work or services.

C. The work included in this division consists of the furnishing of all labor, equipment, transportation, excavation, backfill, supplies, material, appurtenances and services necessary for the satisfactory installation of the complete and operating Mechanical System(s) indicated or specified in the Contract Documents.

D. Any materials, labor, equipment or services not mentioned specifically herein which may be necessary to complete or perfect any part of the Mechanical Systems in a substantial manner, in compliance with the requirements stated, implied or intended in the drawings and/or specifications, shall be included as part of this Contract.

E. It is not the intent of this section of the specifications to make any Contractor, other than the General Contractor responsible to the Owner, Architect and Engineer. All transactions such as submittal of shop drawings, claims for extra costs, requests for equipment or materials substitution, shall be routed through the General Contractor to the Architect then to the Engineer. Also, this section of the specifications shall not be construed as an attempt to arbitrarily assign responsibility of work, material, equipment or services to a particular trade or Contractor. Unless stated otherwise, the subdivision and assignment of work under the various sections shall be optional.

F. It is the intent of this Contract to deliver to the Owners a "like new" project once work is complete. Although plans and specifications are complete to the extent possible, it shall be the responsibility of the Contractors involved to remove and/or relocate or re-attach any existing or new systems which interfere with new equipment or materials required for the complete installation without additional cost to the Owner.

G. In general, and to the extent possible, all work shall be accomplished without interruption of existing facilities operations. The Contractor shall advise the Owners at least two weeks prior to the interruption of any services or utilities. The Owners shall be advised of the exact time that interruption will occur and the length of time the interruption will last. Failure to comply with this requirement may result in complete work

stoppage by the Contractors involved until a complete schedule of interruptions can be developed.

H. Definitions and Abbreviations

(1) Contractor - Any Contractor whether proposing or working independently or under the supervision of a General Contractor and/or Construction Manager and who installs any type of mechanical work (Controls, Plumbing, HVAC, Sprinkler, Gas Systems, etc.) or, the General Contractor.

(2) Engineer - The Consulting Mechanical-Electrical Engineers either consulting to the Owners, Architect, other Engineers, etc. In this case: CMTA, Inc., Consulting Engineers.

(3) Architect - The Architect of Record for the project.

(4) Furnish - Deliver to the site in good condition and turn over to the Contractor who is to install.

(5) Provide - Furnish and install complete, tested and ready for operation.

(6) Install - Receive and place in satisfactory operation.

(7) Indicated - Listed in the Specifications, shown on the Drawings or Addenda thereto.

(8) Typical - Where indicated repeat this work, method or means each time the same or similar condition occurs whether indicated or not.

(9) Contract Documents - All documents pertinent to the quality and quantity of work to be performed on this project. Includes, but not limited to: Plans, Specifications, Instructions to Bidders, General and Special Conditions, Addenda, Alternates, Lists of Materials, Lists of Sub-Contractors, Unit Prices, Shop Drawings, Field Orders, Change Orders, Cost Breakdowns, Schedules of Value, Periodical Payment Requests, Construction Contract with Owners, etc.

(10) Proposer - Any person, agency or entity submitting a proposal to any person, agency or entity for any part of the work required under this contract.

(11) OSHA - Office of Safety and Health Administration.

(12) KBC - Kentucky Building Code.

(13) The Project - All of the work required under this Contract.

(14) NEC - National Electrical Code.

(15) NFPA - National Fire Protection Association.

(16) ASME - American Society of Mechanical Engineers.

(17) SMACNA - Sheet Metal and Air Conditioning Contractors National Association.

(18) ANSI - American National Standards Institute.

(19) ASHRAE - American Society of Heating, Refrigeration and Air Conditioning Engineers.

(20) NEMA - National Electrical Manufacturers Association.

(21) UL - Underwriters Laboratories.

(22) ADA - Americans with Disabilities Act.

(23) IMC - International Mechanical Code.

(24) IECC - International Energy Conservation Code.

I. Required Notices:

(1) Ten days prior to the submission of a proposal, each proposer shall give written notice to the Engineer of any materials or apparatus believed inadequate or unsuitable; in violation of laws, ordinances, rules or regulations of authorities having jurisdiction; and any necessary items of work omitted. In the absence of such written notice, Proposers signify that they have included the cost of all required items in the proposal and that the Proposer will be responsible for the safe and satisfactory operation of the entire system.

2. INTENT

A. It is the intention of the Contract Documents to call for finished work, tested and ready for operation.

B. Details not usually shown or specified, but necessary for the proper installation and operation of systems, equipment, materials, etc., shall be included in the work, the same as if herein specified or indicated.

3. DRAWINGS AND SPECIFICATIONS

A. The drawings are diagrammatic only and indicate the general arrangement of the systems and are to be followed. If deviations from the layouts are necessitated by field conditions, detailed layouts of the proposed departures shall be submitted to the Engineer for approval before proceeding with the work. The drawings are not intended

to show every item which may be necessary to complete the systems. All proposers shall anticipate that additional items may be required and submit their bid accordingly.

B. The drawings and specifications are intended to supplement each other. No Proposer shall take advantage of conflict between them, or between parts of either. Should this condition exist, the Proposer shall request a clarification not less than twelve days prior to the submission of the proposal so that the condition may be clarified by Addendum. In the event that such a condition arises after work is started, the interpretation of the Engineer shall be final.

C. The drawings and specifications shall be considered to be cooperative and anything appearing in the specifications which may not be indicated on the drawings or conversely, shall be considered as part of the Contract and must be executed the same as though indicated by both.

D. Contractor shall make all his own measurements in the field and shall be responsible for correct fitting. He shall coordinate this work with all other branches of work in such a manner as to cause a minimum of conflict or delay.

E. The Engineer shall reserve the right to make adjustments in location of piping, ductwork, equipment, etc. where such adjustments are in the interest of improving the project.

F. Should conflict or overlap (duplication) of work between the various trades become evident, this shall be called to the attention of the Engineer. In such event neither trade shall assume that he is to be relieved of the work which is specified under his branch until instructions in writing are received from the Engineer.

G. Unless dimensioned, the mechanical drawings only indicate approximate locations of equipment, piping, ductwork, etc. Dimensions given in figures on the drawings shall take precedence over scaled dimensions and all dimensions, whether given in figures or scaled, shall be verified in the field to ensure no conflict with other work.

H. Each Proposer shall review all drawings including Architectural, Mechanical, Electrical, Fire Protection, Structural, Surveys, etc., to ensure that the work he intends to provide does not encroach a conflict with or affect the work of others in any way. Where such effect does occur, it shall be the Proposer's responsibility to satisfactorily eliminate any such encroachment conflict or effect prior to the submission of his proposal. Each Proposer shall in particular ensure that there is adequate space to install his equipment and materials. Failure to do so shall result in the correction of such encroachment conflict or effect of any work awarded the proposer and shall be accomplished fully without expense to others and that they are reasonably accessible for maintenance. Check closely all mechanical and electrical closets, chases, ceiling voids, wall voids, crawl spaces, etc., to ensure adequate spaces.

I. Where on the drawings a portion of the work is drawn out and the remainder is indicated in outline, or not indicated at all, the parts drawn out shall apply to all other like portions of the work. Where ornamentation or other detail is indicated by starting only, such

detail shall be continued throughout the courses or parts in which it occurs and shall also apply to all other similar parts of the work, unless otherwise indicated.

J. Details not usually shown or specified, but necessary for the proper installation and operation of systems, equipment, materials, etc., shall be included in the work, the same as if herein specified or indicated.

K. Where on the Drawings or Addenda the word typical is used, it shall mean that the work method or means indicated as typical shall be repeated in and each time it occurs whether indicated or not.

L. Special Note: Always check ceiling heights indicated on Architectural Drawings and Schedules and ensure that they may be maintained after all mechanical and electrical equipment is installed. Do not install equipment in the affected area until the conflict is resolved.

4. EXAMINATION OF SITE AND CONDITIONS

A. Each Proposer shall inform himself of all of the conditions under which the work is to be performed, the site of the work, the structure of the ground, above and below grade, the obstacles that may be encountered, the availability and location of necessary facilities and all relevant matters concerning the work. Each Proposer shall also fully acquaint himself with all existing conditions as to ingress and egress, distance of haul from supply points, routes for transportation of materials, facilities and services, availability of utilities, etc. His proposal shall cover all expenses or disbursements in connection with such matters and conditions. No allowance will be made for lack of knowledge concerning such conditions after bids are accepted.

5. EQUIPMENT AND MATERIALS SUBSTITUTIONS OR DEVIATIONS

A. When any Contractor requests approval of materials and/or equipment of different physical size, capacity, function, color, access, it shall be understood that such substitution, if approved, will be made without additional cost to anyone other than the Contractor requesting the change regardless of changes in connections, space requirements, electrical characteristics, electrical services, etc., from that indicated. In all cases where substitutions affect other trades, the Contractor requesting such substitutions shall advise all such Contractors of the change and shall remunerate them for all necessary changes in their work. Any drawings, Specifications, Diagrams, etc., required to describe and coordinate such substitutions or deviations shall be professionally prepared at the responsible Contractor's expense. Review of Shop Drawings by the Engineers does not in any way absolve the Contractor of this responsibility.

B. Notwithstanding any reference in the specifications to any article, device, product, material, fixture, form, or type of construction by name, make or catalog number, such reference shall be interpreted as establishing a standard of quality and shall not be construed as limiting competition; any devices, products, materials, fixtures, forms, or

types of construction which, in the judgment of the Engineer, are equivalent to those specified are acceptable, provided the provisions of Paragraph (A) immediately preceding are met. Requested substitutions shall be submitted to the Engineer a minimum of twelve days prior to bids.

C. Wherever any equipment and material is specified exclusively only such items shall be used unless substitution is accepted in writing by the Engineers.

D. Each Proposer shall furnish along with his proposal a list of specified equipment and materials which he is to provide. Where several makes are mentioned in the specifications and the Contractor fails to state which he proposes to furnish, the Engineer shall choose any of the makes mentioned without change in price. Inclusion in this list shall not ensure that the Engineers will approve shop drawings unless the equipment, materials, etc., submitted in shop drawings is satisfactorily comparable to the items specified and/or indicated.

6. SUPERVISION OF WORK

A. The Contractor shall personally supervise the work for which he is responsible or have a competent superintendent, approved by the Engineers, on the work at all times during progress with full authority to act for him.

7. CODES, RULES, PERMITS, FEES, INSPECTIONS, REGULATIONS, ETC.

A. The Contractor shall give all necessary notices, obtain and pay for all permits, government sales taxes, fees, inspections and other costs, including all utility connections, meters, meter settings, taps, tap fees, extensions, water and/or sewer system development charge, etc. in connection with his work. He shall also file all necessary plans, prepare all documents and obtain all necessary approvals of all governmental departments and/or the appropriate municipality or utility company having jurisdiction, whether indicated or specified or not. He shall hire an independent Registered Engineer to witness installations and provide necessary certifications where required by utility companies, municipal agencies or others that have review authority. He shall also obtain all required certificates of inspection for his work and deliver same to the Engineers before request for acceptance and final payment for the work. Ignorance of Codes, Rules, Regulations, Laws, etc. shall not render the Contractor irresponsible for compliance. The Contractor shall also be versed in all Codes, Rules and Regulations pertinent to his part of the work prior to submission of a proposal.

B. The Contractor shall include in his work, without extra cost, any labor, materials, services, apparatus and drawings in order to comply with all applicable laws, ordinances, rules and regulations, whether or not indicated or specified.

C. All materials furnished and all work installed shall comply with the National Fire Codes of the National Fire Protection Association, with the requirements of local utility companies, or municipalities and with the requirements of all governmental agencies having jurisdiction.

D. All materials and equipment so indicated and all equipment and materials for the electrical portion of the mechanical systems shall bear the approval label of, or shall be listed by the Underwriters' Laboratories (UL), Incorporated. Each packaged assembly shall be approved as a package. Approval of components of a package shall not be acceptable. Where required by the Code and/or the Authority Having Jurisdiction, provide the services of a field labeling agency to provide a UL label for the entire system in the field under evaluation.

E. All plumbing work is to be constructed and installed in accordance with plans and specifications which have been approved in their entirety and/or reflect any changes requested by the State Department of Health. Plumbing work shall not commence until such plans are in the hands of the Contractor.

F. All Heating, Ventilation and Air Conditioning work shall be accomplished in accordance with the Kentucky Building Code (KBC) and amendments thereto, the latest standards recognized by the American Society of Heating, Refrigerating and Air Conditioning and the National Fire Protection Association. Contractor shall secure a permit from the Division of HVAC. Final inspection certificate shall be provided by Contractor and a copy included in Operation and Maintenance Manuals.

G. The Contractor shall furnish three (3) copies of all Final Inspection Certificates obtained to the Engineer when work is complete. Final payment for work will be contingent upon compliance with this requirement.

H. Where minimum code requirements are exceeded in the Design, the Design shall govern.

I. The Contractor shall ensure that his work is accomplished in accord with the OSHA Standards and that he conducts his work and the work of his personnel in accord with same.

J. All work relating to the handicapped shall be in accord with regulations currently enforced by the Department of Housing, Buildings and Construction, Commonwealth of Kentucky and the American Disabilities Act.

K. All work in relation to domestic water systems shall, in addition to all other Codes, Rules, Regulations and Standards, be in compliance with the requirements of the local water utility company and the adopted edition of the 10 States Standards.

L. All work in relation to the installation of sanitary shall in addition to all other Codes, Rules, Regulations and Standards, be in compliance with the local agency governing such installations and the adopted edition of the 10 States Standards.

M. All work relating to the handicapped shall be in accord with regulations currently enforced by the Department of Housing, Buildings, and Construction, Commonwealth of Kentucky and the American Disabilities Act.

8. CORRECTION PERIOD

   A. All equipment, apparatus, materials, and workmanship shall be the best of its respective kind. The Contractor shall replace all parts at his own expense, which are proven defective as described in the General Conditions. The effective date of completion of the work shall be the date of the Architect's or Engineer's Statement of Substantial Completion. Items of equipment which have longer guarantees, as called for in these specifications, shall have warranties and guarantees completed in order, and shall be in effect at the time of final acceptance of the work by the Engineer. The Contractor shall present the Engineer with such warranties and guarantees at the time of final acceptance of the work. The Owner reserves the right to use equipment installed by the Contractor prior to date of final acceptance. Such use of equipment shall not invalidate the guarantee except that the Owner shall be liable for any damage to equipment during this period, due to negligence of his operator or other employees. Refer to other sections for any special or extra warranty requirements.

   B. It is further clarified that all required and specified warranties shall begin on the date of Substantial Completion, not at the time of equipment start-up.

9. CHANGES IN MECHANICAL WORK

   REFER TO GENERAL AND SPECIAL CONDITIONS.

10. CLAIMS FOR EXTRA COST

    REFER TO GENERAL AND SPECIAL CONDITIONS.

11. SURVEY, MEASUREMENTS AND GRADE

    A. The Contractor shall lay out his work and be responsible for all necessary lines, levels, elevations and measurements. He must verify the figures shown on the drawings before laying out the work and will be held responsible for any error resulting from his failure to do so.

    B. The Contractor shall base all measurements, both horizontal and vertical from established bench marks. All work shall agree with these established lines and levels. Verify all measurements at the site and check the correctness of same as related to the work.

    C. Should the Contractor discover any discrepancy between actual measurements and those indicated, which prevents following good practice or the intent of the contract documents, he shall promptly notify the Engineer and shall not proceed with this work until he has received instructions from the Engineer on the disposition of the work.

12. TEMPORARY USE OF EQUIPMENT

A. The permanent heating and plumbing equipment, when installed, may be used for temporary services, with the consent of the Engineers. Should the permanent systems be used for this purpose the Contractors shall make all temporary connections required at their expense. They shall also make any replacement required due to damage wear and tear, etc., leaving the same in "as new" condition.

B. Permission to use the permanent equipment does not relieve the Contractors from the responsibility for any damages to the building construction and/or equipment which might result because of its use.

13. RECORD DRAWINGS

A. The Contractor shall ensure that any deviations from the Design are as they occur recorded in red, erasable pencil on record drawings kept at the jobsite. The Engineer shall review the record documents from time to time to ensure compliance with this specification. Compliance shall be a contingency of final payment. Pay particular attention to the location of under floor sanitary and water lines, shut-off valves, cleanouts and other appurtenances important to the maintenance and operation of Mechanical Systems. Also, pay particular attention to Deviations in the Control Systems and all exterior utilities. Keep information in a set of drawings set aside at the job site especially for this purpose. Deliver these record drawings electronically in AutoCAD 2007 format along with the hand marked field set to the Engineer. Electronic bid drawings will be furnished to the Contractor for his use.

14. MATERIALS AND WORKMANSHIP

A. All equipment, materials and articles incorporated in the work shall be new and of comparable quality to that specified. Each Proposer shall determine that the materials and/or equipment he proposes to furnish can be brought into the building(s) and installed within the space available. In certain cases, it may be necessary to remove and replace walls, floors and/or ceilings and this work shall be the responsibility of the Contractor. All equipment shall be installed so that all parts are readily accessible for inspection, maintenance, replacement of filters, etc. Extra compensation will not be allowed for relocation of equipment for accessibility or for dismantling equipment to obtain entrance into the building(s). Ensure, through coordination, that no other Contractor seals off access to space required for equipment, materials, etc.

B. Materials and equipment, where applicable, shall bear Underwriters' Laboratories label where such a standard has been established.

C. Use extreme care in the selection of equipment and its installation to ensure that noise and vibration are kept at a minimum. The Engineer's determination shall be final and corrections to such discrepancies shall be made at the cost of the Contractor.

D. Each length of pipe, fitting, trap, fixture and device used in the plumbing or drainage systems shall be stamped or indelibly marked with the weight or quality thereof and with the manufacturer's mark or name.

E. All equipment shall bear the manufacturer's name and address. All electrically operated equipment shall bear a data plate indicating required horsepower, voltage, phase and ampacity.

15. COOPERATION AND COORDINATION WITH OTHER TRADES

A. The Contractor shall give full cooperation to all other trades and shall furnish in writing with copies to the Engineer, any information necessary to permit the work of other trades to be installed satisfactorily and with the least possible interference or delay.

B. Where any work is to be installed in close proximity to, or will interfere with work of other trades, each shall cooperate in working out space conditions to make a satisfactory adjustment. If so directed by the Engineer, the Contractor shall prepare composite working drawings and sections at a suitable scale not less than 1/4” = 1'-0”, clearly indicating how his work is to be installed in relation to the work of other trades, or so as not to cause any interference with work of other trades. He shall make the necessary changes in his work to correct the condition without extra charge.

C. The Contractor shall furnish to other trades, as required, all necessary templates, patterns, setting plans, and shop details for the proper installation of work and for the purpose of coordinating adjacent work.

16. QUALIFICATIONS OF WORKMEN

A. All mechanical work shall be accomplished by qualified workmen competent in the area of work for which they are responsible. Untrained and incompetent workmen, as evidenced by their workmanship, shall be summarily relieved of their responsibilities in areas of incompetency. The Engineer shall reserve the right to determine the quality of workmanship of any workman and unqualified or incompetent workman shall refrain from work in areas not satisfactory to him. Requests for relief of a workman shall be made through the normal channels of Architect, Contractor, etc.

B. All plumbing work shall be accomplished by Journeymen Plumbers under the direct supervision of a Master Plumber as defined and clarified under Kentucky State Plumbing Law Regulations and Code. Proof and Certification may be requested by the Engineer.

C. All sheet metal, insulation and pipe fitting work shall be installed by workmen normally engaged or employed in these respective trades, except where only small amounts of such work are required and are within the competency of workmen directly employed by the Contractor involved.

D. All automatic control systems shall be installed by workmen normally engaged or employed in this type work, except in the case of minor control requirements (residential type furnaces, packaged HVAC equipment with integral controls, etc.) in which case, if a

competent workman is the employee of this Contractor, he may be utilized subject to review of his qualifications by the Engineer and after written approval from same.

E. All special systems (Automatic Sprinkler Equipment, etc.) shall be installed only by workmen normally engaged in such services. Exception to this specification may only be made in writing by the Engineer.

F. All electrical work shall be installed only by competent workmen under direct supervision of a fully qualified Electrician.

17. CONDUCT OF WORKMEN

A. The Contractor shall be responsible for the conduct of all workmen under his supervision. Misconduct on the part of any workman to the extent of creating a safety hazard, or endangering the lives and property of others, shall result in the prompt relief of that workman. The consumption of alcoholic beverages or other intoxicants, narcotics, barbiturates, hallucinogens or debilitating drugs on the job site is strictly forbidden.

18. PROTECTION OF MATERIALS AND EQUIPMENT

A. The Contractor shall be entirely responsible for all material and equipment furnished by him in connection with his work and special care shall be taken to properly protect all parts thereof from physical, sun, and weather damage during the construction period. Such protection shall be by a means acceptable to the manufacturer and Engineer. All rough-in soil, waste, vent and storm piping, ductwork, etc., shall be properly plugged or capped during construction in a manner approved by the Engineer. Equipment damaged, stolen or vandalized while stored on site, either before or after installation, shall be repaired or replaced by the Contractor at his own expense.

19. SCAFFOLDING, RIGGING AND HOISTING

A. The Contractor shall furnish all scaffolding, rigging, hoisting and services necessary for erection and delivery onto the premises of any equipment and apparatus furnished. All such temporary appurtenances shall be set up in strict accord with OSHA Standards and Requirements. Remove same from premises when no longer required.

20. BROKEN LINES AND PROTECTION AGAINST FREEZING

A. No conduits, piping, troughs, etc. carrying water or any other fluid subject to freezing shall be installed in any part of the building where danger of freezing may exist without adequate protection being given by the Contractor whether or not insulation is specified or indicated on the particular piping. All damages resulting from broken and/or leaking lines shall be replaced or repaired at the Contractor's own expense. If in doubt, contact the Engineer. Do not install piping across or near openings to the outside whether they are carrying static or moving fluids or not. Special Note: Insulation on piping does not necessarily ensure that freezing will not occur.

21. CLEANING

A. The Contractor shall, at all times, keep the area of his work presentable to the public and clean of rubbish and debris caused by his operations; and at the completion of the work, shall remove all rubbish, debris, all of his tools, equipment, temporary work and surplus materials from and about the premises, and shall leave the area clean and ready for use. If the Contractor does not attend to such cleaning upon request, the Engineer may cause cleaning to be done by others and charge the cost of same to the Contractor. The Contractor shall be responsible for all damage from fire which originates in, or is propagated by, accumulations of his rubbish or debris.

B. After completion of all work and before final acceptance of the work, the Contractor shall thoroughly clean all equipment and materials and shall remove all foreign matter such as grease, dirt, plaster, labels, stickers, etc., from the exterior of piping, equipment, fixtures and all other associated or adjacent fabrication.

22. ACCESSIBILITY

A. The Contractor shall be responsible for the sufficiency of the size of shafts and chases, the adequate clearance in double partitions and hung ceilings for the proper installation of his work. He shall cooperate with all others whose work is in the same space. Such spaces and clearances shall, however, be kept to the minimum size required.

B. The Contractor shall locate and install all equipment so that it may be serviced, and maintained as recommended by the manufacturer. Allow ready access and removal of the entire unit and/or parts such as valves, filters, fan belts, motors, prime shafts, etc.

C. The Contractor shall provide access panels for each concealed valve, control damper or other device requiring service as shown on engineer's plans or as required. Locations of these panels shall be identified in sufficient time to be installed in the normal course of work.

23. RESTORATION OF NEW OR EXISTING SHRUBS, PAVING, SURFACES, ETC.

A. The Contractor shall at his expense restore to their original conditions all paving, curbing, surfaces, drainage ditches, structures, fences, shrubs, existing or new building surfaces and appurtenances, and any other items damaged or removed by his operations. Replacement and repairs shall be in accordance with good construction practice and shall match materials employed in the original construction of the item and shall be to the satisfaction of the Architect and/or Engineer.

24. MAINTENANCE OF EXISTING UTILITIES AND LINES

A. The locations of all piping, conduits, cables, utilities and manholes existing, or otherwise, that comes within the contract construction site, shall be subject to continuous

uninterrupted service with no other exception than the Owner of the utilities permission to interrupt same temporarily.

B. Utilities and lines, where known, are indicated on the drawings. Locations and sizes are approximate. Prior to any excavation being performed, the Contractor shall ascertain that no utilities or lines are endangered by new excavation. Exercise extreme caution in all excavation work.

C. If utilities or lines occur in the earth within the construction site, the Contractor shall probe and locate the lines prior to machine excavation or blasting in the respective area. Electromagnetic utility locators and acoustic pipe locators shall be utilized to determine where metallic and non-metallic piping is buried prior to any excavation.

D. Cutting into existing utilities and services where required shall be done in coordination with and only at times designated by the Owner of the utility.

E. The Contractor shall repair to the satisfaction of the Engineer, any surfaces or subsurface improvements damaged during the course of the work, unless such improvement is shown to be abandoned or removed.

F. Machine excavation shall not be permitted with ten feet of electrical lines or lines carrying combustible and/or explosive materials. Hand excavate only.

G. Protect all new or existing lines from damage by traffic, etc. during construction. Repairs or replacement of such damage shall be at the sole expense of the party responsible.

25. SMOKE AND FIRE PROOFING

A. The Contractor shall fire and smoke stop all openings made in fire or smoke rated walls, chases, ceilings and floors in accord with the KBC. Patch all openings around ductwork and piping with appropriate type material to stop smoke at smoke walls and provide commensurate fire rating at fire walls, floors, ceilings, roofs, etc. Back boxes in rated walls shall be a minimum distance apart as allowed by code to maintain the rating. If closer provide rated box or fireproofing in code approved manner.

26. MOTORS

A. Motors shall be built in accordance with the latest standards of NEMA and as specified. Motors shall be tested in accordance with standards of A.S.A. C50, conforming to this and all applicable standards for insulation resistance and dielectric strength.

B. Each motor shall be provided by the equipment supplier, installer or manufacturer with conduit terminal box, and N.E.C. required disconnecting means as specified or required. Three-phase motors shall be provided with external thermal overload protection in their starter units. Single-phase motors shall be provided with thermal overload protection, integral to their windings or external, in control unit. All motors shall be installed with

NEMA-rated starters as specified and shall be connected per the National Electrical Code.

C. The capacity of each motor shall be sufficient to operate associated driven devices under all conditions of operation and load and without overload, and at least of the horsepower indicated or specified. Each motor shall be selected for quiet operation, maximum efficiency and lowest starting KVA per horsepower. Motors producing excessive noise or vibration shall be replaced by the responsible contractor. See Division 26 of Specifications for further requirements related to installation of motors.

27. CUTTING AND PATCHING

A. The Contractor shall provide his own cutting and patching necessary to install his work. Patching shall match adjacent surfaces and shall be to the satisfaction of the Architect and Engineer.

B. No structural members shall be cut without the approval of the Engineer and all such cutting shall be done in a manner directed by him.

C. When installing conduit, pipe, or any other work in insulated concrete form (ICF) walls, the responsible subcontractor for the work shall provide spray foam insulation to patch the rigid insulation to maintain full integrity of the insulating value of the wall after the mechanical and electrical work is complete. Furthermore, all new work shall NOT be installed in concrete center of wall. All mechanical and electrical installations shall be on the interior side of the concrete.

28. CURBS, PLATES, ESCUTCHEONS & AIR TIGHT PENETRATIONS

A. In all areas where ducts are exposed and ducts pass thru floors, the opening shall be surrounded by a 4-inch-high by 3-inch-wide concrete curb.

B. Escutcheon plates shall be provided for all pipes and conduit passing thru walls, floors and ceilings. Plates shall be nickel plated, of the split ring type, of size to match the pipe or conduit. Where plates are provided for pipes passing thru sleeves which extend above the floor surface, provide deep recessed plates to conceal the pipe sleeves.

C. Seal all duct, pipe, conduit, etc., penetrations through walls and floors air tight. If wall or floor assembly is rated then use similarly rated sealing method.

29. WEATHERPROOFING

A. Where any work pierces waterproofing including waterproof concrete, the method of installation shall be as approved by the Engineer before work is done. The Contractor shall furnish all necessary sleeves, caulking and flashing required to make openings permanently watertight.

30. OPERATING INSTRUCTIONS, MAINTENANCE MANUALS AND PARTS LISTS

A. Upon completion of all work tests, the Contractor shall instruct the Owner or his representative(s) fully in the operations, adjustment and maintenance of all equipment furnished. The time and a list of representatives required to be present will be as directed by the Engineer. Turn over all special wrenches, keys, etc., to the owner at this time.

B. The Contractor shall furnish three (3) complete bound sets for delivery to the Engineer of typewritten and/or blueprinted instructions for operating and maintaining all systems and equipment included in this contract prior to substantial completion. All instructions shall be submitted in draft, for approval, prior to final issue. Manufacturer's advertising literature or catalogs alone will not be acceptable for operating and maintenance instructions.

31. REQUIRED CLEARANCE FOR ELECTRICAL EQUIPMENT

A. The NEC has specific required clearances above, in front, and around electrical gear, panels etc. The Contractor shall not install any piping, ductwork, etc., in the required clearance. If any appurtenance is located in the NEC required clearance, it shall be relocated at no additional cost.

32. INDEMNIFICATION

A. The Contractor shall hold harmless and indemnify the Engineer, employees, officers, agents and consultants from all claims, loss, damage, actions, causes of actions, expense and/or liability resulting from, brought for, or on account of any personal injury or property damage received or sustained by any person, persons, (including third parties), or any property growing out of, occurring, or attributable to any work performed under or related to this contract, resulting in whole or in part from the negligence of the Contractor, any subcontractor, any employee, agent or representative.

33. HAZARDOUS MATERIALS

A. The Contractor is hereby advised that it is possible that asbestos and/or other hazardous materials are or were present in this building(s). Any worker, occupant, visitor, inspector, etc., who encounters any material of whose content they are not certain shall promptly report the existence and location of that material to the Contractor and/or Owner. The Contractor shall, as a part of his work, ensure that his workers are aware of this potential and what they are to do in the event of suspicion. He shall also keep uninformed persons from the premises during construction. Furthermore, the Contractor shall ensure that no one comes near to or in contact with any such material or fumes therefrom until its content can be ascertained to be non-hazardous.

B. CMTA, Inc., Consulting Engineers, have no expertise in the determination of the presence of hazardous materials. Therefore, no attempt has been made by them to identify the existence or location of any such material. Furthermore, CMTA nor any

affiliate thereof will neither offer nor make any recommendations relative to the removal, handling or disposal of such material.

C. If the work interfaces, connects or relates in any way with or to existing components which contain or bear any hazardous material, asbestos being one, then, it shall be the Contractor's sole responsibility to contact the Owner and so advise him immediately.

D. The Contractor by execution of the contract for any work and/or by the accomplishment of any work thereby agrees to bring no claim relative to hazardous materials for negligence, breach of contract, indemnity, or any other such item against CMTA, its principals, employees, agents or consultants. Also, the Contractor further agrees to defend, indemnify and hold CMTA, its principals, employees, agents and consultants, harmless from any such related claims which may be brought by any subcontractors, suppliers or any other third parties.

END OF SECTION 200100

SECTION 200200- SCOPE OF THE MECHANICAL WORK

1. GENERAL

A. The Mechanical work for this Contract shall include all labor, materials, equipment, fixtures, excavation, backfill and related items required to completely install, test, place in service and deliver to the Owner the complete mechanical systems in accordance with the accompanying plans and all provisions of these specifications. This work shall primarily include, but is not necessarily limited to the following:

(1) Interior soil, waste and vent systems.

(2) All plumbing equipment, fixtures and fittings.

(3) 100% automatic sprinkler system.

(4) Condensate drainage systems.

(5) Complete heating, ventilation and air conditioning systems.

(6) Final connection of all mechanical equipment furnished by others

(7) All applicable services and work specified in Section 200100; General Provisions - Mechanical.

(8) All specified or required control work.

(9) One year guarantee of all mechanical equipment, materials and workmanship.

(10) Thorough instruction of the owner's maintenance personnel in the operation and maintenance of all mechanical equipment.

(11) Thorough coordination of the installation of all piping, equipment and any other material with other trades to ensure that no conflict in installation.

(12) Approved supervision of the mechanical work.

(13) Procurement of all required permits and inspections, including fees for all permits and inspection services and submission of final certificates of inspection to the Engineers (Plumbing, Boiler, HVAC, etc.).

END OF SECTION 200200

SECTION 200300 - SHOP DRAWINGS, DESCRIPTIVE LITERATURE, MAINTENANCE MANUALS, PARTS LISTS, SPECIAL KEYS & TOOLS

1. GENERAL

A. The Contractor's attention is directed also to the General and Special Conditions and Section 200100 - General Provisions - Mechanical as well as to all other Contract Documents as they may apply to his work.

B. The Contractor shall prepare and submit to the Engineer, through the General Contractor and the Architect (where applicable) within thirty (30) days after the date of the Contract, a minimum of seven (7) copies of all shop drawings, certified equipment drawings, installation, operating and maintenance instructions, samples, wiring diagrams, etc. on all items of equipment specified hereinafter.

C. Submittal data shall include specification data including metal gauges, finishes, accessories, etc. Also, the submittal data shall include certified performance data, wiring diagrams, dimensional data, and a spare parts list. Submittal data shall be reviewed by the Engineer before any equipment or materials is ordered or any work is begun in the area requiring the equipment.

D. All submittal data shall have the stamp of approval of the Contractor submitting the data as well as the General Contractor and the Architect (if applicable) to show that the drawings have been reviewed by the Contractor. Any drawings submitted without these stamps of approval may not be considered and will be returned for proper resubmission.

E. It shall be noted that review of shop drawings by the Engineer applies only to conformance with the design concept of the project and general compliance with the information given in the contract documents. In all cases, the Contractor alone shall be responsible for furnishing the proper quantity of equipment and/or materials required, for seeing that all equipment fits the available space in a satisfactory manner and that piping, electrical and all other connections are suitably located.

F. The Engineers review of shop drawings, schedules or other required submittal data shall not relieve the Contractor from responsibility for: adaptability of the item to the project; compliance with applicable codes, rules, regulations and information that pertains to fabrication and installation; dimensions and quantities; electrical characteristics; and coordination of the work with all other trades involved in this project. Any items that differ from the Drawings or Specifications shall be flagged by the Contractor so the Engineer will be sure to see the item. Do not rely on the Engineer to “catch” items that do not comply with the Drawings or Specifications. The Contractor is responsible for meeting the Drawings and Specification requirements, regardless of whether or not something does not get caught by the Contractor or Engineer during shop drawing reviews.

G. Equipment shall not be ordered and no final rough-in connections, etc., shall be accomplished until reviewed equipment shop drawings are in the hands of the

Contractor. It shall be the Contractor's responsibility to obtain reviewed shop drawings and to make all connections, etc. in the neatest and most workmanlike manner possible. The Contractor shall coordinate with all the other trades having any connections, roughing-in, etc. to the equipment.

H. If the Contractor fails to comply with the requirements set forth above, the Engineer shall have the option of selecting any or all items listed in the Specifications or on the drawings; and the Contractor shall be required to furnish all materials in accordance with this list.

I. Colors for equipment in other than mechanical spaces shall be selected from the Manufacturer's standard and factory optional colors. Color samples shall be furnished with the shop drawing submission for such equipment.

2. SHOP DRAWINGS

Shop Drawings, descriptive literature, technical data and required schedules shall be submitted on the following:

PTAC
Plumbing Fixtures
Fire Protection

END OF SECTION 200300

SECTION 200400 - DEMOLITION AND SALVAGE

1. GENERAL

   A. The Contractor's attention is directed to the General and Special Conditions, General Conditions-Mechanical and to all other Contract Documents as they apply to this branch of the work. Attention is also directed to all other sections of the Contract Documents which affect the work of this section and which are hereby made a part of the work specified in this section.

2. DEMOLITION

   A. INTENT

      It is the intent of this section to completely remove all components of any existing mechanical system no longer in use that will be open to view in, or will interfere with the operations of the completed building, or which will, in any way, interfere with project construction. Components of the existing mechanical systems which do not meet the above criteria, may be abandoned in place in a safe, workmanlike, code approved manner.

   B. PLUMBING

      (1) All existing piping not to be reused, shall be removed when located in accessible chases, accessible ceiling spaces, crawl spaces, mechanical rooms, exposed, etc.

      (2) Unless otherwise indicated, the Contractor shall be responsible for patching and repairing all holes, etc. in the ceilings, walls, and floors where plumbing piping is removed.

      (3) All lines abandoned in place shall be made safe in compliance with the Kentucky Plumbing Code.

   C. HVAC

      (1) Remove from the project area all piping not to be reused and hangers, specialties, etc. that are accessible or that become accessible during construction and/or interfere in any way with any part of the construction or would be exposed in the completed building.

      (2) Remove all temperature controls and related items that are accessible or become accessible during construction.

      (3) Remove all existing heating and ventilating equipment not indicated to be reused from the building.

(4) The Contractor shall be responsible for the removal and/or relocation of any HVAC piping, equipment, fittings, valves, etc. which may, in the course of construction, interfere with the installation of any new and/or relocated Architectural, Structural, Mechanical or Electrical Systems at no increase in the contract price.

(5) Unless otherwise indicated, the Contractor shall be responsible for the patching and repairing of all holes, etc. in the ceiling, wall and floors where HVAC equipment is removed.

D. REFRIGERANT RECOVERY

(1) The Contractor shall have a licensed refrigerant recovery technician evacuate all refrigerants from all refrigeration equipment being removed in accordance with EPA guidelines and regulations. The Contractor shall take all necessary precautions to not accidentally vent refrigerants to the atmosphere. The recovered refrigerant shall be offered to the Owner. If the Owner refuses it then it becomes the property of the Contractor.

E. THERMOSTAT, THERMOMETER, AND MERCURY BEARING DEVICE DISPOSAL

(1) The Contractor shall dispose of all mercury bearing materials in accordance with state and federal guidelines. The Contractor shall take all necessary precautions to not accidentally allow mercury to be released from the device during demolition.

3. SALVAGE

A. It is the intent of this section to deliver to the owner all components of any mechanical system which may be economically reused by him. The Contractor shall make every effort to remove reusable components without damage and deliver them to a location designated by the Owner.

(1) Components to be delivered to the owner shall be specifically identified by the owner’s representative prior to beginning the demolition.

B. Other items become the property of the Contractor and are to be removed from the site.

END OF SECTION 200400

SECTION 200500 - COORDINATION AMONG TRADES, SYSTEMS INTERFACING AND CONNECTION OF EQUIPMENT FURNISHED BY OTHERS

1. COORDINATION

   A. The Contractor is expressly directed to read the General Conditions and all detailed sections of these specifications for all other trades and to study all drawings applicable to his work, including Architectural and Structural drawings, to the end that complete coordination between trades will be affected. Special attention shall be given to the points where ducts or piping must cross other ducts or piping, where lighting fixtures must be recessed in ceilings, and where ducts, piping and conduit must fur into walls, soffits, columns, etc. It shall be the responsibility of the Contractor to leave the necessary room for other trades. No extra compensation will be allowed to cover the cost of removing piping, conduit, ducts, etc., or equipment found encroaching on space required by others.

   B. The Contractor shall be responsible for coordination with the Electrical trade to ensure that he has made provision for connections, operational switches, disconnect switches, fused disconnects, etc. for electrically operated equipment provided under this division of the specifications, or called for on the plans.

   C. If any discrepancies occur between accompanying drawings and these specifications and drawings and specifications covering other Contracts, each trade shall report such discrepancies to the Architect far enough in advance so that a workable solution can be presented. No extra payment will be allowed for relocation of piping, ductwork, conduit, and equipment not installed in accordance with the above instructions, and which interfered with work and equipment of other trades.

   D. In all areas where air diffusers and lighting fixtures are to be installed, the Contractor shall coordinate their respective construction and installations so as to provide combined symmetrical arrangements.

2. INTERFACING

   The Contractor shall ensure that coordination is affected relative to interfacing of systems. Some interface points are (but not necessarily all):

   A. Connection of Fire Protection System to local system.

   B. Connection of Sanitary sewer to house line.

3. CONNECTION OF EQUIPMENT FURNISHED BY OTHERS

   A. The Contractor shall make all connections to equipment furnished by others, or relocated from the existing structure, whenever such equipment is shown on any part of the drawings or mentioned in any part of the Specifications, unless otherwise specifically specified hereinafter.

B. Supervision to assure proper functioning and operation shall be provided by the Contractor.

C. Items indicated on the drawings as rough-in only (RIO) will be connected by others. The Contractor shall be responsible for rough-in provisions only.

D. For items furnished by others, relocated, or RIO, the Contractor shall obtain from the supplier or shall field determine as appropriate, the exact rough-in locations and connection sizes for the referenced equipment.

E. The Contractor shall be responsible for coordinating to determine any and all final connections that he is to make to equipment furnished by others.

4. RECORD DRAWINGS

(1) RECORD DRAWINGS - Each Contractor shall ensure that any deviations from the Coordination Drawings are recorded as they occur, in red erasable pencil on Coordination Drawings kept at the jobsite. Upon completion of a particular phase, the Mechanical Contractor shall incorporate all field deviations into the Coordination Drawings to be utilized as Record Drawings. The Engineer shall review the Record Documents from time to time to ensure compliance with this specification. Compliance shall be a contingency of final payment. Pay particular attention to the location of under floor sanitary and water lines, shut-off valves, cleanouts and other appurtenances important to the maintenance and operation of Mechanical Systems. Also, pay particular attention to Deviations in the Control Systems and all exterior utilities. Keep information in a set of drawings set aside at the job site especially for this purpose. The Record Drawings shall be distributed electronically (on CD) to the Construction Manager, Owner, Architect and Engineer for their Records.

END OF SECTION 200500

SECTION 201100 - SLEEVING, CUTTING, PATCHING AND REPAIRING

1. GENERAL

   A. The Contractor's attention is directed to the General and Special Conditions, General Conditions-Mechanical and to all other Contract Documents as they apply to this branch of the work. Attention is also directed to all other sections of the Contract Documents which affect the work of this section and which are hereby made a part of the work specified in this section.

   B. The Contractor shall be responsible for all openings, sleeves, trenches, etc., that he may require in floors, roofs, ceilings, walls, etc., and shall coordinate all such work with the General Contractor and all other trades. Coordinate with the General Contractor, any openings which he is to provide before submitting a bid proposal in order to avoid conflict and disagreement during construction. Improperly located openings shall be reworked at the expense of the Contractor.

   C. The Contractor shall plan his work ahead and shall place sleeves, frames or forms through all walls, floors and ceilings during the initial construction, where it is necessary for piping, ductwork, conduit, etc., to go through; however, when this is not done, the Contractor shall do all cutting and patching required for the installation of his work, or he shall pay other trades for doing this work when so directed by the Engineer. Any damage caused to the buildings by the workmen of the responsible Contractor must be corrected or rectified by him at is own expense.

   D. The Contractor shall notify other trades in due time where he will require openings or chases in new concrete or masonry. He shall set all concrete inserts and sleeves for his work. Failing to do this, he shall cut openings for his work and patch same as required at his own expense.

   E. The Contractor shall be responsible for properly shoring, bracing, supporting, etc., any existing and/or new construction to guard against cracking, settling, collapsing, displacing or weakening while openings are being made. Any damage occurring to the existing and/or new structures, due to failure to exercise proper precautions or due to action of the elements shall be promptly and properly made good to the satisfaction of the Engineer.

   F. All work improperly done or not done at all as required by the Mechanical Trades in this section, will be performed by the Contractor at the direction of the trade whose work is affected.

2. SLEEVES, PLATES AND ESCUTCHEONS

   A. The Contractor shall provide and locate all sleeves and inserts required for his work before the floors and surface being penetrated are built, otherwise the Contractor shall core drill for pipes where sleeves and inserts were not installed, or where incorrectly located. Core drilling is the only acceptable alternative to sleeves. Do not chisel

openings. Where sleeves are placed in exterior walls or in slabs on grade, the space between the pipe or conduit and the sleeves shall be made completely and permanently water tight.

B. Pipe that penetrates fire and/or smoke rated assemblies shall have sleeves installed as required by the manufacturer of the rating seal used.

C. At all other locations either pipe sleeves or core drilled openings are acceptable.

D. Where thermal expansion does not occur, the wall may be sealed tight to the pipe or insulation.

E. Insulation, that requires a vapor barrier (i.e., cold water or refrigerant piping, etc.), must be continuous through the sleeve/cored hole. For other piping, insulation may stop on either side of the sleeve.

F. Sleeves shall be constructed of 24-gauge galvanized sheet steel with lock seam joints or Schedule 40 pipe. Sleeves in floors shall extend 1" above finished floor level.

G. Fasten sleeves securely in floors, walls, so that they will not become displaced when concrete is poured or when other construction is built around them. Take precautions to prevent concrete, plaster or other materials being forced into the space between pipe and sleeve during construction.

H. In all areas where ducts are exposed and ducts pass thru floors, the opening shall be surrounded by a 4-inch-high by 3-inch-wide concrete curb.

I. Escutcheon plates shall be provided for all pipes and conduit passing thru walls, floors and ceilings. Plates shall be nickel plated, of the split ring type, of size to match the pipe or conduit. Where plates are provided for pipes passing thru sleeves which extend above the floor surface, provide deep recessed plates to conceal the pipe sleeves.

3. CUTTING

A. Mechanical, plumbing, and fire protection contractors shall coordinate all openings in new and existing masonry walls with the Contractor.

B. Pipe openings in slabs and walls shall be cut with core drill. Hammer devices will not be permitted. Edges of trenches and large openings shall be scribe cut with a masonry saw.

4. PATCHING AND REPAIRING

A. Patching and repairing made necessary by work performed under this division shall be included as a part of the work and shall be done by skilled mechanics of the trade or trades for work cut or damaged, in strict accordance with the provisions herein before

specified for work of like type to match adjacent surfaces and in a manner acceptable to the Engineer.

B. Where portions of existing lawns, shrubs, paving, etc. are disturbed for installation of work of this Division, such items shall be repaired and/or replaced to the satisfaction of the Engineer.

C. Where the installation of conduit, ducts, piping, etc. requires the penetration of fire or smoke rated walls, ceilings or floors, the space around such conduit, duct, pipe, etc., shall be tightly filled with an approved non-combustible fire insulating material satisfactory to maintain the rating integrity of the wall, floor or ceilings affected.

D. Where ducts penetrate fire rated assemblies, fire dampers shall be provided with an appropriate access door.

E. Piping passing through floors, ceilings and walls in finished areas, unless otherwise specified, shall be fitted with chrome plated brass escutcheons of sufficient outside diameter to amply cover the sleeved openings and an inside diameter to closely fit the pipe around which it is installed.

F. Where ducts, pipes, and conduits pass through interior or exterior walls, the wall openings shall be sealed air tight. This shall include sealing on both sides of the wall to ensure air does not enter or exit the wall cavity. This is especially critical on exterior walls where the wall cavity may be vented to the exterior.

END OF SECTION 201100

SECTION 201300 - PIPE, PIPE FITTINGS AND PIPE SUPPORT

1. GENERAL

A. The Contractor's attention is directed to the General and Special Conditions, General Conditions-Mechanical and to all other Contract Documents as they apply to this branch of the work. Attention is also directed to all other sections of the Contract Documents which affect the work of this section and which are hereby made a part of the work specified in this section.

B. When a pipe size is not indicated, the Contractor shall request the pipe size from the Engineers. All piping shall be installed straight and true, parallel or perpendicular to the building construction. Piping shall be installed so as to allow for expansion without damage to the building finishes, structure, pipe, equipment, etc., use offsets, U-bends or expansion joints as required. Where a section of piping is not indicated but is obviously required for completion of the system, the Contractor shall provide same at no additional cost to the project. No mitered joints or field fabricated pipe bends shall be accepted. Pipe shall clear all windows, doors, louvers and other building openings.

C. Where piping rests directly on a hanger, clip, bracket or other means of support, the support element shall be of the same material as the pipe, (e.g., copper to copper, ferrous to ferrous, etc.) or shall be electrically isolated one from the other so as to prevent pipe damage by electrolysis. Pay particular attention and do not allow copper pipe to rest on ferrous structural members, equipment, etc. without electrolytic isolation.

D. All hot and cold-water piping shall be kept a sufficient distance apart so as to prevent heat transfer between them. Cold water piping shall also be kept apart from refrigerant hot gas lines.

E. All cast iron soil pipe and fittings shall be coated inside and out with coal tar varnish.

F. Nipples shall be of the same material, composition and weight classification as pipe with which installed.

G. Where piping is not indicated on the plans, but is obviously or apparently required, contact the Engineers prior to submission of a bid proposal.

H. Pay particular attention to conflict of piping with other work. Do not install until conflict is resolved. If necessary, contact Engineers.

I. The entire domestic hot, cold and recirculating hot water piping system shall be sterilized in strict accord with requirements of the Department of Health Codes, Rules and Regulations for the State which the work is being accomplished in.

J. Where piping penetrates interior or exterior walls, the wall shall be sealed air tight. Refer to the sleeving, cutting, patching and repairing section of the specifications for additional requirements.

K. Provide check valves on individual hot and cold-water supplies to each mixing valve (including each sensor style faucet, safety shower, mop sink, etc.) and each showerhead with a diverter valve (including all ADA showers). This requirement shall not be satisfied by mixing valves or fixtures with internal check valves. Independent external check valves are required.

2. SPECIFICATIONS STANDARDS

All piping and material shall be new, made in the United States and shall conform to the following minimum applicable standards:

A. Copper tube; Type K, L, M; ASTM B88-62; Type DWV ASTM B306-62.

B. Cast iron soil pipe; ASA A-40.l and CS 188-59.

C. Cast iron drainage fittings; ASA B16.12.

D. Cast iron screwed fittings; ASA B16.4.

E. Cast brass and wrought copper fittings; ASA B16.18.

F. Cast brass drainage fittings; ASA B16.23.

G. PVC plastic pipe; ASTM D1785.

3. PITCH OF PIPING

All piping systems shall be installed so as to drain to a low point. Certain minimum pitches shall be required for this drainage. For proper flow and/or for proper operation, the following pitches shall be required:

A. Interior Soil, Waste and Vent Piping:

1/4 inch per foot in direction of flow where possible but in no case less than 1/8" per foot.

B. Condensate Drain Lines from Cooling Equipment:

Not less than 1/4 inch per foot in direction of flow.

4. APPLICATIONS

A. General Notes

(1) Where plastic piping penetrates a fire rated assembly, it shall be replaced with a threaded metal adapter and metal pipe or whatever means necessary to maintain the separation rating in accordance with local plumbing and fire codes.

(2) Plastic piping or any materials with a flame and smoke spread rating not approved for plenum use shall not be permitted in supply, return, relief or exhaust plenums.

(3) PVC or plastic piping whether specifically listed or not may not be used in high rise buildings or anywhere else prohibited by code.

B. Soil Waste and Vent Piping - General Requirements

(1) Soil and waste piping serving mechanical rooms, laundries and kitchens shall be cast iron regardless whether PVC piping is allowed or not. Cast iron will also be required at any other location where waste water temperature can exceed 120°F. Cast iron shall extend a minimum of 35' past last waste inlet.

C. Soil, Waste and Vent Piping (Below Slab)

(1) Service weight hubless cast iron with manufacturer's approved bands.

D. Soil, Waste and Vent Piping (Above Slab)

(1) Service weight hubless cast iron pipe. Bands shall be heavy duty band with extra width for lateral support. Each coupling shall include a minimum of four bands.

(2) Service weight cast iron hub and spigot piping with compression gasket joints.

(3) Schedule 40 galvanized steel piping with screwed ends and cast-iron drainage pattern fittings for piping 2" and less in size. Provide pipe adapters for connector of cast iron pipe at slab.

(4) Type DWV copper drainage piping with cast bronze drainage pattern fittings with solder joints.

E. Domestic Cold, Hot and Recirculating Hot Water Piping (Above Slab)

(1) Type "L" hard copper tubing with wrought copper fittings with lead free solder equivalent in performance to 95/5. (Maximum lead content of solder and flux is 2%).

F. Condensate Drain Lines

(1) Type "DWV" copper, wrought copper, lead free solder.

END OF SECTION 201300

SECTION 202100 - VALVES AND COCKS

1. GENERAL

   A. The Contractor's attention is directed to the General and Special Conditions, General Conditions-Mechanical and to all other Contract Documents as they apply to this branch of the work. Attention is also directed to all other sections of the Contract Documents which affect the work of this section and which are hereby made a part of the work specified herein.

   B. The Contractor shall provide all valves required to control, maintain and direct flow of all fluid systems indicated or specified. This shall include, but may not be limited to all valves of all types including balancing cocks, air cocks, lubricated plug cocks, packed plug cocks, special valves for special systems, etc., for all Mechanical Systems.

   C. All valves shall be designed and rated for the service to which they are applied.

   D. The following type valves shall not be acceptable: Zinc, plastic, fiber or non-metallic.

   E. Each type of valve shall be of one manufacturer, i.e., gate valves, one manufacturer, globe valves, one manufacturer, silent check valves, one manufacturer, etc. The following valve manufacturers shall be acceptable: Lunkenheimer, Tour & Anderssen, Powell, Nibco, Crane, Jenkins, T & S Brass, Walworth, Milwaukee, DeZurik, Consolidated Valve Industries, Inc., Victaulic, Bell & Gossett, Flow Design, Watts, Victaulic.

   F. All valves shall comply with current Federal, State and Local Codes.

   G. All valves shall be new and of first quality.

   H. All valves shall be full line size. Valves and hydronic specialties shall not be reduced to coil or equipment connection size. Size reductions shall be made at the connection to the equipment.

   I. Angle stops for plumbing fixtures shall be quarter turn ball type.

   J. All valves for use in potable water systems shall comply with federal lead-free requirements that the lead content of wetted surfaces cannot exceed 0.25% by weight.

2. WORKMANSHIP AND DESIGN

   A. Handwheels for valves shall be of a suitable diameter to allow tight closure by hand with the application of reasonable force without additional leverage and without damage to stem, seat and disc. Seating surfaces shall be machined and finished to ensure tightness against leakage for service specified and shall seat freely. All screwed valves shall be so designed that when the screwed connection is properly made, no

interference with, nor damage to the working parts of the valve shall occur. The same shall be true for sweat valves when solder or brazing is applied.

3. TYPES AND APPLICATION

A. CHECK VALVES

Check Valves shall be horizontal swing type with two-piece hinges, disc construction seats to be bronze and bronze discs or with composition face depending on service and provide silent operation. Valves 1-1/2 inches and smaller shall be bronze with ends to suit piping, have full area "Y" pattern body and integral seats. Valves 2 inches and larger shall be iron body brass mounted and with flanged ends. Working pressure for bronze valves shall be 150 psi and iron valves 125 psi when installed in piping with system pressures up to 100 psi and 250 psi for 100 psi and over. 3" and under NIBCO T433Y, greater than 3" NIBCO F918B (for less than 100 psi systems) greater than 3” NIBCO F968B (for 100 psi or greater systems). Victaulic 716/779 check valves allowed with grooved piping system.

B. BALL VALVES (POTABLE WATER)

All valves for use in potable water systems 2” and smaller contain less than 0.25% lead by weight and comply with federal lead free potable water requirements. Ball valves shall have a removable lever handle with vinyl grip, adjustable stem gland screw, reinforced Teflon stuffing box ring, blowout proof stem, stainless steel or bronze body, reinforced Teflon seats, stainless steel or chrome plate steel ball as manufactured by Apollo, Aslo, Nibco, Milwaukee, or equivalent. Provide a stem extension so that they bas of the handle is ¼” above the insulation similar to Nibseal. NIBCO S-585-66-LF.

END OF SECTION 202100

SECTION 202110 - ACCESS TO VALVES, EQUIPMENT, FILTERS, ETC.

1. GENERAL

   A. The Contractor's attention is directed to the General and Special Conditions, General Requirements-Mechanical and to all other Contract Documents as they apply to this branch of the work. Attention is also directed to all other sections of the Contract Documents which affect the work of this section and which are hereby made a part of the work specified herein.

   B. All mechanical equipment shall be installed in a manner which allows ready access to all components requiring service, adjustments, shutoff, etc.

   C. All valves, unions, strainers, cleanouts, volume dampers, and test points shall be accessible.

   D. Access panels in lay-in ceilings shall be labeled with a lamacoid plate to indicate location of equipment, filters, valves, etc.

   E. Access panels in fire rated walls shall bear the same rating as the wall.

   F. Each fire damper shall be provided access through the duct to allow reset of the damper. This may be either a gasketed sheet metal panel over a suitable opening or a factory built access panel. The panel shall be at least one and one-half (12) inch larger than the opening all around and shall be held in place with sheet metal screws sufficiently to ensure that it is air tight. Manually check the size and location of each of these openings to ensure that the fire damper may be manually reset by use of hand only.

   G. Contractor shall coordinate the finish of all access doors and panels installed in finished areas with Architect.

2. ACCESS DOORS

   Refer to Sheet Metal and Flexible Duct section of the specifications.

END OF SECTION 202110

SECTION 202200 - INSULATION - MECHANICAL

1. GENERAL

   A. The Contractor's attention is directed to the General and Special Conditions, General Conditions-Mechanical and to all other Contract Documents as they apply to this branch of the work. Attention is also directed to all other sections of the Contract Documents which affect the work of this section and which are hereby made a part of the work specified herein.

   B. Work under this section shall include all labor, equipment, accessories, materials and services required to furnish and install all insulation, fittings and finishes for all mechanical systems specified herein and/or as indicated.

   C. Application of insulation materials shall be done in accordance with manufacturer's written recommendations. Where thickness of insulation is not specified, use applicable thickness recommended by manufacturer for specific use. Insulation shall be applied by a company regularly engaged in the application of insulation and any work deemed unacceptable by the Engineers shall be removed and properly installed at the expense of the Contractor.

2. MANUFACTURERS

   A. Insulation shall be as manufactured by Manville, Knauf, CertainTeed, Owens-Corning, Armacell or approved equivalent. Insulation sundries, adhesives, and jackets/covers shall be as made by Benjamin Foster, Zeston, Speedline, Proto, Childers, Vimasco or approved equivalent.

3. FIRE RATINGS AND STANDARDS

   A. Insulations, jackets and facings shall have composite fire and smoke hazard ratings as tested by ASTM E-84, NFPA 255 and UL 723 procedures not exceeding Flame Spread 25, Smoke Developed 50.

   B. Adhesives, mastics, tapes and fitting materials shall have component ratings as listed above.

   C. All products and their packaging shall bear a label indicating above requirements are not exceeded.

   D. Duct linings shall meet the Erosion Test Method in compliance with UL Publication No. 181.

4. GENERAL APPLICATION REQUIREMENTS

   A. Insulation shall be applied on clean, dry surfaces in a neat and workmanlike manner reflecting the best current practices in the trade. Insulation shall not be applied to piping, ductwork or equipment until tested, inspected and released for insulation.

   B. All insulation shall be continuous through walls, ceiling openings and sleeves. However, insulation shall be broken through fire walls. All covered pipe and ductwork is to be located a sufficient distance from walls, other pipe, ductwork and other obstacles to permit the application of the full thickness of insulation specified. If necessary, extra fittings and pipe are to be used. No noticeable deformation of insulation or discontinuity of vapor seal, where required, will be accepted.

   C. "Concealed", where used herein, shall mean hidden from sight as in trenches, chases, furred spaces, pipe shafts, or above hung finished ceilings. "Exposed" shall mean that piping or equipment is not "concealed" as defined above. Piping and equipment in service tunnels,

mechanical equipment rooms, mechanical platform, mezzanine, penthouses, storage areas, unfinished rooms, etc. is to be considered as "exposed".

D. Existing and/or new insulation removed and/or damaged during course of construction shall be repaired or replaced as directed by the Engineer.

E. Vapor barrier jackets shall be applied with a continuous unbroken vapor seal. Do not use staples thru the jacket. NO EXCEPTIONS!

F. All insulation shall be installed with joints butted firmly together.

G. The Contractor shall ensure that all insulation (piping, ductwork, equipment, etc.) is completely continuous along all conduits, equipment, connection routes, etc. carrying cold fluids (air, water, other) and that condensation can, in no way, collect in or on the insulation, equipment, conduits, etc. Any such occurrence of condensation collection and/or damage therefrom shall be repaired solely at the expense of the Contractor.

5. PIPING SYSTEMS

A. GENERAL

(1) Bevel insulation and jacket at all points where insulation terminates at unions, flanges, valves and equipment. Note: Applies to hot water lines only; cold water lines require continuous insulation.

(2) Pipe insulation shall extend around valve bodies to above drain pans in hydronic equipment over pumps, etc. to ensure no condensation drip or collection.

(3) Factory molded fittings may be installed in lieu of built-up fittings. Jackets to be the same as adjoining insulation. Insulated fittings must have same or better K factors than adjoining straight run insulation.

(4) Valves, flanges and unions shall only be insulated when installed on piping whose surface temperature will be at or below the dew point temperature of the ambient air.

(5) Insulation shall not extend through fire and smoke walls. A UL-listed penetration system shall be used for each fire or smoke wall penetration in accordance with KBC. Materials used such as caulk, sleeves, etc. shall be manufactured by 3M, Hilti, or equal.

B. INSULATION MATERIAL (FOR THE FOLLOWING SYSTEMS)

Insulation shall be Owens-Corning Model 25ASJ/SSL, or approved equivalent fiberglass pipe insulation with an all service jacket. The insulation shall be a heavy density, pipe insulation with a K factor .23 at 75°F mean temperature. The insulation shall be wrapped with a vapor barrier jacket. Approved manufacturers are listed in Section 2 – Manufacturers. The jacket shall have an inside foil surface with self sealing lap and a water vapor permeability of .02 perm/inch. All circumferential joints shall be vapor sealed with butt strips. All insulation shall be installed in strict accordance with the manufacturers' recommendations. The following pipes shall be insulated with the thickness of insulation as noted.

(1) Domestic Cold Water

a. Piping 3'' or less – use 1/2" thick insulation. Provide an additional ½" layer of insulation 3" above and 3" below vertical pipe supports.

b. Piping 4'' or greater – use 1'' thick insulation.

(2) Domestic Hot Water

a. Piping 1 ½'' or less – use 1 ½'' thick insulation.

b. Piping 2'' or greater – use 2'' thick insulation.

(3) Condensate Drain Lines.

a. Piping 1 ½'' or less – use 1/2" thick insulation

b. Piping 2'' or greater – use 1'' thick insulation

END OF SECTION 202200

SECTION 203200 - MECHANICAL MAINTENANCE

1. GENERAL

   A. The Contractor's attention is directed to the General and Special Conditions, General Conditions-Mechanical and to all other Contract Documents as they apply to this branch of the work. Attention is also directed to all other sections of the Contract Documents which affect the work of this section and which are hereby made a part of the work specified herein.

2. MECHANICAL MAINTENANCE CONTRACT

   A. In addition to all other work indicated and specified, the Contractor shall provide the necessary skills and labor to assure the proper operation and to provide all required current preventative maintenance for all equipment and controls provided under Division 20 for a period of one year after substantial completion of the contract as defined in these specifications.

   B. The Contractor shall receive calls for any and all problems experienced in the operation of the equipment provided and shall take steps to immediately correct any deficiencies that may exist.

   C. All equipment that requires repairing shall be immediately serviced and repaired. Since the period of maintenance runs for one year concurrently with the warranty and guarantee, all parts and labor shall be furnished at no extra cost to the Owner.

   D. When emergency service is required beyond regular working hours to maintain the system in operation, the Contractor shall furnish such service.

   E. Failure on the part of the Contractor to comply with all or part of this section of his work, will be required to relinquish a portion of his original contract sum. In general, that cost will be determined by the cost incurred by the owners to have work accomplished which should have, by contract, been accomplished by the Contractor.

END OF SECTION 203200

SECTION 210100 - FIRE PROTECTION SYSTEM

1. GENERAL

A. The General Conditions, Instructions to Bidders, Section 200100, 1. A, and other Contract Documents are a part of this specification and shall be binding on the Contractor. It shall be the Contractor's responsibility to apprise himself of all information pertinent to his work prior to submitting his proposal. No adjustments will be made in this Contract which is a result of failure to comply with this requirement.

B. No Contractor, other than those regularly engaged in the installation of approved and franchised automatic sprinkler systems, will be considered or approved for the work under this section of the specifications. Bidders must have had not less than five (5) years experience in the fabrication and erection of such systems: wet, dry and rack storage types, and shall have completed installations similar and equivalent in scope to this system under approval by one or more of the recognized Underwriting Associations in the Insurance Field.

C. Before submitting bid, examine all Mechanical, Architectural, and Structural Drawings, visit the site and become acquainted with all conditions that may, in any way whatsoever, affect the execution of this work. Also, the Contractor shall coordinate with the rating bureau and insuring agency to verify adequacy of water supply for the proposed sprinkler system extension.

D. The Contractor shall take his own measurements and be responsible for exact size and location of all openings required for installation of this work. Figured dimensions where indicated are reasonably accurate and should govern in setting out work. Detailed method of installation is not indicated. Where variations exist between described work and approved practice, the Engineer shall be consulted for directive.

E. It is the intent of the Plans and Specifications to provide a general layout only and locate major equipment, piping, etc. Variations in head locations, pipe routing, etc., may be anticipated by the Contractor and shall be coordinated with all other trades and indicated on the drawings and descriptive literature called for hereinafter. It shall be the express responsibility of the Contractor to provide all required materials and equipment and perform all work required to install a complete and approved installation.

F. All materials and methods shall be in accordance with applicable codes, regulations and/or ordinances and meet approval of local inspection authority and the State Fire Marshal. Also, all work shall comply with the latest editions of the National Board of Fire Underwriters, National Fire Protection Association, OSHA Regulations, the National Building Code, the Life Safety Code, IMC Code and the Southern Building Code (Where applicable). The local insuring agency shall review plans prepared and submitted by the Contractor but shall have no authority to make changes once work has begun.

G. All work performed under this section shall be accomplished in close harmony with all other trades. All work not so coordinated shall be removed and reinstalled at the expense of the Contractor.

H. The Contractor shall submit a proposed layout to the Engineer prior to submittal to the Fire Marshal's Office.

2. SCOPE OF WORK

A. Furnish all material, labor, tools, equipment and supervision required for installation of a complete fire protection and stand pipe system as indicated on the project drawings. Include all necessary piping, sprinkler heads, test connections, valves, drains, cabinets, siamese connections, fire hydrants, fire pump, etc.

B. The Contractor shall provide flushing and sterilization of all water lines in accordance with current Kentucky Plumbing Codes, Rules and Regulations and shall make connection to domestic water mains in accord with current rules and regulations of the State Department of Sanitary Engineering and Division of Water.

3. WATER SUPPLIES AND SYSTEM LAYOUT CRITERIA

A. Where flow and pressure data are available, they are indicated on the project drawings. The Contractor shall independently verify all such information and notify the engineer of any discrepancies discovered prior to beginning the work. Where no flow information is indicted on the project drawings, the Contractor shall obtain it and indicate it on the shop drawing submittal. Piping systems shall be hydraulically sized based on the most conservative flow information obtained. No adjustments in the contract amount will be allowed for failure of the Contractor to obtain adequate flow information.

4. PERMITS

A. The Contractor shall obtain and pay for all necessary state, municipal, county, city and other permits and fees and pay all State taxes which are applicable.

5. GUARANTEE

A. All workmanship, equipment and material shall be guaranteed in writing against defects from any cause, other than misuse, for a period of one year after date of final acceptance.

6. ACCEPTANCE CERTIFICATE

A. Upon completion, the Contractor shall submit to the Engineers, a properly filled out "Sprinkler Contractor's Certificate Covering Materials and Tests." (4 copies).

7. CLEANING

A. Upon completion of this work all debris, material, and equipment shall be removed from the building and premises; all piping shall be cleaned ready for finish painting. Note: Do not remove rust inhibitive primer specified hereinafter.

8. PAINTING

A. All fire protection piping, fittings, etc., shall have one factory or shop coat of rust inhibitive primer. The Contractor shall thoroughly clean all such items in areas where the piping will be exposed so as to readily receive the finish coat specified in the Architectural Division of Painting.

9. EQUIPMENT AND MATERIALS

A. Pipe & Fittings

(1) Nipples and fittings shall be of same material, composition, and weight classification as pipe in which installed.

(2) Up to 2" (Interior) Schedule 40 ASTM A-53 black steel; 125# cast iron screwed fittings or Schedule 10, ASTM A-135 black steel with victaulic or similar type approved fittings.

(3) 2-1/2" and larger (Interior) Schedule 40 black steel with flanged, welded or victaulic (or similar) type approved fittings or Schedule 10, ASTM A-135 black steel with victaulic or similar type approved fittings.

B. Clamps and Anchors

(1) Furnish and install approved clamps, as required, at all (45 degree) l/8 bends, (90 degree) 1/4 bends and flange and spigot pieces to the straight pipe to ensure permanent anchorage of all fire lines. Clamps, clamp rods, nuts, washers, and glands shall be coated with a quick drying coal tar bituminous paint after installation.

C. Hangers

(1) All piping shall be adequately and permanently supported in an approved manner on approved hangers (Submit with drawings).

D. Sleeves and Escutcheon Plates

(1) Furnish and install sleeves for pipes where piping penetrates masonry walls; exterior wall sleeves to be watertight. Fire and smoke stop all penetrations through fire and smoke walls and coordinate with General Contractor for locations.

(2) Furnish and install cast brass chrome plated split ring type escutcheons where piping penetrates walls, ceilings and floors, whether in finished areas or not.

E. Sprinkler Heads

Gem, Grinnell, Star, Viking, Reliable, Central or approved equivalent as follows:

(1) Where piping is exposed: "Standard up right."

(2) Where piping is concealed above finished ceilings, provide two pieces, semi recessed, white plated sprinkler heads with removable escutcheon.

(3) Install sprinkler head guards where heads are subject to physical abuse. Heads located below seven (7) feet above floor, etc.

(4) Sprinkler head degree ratings shall be determined by the area serviced in accord with current Codes and Standard Practices. Indicate degree ratings on submitted Shop Drawings.

(5) The Contractor shall submit to the Engineer for inspection, one (1) sample of each type of sprinkler head, proposed to be used on the project.

(6) Where heads are installed in a tile ceiling, they shall be installed in the middle of the tiles, at half or quarter points along the length of the tiles. Install sprinkler heads at quarter points of center scoured 2' X 4' ceiling tiles.

10. GUARANTEE

A. All workmanship, equipment and material shall be guaranteed in writing against defects from any cause, other than misuse, or vandalism, for a period of one year after date of final acceptance.

END OF SECTION 210100

SECTION 220200 - PLUMBING FIXTURES, FITTINGS AND TRIM

1. GENERAL

A. The Contractor's attention is directed to the General and Special Conditions, General Conditions-Mechanical and to all other Contract Documents as they apply to this branch of the work. Attention is also directed to all other sections of the Contract Documents which affect the work of this section and which are hereby made a part of the work specified in this section.

B. The Contractor shall provide all fixtures complete with trim required and connect in a manner conforming to the State Plumbing Code.

C. The Contractor shall obtain exact centerline rough-in dimensions between partitions, walls, etc. as required for lay-out of his rough-in work. All work shall be roughed-in so that all exposed piping will be straight and true without bends or offsets.

D. All exposed piping or in casework below sinks, stops, traps, tailpieces, etc., shall be code approved chrome plated brass unless otherwise indicated or specified. Water supplies shall connect through walls with stops and chrome plated escutcheons with set screws.

E. All fittings, fixtures and trim shall be new unless otherwise indicated or specified. They shall also be of equivalent quality, dimensions, material, etc. as those specified. All faucets, shower heads, drains, levers, trim, etc. shall be constructed of metal and not plastic.

F. Handicapped fixtures shall be mounted as recommended by the KBC and ADA.

G. All fixtures shall be mounted as recommended by the manufacturer. Fixtures shall be rigidly mounted to walls and floors. Pay particular attention to flush valves and bracket concealed portion to building structure during rough-in. Loose, shaky flush valves, lavatories, etc. shall not be acceptable.

H. Prior to final inspection open all faucets and allow to run for fifteen (15) minutes, then remove all faucet aerators and thoroughly clean until smooth flow is obtained.

I. Prior to final inspection, remove all stick-on labels, dirt, grease, other removable stampings, lettering, etc. from plumbing fixtures and thoroughly clean same.

J. All sink and lavatory traps shall have screw in plugs in the bottom for ease of cleaning and have mechanical fittings for ease of removal.

K. All fixtures shall be set level and true and shall be grouted into finished walls, floors, etc. in a neat and workmanlike manner with an approved waterproof non-yellowing grout for such service.

L. Special Note for Handicap Grab Rails: Coordinate top of shower valves, flush valves, flush tank, etc., with location of grab rails as shown on the architectural plans. The Contractor shall install all items to allow for installation, removal and service without removal of the grab bar.

M. All exposed drain pipes and domestic water piping under handicap accessible sinks and lavatories shall be insulated in accordance with ADA requirements and shall have a vinyl plastic covering over all insulation.

N. All gooseneck faucets shall have rigid spouts, unless swing spouts are specified. If swing spouts are specified, the spout shall have a maximum swing of 140 degrees from side to side.

O. All plumbing fixtures shall comply with federal lead-free requirements that the lead content of wetted surfaces cannot exceed 0.25% by weight.

2. FIXTURES AND TRIM

Available Manufacturers: Subject to compliance with requirements of manufacturers offering plumbing fixtures and trim. Plumbing fixtures and trim, which may be incorporated in the work include, but are not limited to, the following:

A. Service Sinks and Mop Basins

American Standard, U.S. Plumbing Products
Eljer Plumbingware Div., Wallace-Murray Corp.
Fiat Products
Kohler Co.
Stern-Williams Co., Inc.
Florestone

3. FIXTURE SELECTION

A. Refer to drawings for fixture schedule.

END OF SECTION 220200

SECTION 230200 - HVAC EQUIPMENT

1. GENERAL

A. The Contractor's attention is directed to the General and Special Conditions, General Conditions-Mechanical and to all other Contract Documents as they apply to this branch of the work. Attention is also directed to all other sections of the Contract Documents which affect the work of this section and which are hereby made a part of the work specified herein.

B. The Contractor shall provide in complete working order the following heating, ventilation and air conditioning equipment located as indicated and installed, connected and placed in operation in strict accordance with the manufacturer's recommendations. All equipment shall be factory painted and, where applicable, factory insulated and shall, where such standards exist, bear the label of the Underwriters Laboratory.

C. Each subcontractor shall be responsible for their own completion of System Verification Checklists/Manufacturer’s Checklist.

D. All HVAC equipment shall comply with the latest provisions of ASHRAE Standard 90 and/or International Energy Conservation Code 2012, whichever is more stringent.

E. Installation of all heating, ventilating and air conditioning systems shall be performed by a master HVAC contractor licensed in the state the work will be performed.

F. Note to Suppliers and Manufacturers Representative furnishing proposals for equipment for the project:

(1) Review the section of these specifications entitle: SHOP DRAWINGS, DESCRIPTIVE LITERATURE, MAINTENANCE MANUALS, PARTS LISTS, SPECIAL KEYS, TOOLS, ETC., and provide all documents called for therein.

(2) Ensure that the equipment which you propose to furnish may be installed, connected, placed in operation and easily maintained at the location and in the space allocated for it.

(3) Determine from the Bid Documents the date of completion of this project and ensure that equipment delivery schedules can be met so as to allow this completion date to be met.

(4) All condensate producing equipment shall be provided with a condensate trap as recommended by the equipment manufacturer and a condensate overflow switch.

2. EQUIPMENT

A. Refer to schedule on plans.

END OF SECTION 230200

SECTION 230300 - CONDENSATE DRAINAGE SYSTEM (FOR COOLING EQUIPMENT)

1. GENERAL

   A. The Contractor's attention is directed to the General and Special Conditions, General Conditions-Mechanical and to all other Contract Documents as they apply to this section of the work. Attention is also directed to all other sections of the Contract Documents which affect the work of this section and which are hereby made a part of the work specified in this section.

   B. The Contractor shall provide a complete condensate drainage system to carry all condensate discharge from all cooling equipment from the building. Condensate system shall be installed in accordance with IMC. Provide condensate overflow switch for all condensate producing equipment.

   C. Pipe installation and fabrication shall be in accordance with the section of these specifications entitled PIPE, PIPE FITTINGS AND PIPE SUPPORT and as hereinafter specified.

   D. All piping shall be installed concealed, unless specifically noted otherwise and shall be installed under slabs or underground only when specifically indicated.

   E. Lines installed in ceiling spaces shall be held at the maximum possible elevation and shall be coordinated with all other trades to avoid conflicts.

   F. Condensate drain lines shall be pitched 1/4 inch per foot and installed with cleanout plugs at each change in direction and/or at thirty (30) foot intervals. Where this minimum pitch cannot be attained, contact Engineers.

   G. Horizontal runs of condensate drain lines shall be supported at six (6) foot intervals maximum, or more frequently where required to prevent sags and low spots.

   H. Lengths of horizontal lines shall be held at a minimum due to potential lint collection.

   I. Provide condensate traps in accordance with the manufacturer’s recommendations.

2. MATERIAL

   A. Refer to Section of these Specifications entitled: PIPE, PIPE FITTINGS AND SUPPORT.

3. INSULATION

   A. Refer to Section of these Specifications entitled: INSULATION - MECHANICAL.

END OF SECTION 230300

SECTION 260501 - GENERAL PROVISIONS - ELECTRICAL

1. GENERAL

A. The Instructions to Bidders, General and Special Conditions, and all other contract documents shall apply to the Contractor's work as well as to each of his Sub Contractor's work. Each Contractor is directed to familiarize himself in detail with all documents pertinent to this Contract. In case of conflict between these General Provisions and the General and/or Special Conditions, the affected Contractor shall contact the Engineer for clarification and final determination.

B. The Contractor shall be governed by any alternates, unit prices and Addenda or other contract documents insofar as they may affect his part of the work.

C. The work included in this division consists of the furnishing of all labor, equipment, transportation, supplies, material and appurtenances and performing all operations necessary for the satisfactory installation of complete and operating electrical systems indicated on the drawings and/or specified herein.

D. Any materials, labor, equipment or services not mentioned specifically herein which may be necessary to complete or perfect any part of the electrical systems in a substantial manner, in compliance with the requirements stated, implied, or intended in the drawings and specifications, shall be included as part of this Contract. The Contractor shall give written notice of any materials or apparatus believed inadequate or unsuitable; in violation of laws, ordinances, rules or regulations of authorities having jurisdiction; and any necessary items of work omitted a minimum of ten days prior to bid. In the absence of such written notice and by the act of submitting his bid, it shall be understood that the Contractor has included the cost of all required items in his bid, and that he will be responsible for the approved satisfactory functioning of the entire system without extra compensations.

E. It is not the intent of this section of the specifications (or the remainder of the contract documents) to make any specific Contractor, other than the Contractor holding the prime contract, responsible to the Owner, Architect and Engineer. All transactions such as submittal of shop drawings, claims for extra costs, requests for equipment or materials substitution, shall be done through the Contractor to the Architect (if applicable), then to the Engineer.

F. This section of the Specifications or the arrangement of the contract documents shall not be construed as an attempt to arbitrarily assign responsibility for work, material, equipment or services to a particular trade Contractor or Sub-Contractor. Unless stated otherwise, the subdivision and assignment of work under the various sections shall be the responsibility of the Contractor holding the prime contract.

G. It is the intent of this Contract to deliver to the Owner a "like new" project once work is complete. Although plans and specifications are complete to the extent possible, it shall be responsibility of the Contractors involved to remove and/or relocate or re-attach any

existing or new systems which interfere with new equipment or materials to be installed by other trades without additional cost to the Owner.

H. The Contractor shall provide interim life safety and fire detection measures as required by the Authority Having Jurisdiction, Division 1 specifications, NFPA, and applicable Codes. This includes temporary relocations of heat/smoke detection, exit signage, and egress lighting in existing buildings as applicable.

I. In general, and to the extent possible, all work shall be accomplished without interruption of the existing facilities' operations. Each Contractor shall advise the Architect, Owner and Engineer (as applicable) in writing at least one week prior to the deliberate interruption of any services. The Owner shall be advised of the exact time that interruption will occur and the length of time the interruption will occur. Failure to comply with this requirement may result in complete work stoppage by the Contractors involved until a complete schedule of interruptions can be developed.

J. Whenever utilities are interrupted, either deliberately or accidentally, the Contractor shall work continuously to restore said service. The Contractor shall provide tools, materials, skilled journeymen of his own and other trades as necessary, premium time as needed and coordination with all applicable utilities, including payment of utility company charges (if any), all without request for extra compensation to the Owner, except where otherwise provided for in the contract document.

K. The Contractor shall be responsible for maintaining existing fire alarm, paging, access control, intrusion detection, CCTV, nurse call systems, etc., in occupied spaces in renovation and addition projects. The Contractor shall be required to disconnect and remove all existing devices in renovated areas (where directed as such) without affecting system operations. All costs associated with said work shall be borne by the Contractor.

L. Definitions:

(1) Prime Contractor - The Contractor who has been engaged by the Owner in a contractual relationship to accomplish the work.

(2) Electrical Contractor - Any Contractor whether bidding or working independently or under the supervision of a General Contractor, that is: the one holding the Prime Contract and who installs any type of Electrical work, such as: power, lighting, television, telecommunications, data, fiber optic, intercom, fire detection and alarm, security, video, underground or overhead electrical, etc.

Note: Any reference within these specifications to a specific entity, i.e., "Electrical Contractor" is not to be construed as an attempt to limit or define the scope of work for that entity or assign work to a specific trade or contracting entity. Such assignments of responsibility are the responsibility of the Contractor or Construction Manager holding the prime contract, unless otherwise provided herein.

(3) Electrical Sub-Contractor - Each or any Contractor contracted to, or employed by, the Electrical Contractor for any work required by the Electrical Contractor.

(4) Engineer - The Consulting Mechanical-Electrical Engineers, either consulting to the Owner, Architect, other Engineers, etc.

(5) Architect - The Architect of Record for the project, if any.

(6) Furnish - Deliver to the site in good condition.

(7) Provide - Furnish and install in complete working order.

(8) Install - Install equipment furnished by others in complete working order.

(9) Contract Documents - All documents pertinent to the quality and quantity of all work to be performed on the project. Includes, but not limited to: Plans, Specifications, Addenda, Instructions to Bidders, (both General and Sub-Contractors), Unit Prices, Shop Drawings, Field Orders, Change Orders, Cost Breakdowns, Construction Manager's Assignments, Architect's Supplemental Instructions, Periodical Payment Requests, etc.

2. INTENT

A. It is the intent of these specifications and all associated drawings that the Contractor provide finished work, tested, and ready for operation. Wherever the word "provide" is used, it shall mean "furnish and install complete and ready for use."

B. Minor details not usually shown or specified, but necessary for the proper installation and operation, shall be included in the work, the same as if herein specified or shown.

3. ELECTRICAL DRAWINGS AND SPECIFICATIONS

A. The drawings are diagrammatic only and indicate the general arrangement of the systems and are to be followed insofar as possible. If deviations from the layouts are necessitated by field conditions, detailed layouts of the proposed departures shall be submitted in writing to the Engineer for review before proceeding with the work. The Contract Drawings are not intended to show every vertical or horizontal offset which may be necessary to complete the systems. Contractors shall, however, anticipate that additional offsets may be required and submit their bid accordingly.

B. The drawings and specifications are intended to supplement each other. No Contractor or supplier shall take advantage of conflict between them, or between parts of either, but should this condition exist, the Contractor or supplier shall request a clarification of the condition at least ten days prior to the submission of bids so that the condition may be clarified by Addendum. In the event that such a condition arises after work is started, the interpretation of the Engineer shall be the determining factor. In all instances, unless

modified in writing and agreed upon by all parties thereto, the Contract to accomplish the work shall be binding on the affected Contractor.

C. The drawings and specifications shall be considered to be cooperative and complimentary and anything appearing in the specifications which may not be indicated on the drawings or conversely, shall be considered as part of the Contract and must be executed the same as though indicated by both.

D. The Contractor shall make all his own measurements in the field and shall be responsible for correct fitting. He shall coordinate this work with all other branches of work in such a manner as to cause a minimum of conflict or delay.

E. The Engineer shall reserve the right to make minor adjustments in location of conduit, fixtures, outlets, switches, etc., where he considers such adjustments desirable in the interest of concealing work or presenting a better appearance.

F. The Contractor shall evaluate ceiling heights called for on Architectural Plans. Where the location of Electrical equipment may interfere with ceiling heights, the Contractor shall call this to the attention of the Engineer in writing prior to making the installation. Any such changes shall be anticipated and requested sufficiently in advance so as to not cause extra work on the part of the Contractor or unduly delay the work.

G. Special Note: Always check ceiling heights indicated on Drawings and Schedules and insure that these heights may be maintained after all mechanical and electrical equipment is installed. If a conflict is apparent, notify the Engineer in writing for instructions.

H. Should overlap of work between the various trades become evident, this shall be called to the attention of the Engineer. In such event neither trade shall assume that he is to be relieved of the work which is specified under his branch until instructions in writing are received from the Engineer.

I. The drawings are intended to show the approximate location of equipment, materials, etc. Dimensions given in figures on the drawings shall take precedence over scaled dimensions and all dimensions whether given in figures or scaled shall be verified in the field. In case of conflict between small and large scale drawings, the larger scale drawings shall take precedence.

J. The Contractor and his Sub Contractors shall review all drawings in detail as they may relate to his work (structural, architectural, site survey, mechanical, etc.). Review all drawings for general coordination of work, responsibilities, ceiling clearances, wall penetration points, chase access, fixture elevations, etc. Make any pertinent coordination or apparent conflict comments to the Engineers at least ten days prior to bids, for issuance of clarification by written addendum.

K. Where on any of the drawings a portion of the work is drawn out and the remainder is indicated in outline, or not indicated at all, the parts drawn out shall apply to all other like

portions of the work. Where ornament or other detail is indicated by starting only, such detail shall be continued throughout the courses or parts in which it occurs and shall also apply to all other similar parts of the work, unless otherwise indicated.

4. EXAMINATION OF SITE AND CONDITIONS

A. The Contractor shall inform himself of all of the conditions under which the work is to be performed, the site of the work, the structure of the ground, the obstacles that may be encountered, the availability and location of necessary facilities and all relevant matters concerning the work. All Contractors or suppliers shall carefully examine all Drawings and Specifications and contract documents to determine the kind and type of materials to be used throughout the project and which may, in any way, affect the execution of his work.

B. The Contractor shall fully acquaint himself with all existing conditions as to ingress and egress, distance of haul from supply points, routes for transportation of materials, facilities and services, availability of temporary or permanent utilities, etc. The Contractor shall include in his work all expenses or disbursements in connection with such matters and conditions. The Contractor shall verify all work shown on the drawings and conditions at the site, and shall report in writing to the Engineer ten days prior to bid, any apparent omissions or discrepancies in order that clarifications may be issued by written addendum. No allowance is to be made for lack of knowledge concerning such conditions after bids are accepted.

5. EQUIPMENT AND MATERIALS SUBSTITUTIONS OR DEVIATIONS

A. When any Contractor requests review of substitute materials and/or equipment, and when under an approved formal alternate proposal, it shall be understood and agreed that such substitution, if approved, will be made without additional cost regardless of changes in connections, spacing, service, mounting, etc. In all cases where substitutions affect other trades, the Contractor offering such substitutions shall advise all such Contractors of the change and shall reimburse them for all necessary changes in their work. Any drawings, Specifications, Diagrams, etc., required to describe and coordinate such substitutions or deviations shall be professionally prepared at the responsible Contractor's expense. Special Note: Review of Shop Drawings by the Engineer does not absolve the Contractor of this responsibility

B. References in the specifications to any article, device, product, material, fixture, form, or type of construction by name, make, or catalog number shall be interpreted as establishing a standard of quality and shall not be construed as limiting competition. Each Contractor, in such cases, may, at his option, use any article, device, product, material, fixture, form, or type of construction which in the judgment of the Engineer is equivalent to that specified, provided the provisions of paragraph (A) immediately preceding are met. Substitutions shall be submitted to the Engineer a minimum of ten days prior to bid date for approval to bid in written form thru addenda or other method selected by the Engineer. If prevailing laws of cities, towns, states or countries are more

stringent than these specifications regarding such substitutions, then those laws shall prevail over these requirements.

C. Wherever any equipment and material is specified exclusively only such items shall be used unless substitution is accepted in writing by the engineers.

D. The Contractor shall furnish along with his proposal a list of specified equipment and materials which he proposes to provide. Where several makes are mentioned in the Specifications and the Contractor fails to state which he proposes to furnish, the Engineer shall have the right to choose any of the makes mentioned without change in price.

E. The Contractor shall review the contract documents and if a material substitution form is required for each proposed substitution, it shall be submitted per requirements.

6. SUPERVISION OF WORK

A. Each Contractor and Sub-Contractors shall personally supervise the work or have a competent superintendent on the project site at all times during progress of the work, with full authority to act for him in matters related to the project.

7. CODES, RULES, PERMITS, FEES, REGULATIONS, ETC.

A. The Contractor shall give all necessary notices, obtain and pay for all permits, government sales taxes, fees, and other costs including utility connections or extensions, in connection with his work. As necessary, he shall file all required plans, utility easement requests and drawings, survey information on line locations, load calculations, etc., prepare all documents and obtain all necessary approvals of all utility and governmental departments having jurisdiction; obtain all required certificates of inspection for his work and deliver same to the Engineer before request for acceptance and final payment for the work.

B. Ignorance of Codes, Rules, regulations, utility company requirements, laws, etc., shall not diminish or absolve Contractor's responsibilities to provide and complete all work in compliance with such.

C. The Contractor shall include in the work, without extra cost, any labor, materials, services, apparatus or drawings required in order to comply with all applicable laws, ordinances rules and regulations, whether or not shown on drawings and/or specified.

D. All materials furnished and all work installed shall comply with the current edition of the National Electrical Codes, National Fire Codes of the National Fire Protection Association, the requirements of local utility companies, and with the requirements of all governmental agencies or departments having jurisdiction.

E. All material and equipment for the electrical systems shall bear the approval label, or shall be listed by the Underwriters' Laboratories, Incorporated. Listings by other testing agencies may be acceptable with written approval by the Engineer.

F. All electrical work is to be constructed and installed in accordance with plans and specifications which have been approved in their entirety and/or reflect any changes requested by the State Fire Marshal, as applicable or required. Electrical work shall not commence until such plans are in the hands of the Electrical Contractor.

G. The Contractor shall insure that his work is accomplished in accord with OSHA Standards and any other applicable government requirements.

H. Where conflict arises between any code and the plans and/or specifications, the code shall apply except in the instance where the plans and specifications exceed the requirements of the code. Any changes required as a result of these conflicts shall be brought to the attention of the Engineer at least ten working days prior to bid date, otherwise the Contractor shall make the required changes at his own expense. The provisions of the codes constitute minimum standards for wiring methods, materials, equipment and construction and compliance therewith will be required for all electrical work, except where the drawings and specifications require better materials, equipment, and construction than these minimum standards, in which case the drawings and specifications shall be the minimum standards.

8. COST BREAKDOWNS/SCHEDULE OF VALUES

A. Within thirty days after acceptance of the Contract, the Contractor is required to furnish to the Engineer one copy of a detailed cost breakdown on each respective area of work. These cost breakdowns shall be made on forms provided or approved by the Engineer or Architect. Payments will not be made until satisfactory cost breakdowns are submitted. Refer to the end of this section for a sample of expected level and breakout being required.

9. CORRECTION PERIOD

A. All equipment, apparatus, materials, etc., shall be the best of its respective kind. The Contractor shall replace all materials at his own expense, which fail or are deemed defective as described in the General Conditions. The effective date of completion of the work shall be the date each or any portion of the work is accepted by the Architect or Engineer as being substantially complete.

B. Items of equipment which have longer guarantees, as called for in these specifications or as otherwise offered by the manufacturer, such as generators, engines, batteries, transformers, etc., shall have warranties and guarantees completed in order, and shall be in effect at the time of final acceptance of the work by the Engineer. The Contractor shall present the Engineer with such warranties and guarantees at the time of final acceptance of the work. The Owner reserves the right to use equipment installed by the Contractor prior to date of final acceptance. Such use of equipment shall in no way

invalidate the guarantee except that Owner shall be liable for any damage to equipment during this period due to negligence of his operator or other employee.

10. INSPECTION, APPROVALS AND TESTS

A. Before requesting a final review of the installation from the Architect and/or Engineer, the Contractor shall thoroughly inspect his installation to assure that the work is complete in every detail and that all requirements of the Contract Documents have been fulfilled. Failure to accomplish this may result in charges from the Architect and/or Engineers for unnecessary and undue work on their part.

B. The Contractor shall provide as part of this contract electrical inspection by a competent Electrical Inspection Agency (local or state as specific to project), licensed to provide such services in the Commonwealth of Kentucky. The name of this agency shall be included in the list of materials of the Form of Proposal by the Contractor. All costs incidental to the provision of electrical inspections shall be borne by the Electrical Contractor.

C. The Contractor shall advise each Inspection Agency in writing (with an information copy of the correspondence to the Architect and/or Engineer) when he anticipates commencing work. Failure of the Inspection Agency to inspect the work in the stage following and submit the related reports may result in the Contractor's having to expose concealed work not so inspected. Such exposure will be at the expense of the responsible Contractor.

D. Inspections shall be scheduled for rough as well as finished work. The rough inspections shall be divided into as many inspections as may be necessary to cover all roughing-in without fail. Report of each such inspection visit shall be submitted to the Architect, Engineer and the Contractor within three days of the inspection.

E. Approval by an Inspector does not relieve the Contractor from the responsibilities of furnishing equipment having a quality of performance equivalent to the requirements set forth in these plans and specifications. All work under this contract is subject to the review of the Architect and/or Engineer, whose decision is binding.

F. Before final acceptance, the Contractor shall furnish three copies of the certificates of final approval by the Electrical Inspector (as well as all other inspection certificates) to the Engineer with one copy of each to the appropriate government agencies, as applicable. Final payment for the work shall be contingent upon completion of this requirement.

G. The Contractor shall test all wiring and connections for cross connects, continuity and grounds before equipment and fixtures are connected, and when indicated or required, demonstrate by continuity/load/voltage test and Megger Test the installation of any circuit or group of circuits. Where such tests indicate the possibility of faulty insulation, locate the point of such fault, replacing same with new and demonstrate by further test the elimination of such defect. The secondary service entrance conductors from the

utility (source) transformer to the main service disconnecting means shall be megger tested. The results of this test shall be turned over to the engineer for review and approval. Any conductor failing the test shall be replaced and any costs associated shall be borne by the contractor.

11. COMPUTER-BASED SYSTEM SOFTWARE

A. For all equipment, controls, hardware, computer-based systems, programmable logic controllers, and other materials provided as a part of the work, software that is installed shall be certified in writing to the Engineer and Owner by the manufacturer and/or writer to be free of programming errors that might affect the functionality of the intended use.

12. CHANGES IN ELECTRICAL WORK

REFER TO GENERAL AND SPECIAL CONDITIONS.

13. CLAIMS FOR EXTRA COST

REFER TO GENERAL AND SPECIAL CONDITIONS.

14. SURVEYS, MEASUREMENTS AND GRADES

A. The Contractor shall lay out his work and be responsible for all necessary lines, levels, elevations and measurements. He must verify the figures shown on the drawings before laying out the work and will be held responsible for any error resulting from his failure to do so.

B. The Contractor shall base all measurements, both horizontal and vertical from established bench marks. All work shall agree with these established lines and levels. Verify all measurements at site and check the correctness of same as related to the work.

C. Should the Contractor discover any discrepancy between actual measurements and those indicated, which prevents following good practice or the intent of the drawings and specifications, he shall notify the Engineer thru normal channels of job communication and shall not proceed with his work until he has received instructions from the Engineer.

15. TEMPORARY USE OF EQUIPMENT

A. The permanent electrical equipment, when installed, may be used for temporary services, subject to an agreement among the Contractors involved, the Owner, and with the consent of the Engineer. Should the permanent systems be used for this purpose, each Contractor shall pay for all temporary connections required and any replacements required due to damage without cost, leaving the equipment and installation in "as new" condition. The Contractor may be required to bear utility costs, user fees, etc.

B. Permission to use the permanent equipment does not relieve the Contractors who utilize this equipment from the responsibility for any damages to the building construction and/or equipment which might result because of its use.

16. TEMPORARY SERVICES

A. The Contractor shall arrange for temporary electrical and other services which he may require to accomplish his work. In the absence of other provisions in the contract, the Contractor shall provide for his own temporary services of all types, including the cost of connections, utility company fees, construction, removal, etc., in his bid.

17. RECORD DRAWINGS

A. The Contractor shall insure that any deviations from the design are being recorded daily or as necessary on record drawings being maintained by the Contractor. Dimensions from fixed, visible permanent lines or landmarks shown in vertical and horizontal ways shall be utilized. Compliance shall be a requirement for final payment. Pay particular attention to the location of underfloor or underground exterior in-contract or utility-owned or leased service lines, main switches and other appurtenances important to the maintenance and safety of the Electrical System. Keep information in a set of drawings set aside at the job site especially for this purpose. Deliver these record drawings electronically to the Engineer in AutoCad 2000 format (or more recent version) along with the hand marked field set. Electronic bid drawings will be furnished to the Contractor for his use at the completion of the work.

18. MATERIALS AND WORKMANSHIP

A. All electrical equipment, materials and articles incorporated in the work shall be new and of comparable quality to that specified. All workmanship shall be first-class and shall be performed by electricians skilled and regularly employed in their respective trades. The Contractor shall determine that the equipment he proposes to furnish can be brought into the building(s) and installed within the space available. All equipment shall be installed so that all parts are readily accessible for inspection, maintenance, replacement, etc. Extra compensation will not be allowed for relocation of equipment for accessibility or for dismantling equipment to obtain entrance into the building(s).

B. All conduit and/or conductors shall be concealed in or below walls, floors or above ceilings unless otherwise noted. All fixtures, devices and wiring required shall be installed to make up complete systems as indicated on the drawings and specified herein.

C. All materials, where applicable, shall bear Underwriters' Laboratories label or that of another Engineer-approved testing agency, where such a standard has been established.

D. Each length of conduit, wireway, duct, conductor, cable, fitting, fixture and device used in the electrical systems shall be stamped or indelibly marked with the makers mark or name.

E. All electrical equipment shall bear the manufacturer's name and address and shall indicate its electrical capacity and characteristics.

F. All electrical materials, equipment and appliances shall conform to the latest standards of the National Electric Manufacturers Association (NEMA) and the National Board of Fire Underwriters (NBFU) and shall be approved by the Owner's insuring agency if so required.

19. QUALIFICATIONS OF WORKMEN

A. All electrical work shall be accomplished by qualified workmen competent in the area of work for which they are responsible. Untrained and incompetent workmen as evidenced by their workmanship shall be relieved of their responsibilities in those areas. The Engineer shall reserve the right to determine the quality of workmanship of any workman and unqualified or incompetent workmen shall refrain from work in areas not satisfactory to him. Requests for relief of a workman shall be made through the normal channels of responsibility established by the Architect or the contract document provisions.

B. All electrical work shall be accomplished by Journeymen electricians under the direct supervision of a licensed Electrician. All applicable codes, utility company regulations, laws and permitting authority of the locality shall be fully complied with by the Contractor.

C. Special electrical systems, such as Fire Detection and Alarm Systems, Intercom or Sound Reinforcement Systems, Telecommunications or Data Systems, Lightning Protection Systems, Video Systems, Special Electronic Systems, Control Systems, etc., shall be installed by workmen normally engaged or employed in these respective trades. As an exception to this, where small amounts of such work are required and are, in the opinion of the Engineer, within the competency of workmen directly employed by the Contractor involved, they may be provided by this Contractor.

20. CONDUCT OF WORKMEN

A. The Contractor shall be responsible for the conduct of all workmen under his supervision. Misconduct on the part of any workmen to the extent of creating a safety hazard, or endangering the lives and property of others, shall result in the prompt relief of that workman. The consumption or influence of alcoholic beverages, narcotics or illegally used controlled substances on the jobsite is strictly forbidden.

21. COOPERATION AND COORDINATION BETWEEN TRADES

A. The Contractor is expressly directed to read the General Conditions and all detailed sections of these specifications for all other trades and to study all drawings applicable to his work, including Architectural, Mechanical, Structural and other pertinent Drawings, to the end that complete coordination between trades will be affected.

B. Refer to Coordination Among Trades, Systems Interfacing and Connection of Equipment Furnished by Others section of these Specifications for further coordination requirements.

22. PROTECTION OF EQUIPMENT

A. The Contractor shall be entirely responsible for all material and equipment furnished by him in connection with his work and special care shall be taken to properly protect all parts thereof from damage during the construction period. Such protection shall be by a means acceptable to the Engineer. All rough-in conduit shall be properly plugged or capped during construction in a manner approved by the Engineer. Equipment damaged while stored on site either before or after installation shall be repaired or replaced (as determined by the Engineer) by the responsible Contractor.

23. CONCRETE WORK

A. The Contractor shall be responsible for the provision of all concrete work required for the installation of any of his systems or equipment. If this work is provided by another trade, it will not relieve the Electrical Contractor of his responsibilities relative to dimensions, quality of workmanship, locations, etc. In the absence of other concrete specifications, all concrete related to Electrical work shall be 3000 PSI minimum compression strength at 28 days curing and shall conform to the standards of the American Concrete Institute Publication ACI-318. Heavy equipment shall not be set on pads for at least seven days after pour.

B. All floor mounted equipment shall have be provided with pads. All concrete pads shall be complete with all pipe sleeves, embeds, anchor bolts, reinforcing steel, concrete, etc., as required. Pads larger than l8" in width shall be reinforced with minimum #4 round bars on 6" centers both ways. All reinforcing steel shall be per ASTM requirements, tied properly, lapped 18 bar diameters and supported appropriately up off form, slab or underlayment. Bars shall be approximately 3" above the bottom of the pad with a minimum 2" cover. All parts of pads and foundations shall be properly rodded or vibrated. If exposed parts of the pads and foundations are rough or show honeycomb after removing forms properly adhered repairs shall be made. If structural integrity is violated, the concrete shall be replaced. All surfaces shall be rubbed to a smooth finish.

Special Note: All pads and concrete lighting standard bases shall be crowned slightly so as to avoid water ponding beneath equipment.

C. In general, concrete pads for small equipment shall extend 6" beyond the equipment's base dimensions. For large equipment with service access panels, extend pads l8" beyond base or overall dimensions to allow walking and servicing space at locations requiring service access.

D. Exterior concrete pads shall be 4" minimum above grade and 4" below grade on a tamped 4" dense grade rock base unless otherwise noted or required by utility company. Surfaces of all foundations and bases shall have a smooth finish with three-quarter inch radius or chamfer on exposed edges, trowelled or rubbed smooth. All exterior pads shall be crowned approximately 1/8" per foot, sloping from center for drainage.

24. RESTORATION OF NEW OR EXISTING SHRUBS, PAVING, ETC.

A. The Contractor shall restore to their original condition all paving, curbing surfaces, drainage ditches, structures, fences, shrubs, existing or new building surfaces and appurtenances, and any other items damaged or removed by his operations. Replacement and repairs shall be in accordance with good construction practice and shall match materials employed in the original construction of the item to be replaced. All repairs shall be to the satisfaction of the Engineer, and in accord with the Architect's standards for such work, as applicable.

25. MAINTENANCE OF EXISTING UTILITIES AND LINES

A. The locations of all piping, conduits, cables, utilities and manholes existing, or otherwise, that come within the contract construction site, shall be subject to continuous uninterrupted maintenance with no exception unless the Owner of the utilities grants permission to interrupt same temporarily, if need be. Provide one week's written notice to Engineer, Architect and Owner prior to interrupting any utility service or line. Also see Article 1. - General, this section.

B. Known utilities and lines as available to the Engineer are shown on the drawings. However, it is additionally required that, prior to any excavation being performed, each Contractor ascertain that no utilities or lines, known or unknown, are endangered by the excavation.

C. If the above mentioned utilities or lines occur in the earth within the construction site, the Contractor shall first probe and make every effort to locate the lines prior to excavating in the respective area. Electromagnetic utility locators and acoustic pipe locators shall be utilized to determine where metallic and non-metallic piping is buried prior to any excavation.

D. Cutting into existing utilities and services shall be done in coordination with and as designated by the Owner of the utility. The Contractor shall work continuously to restore service(s) upon deliberate or accidental interruption, providing premium time and materials as needed without extra claim to the Owner.

E. The Contractor shall repair to the satisfaction of the Engineer any surface or subsurface improvements damaged during the course of the work, unless such improvement is shown to be abandoned or removed.

F. Machine excavation shall not be permitted within ten feet of existing gas or fuel lines. Hand excavate only in these areas, in accord with utility company, agency or other applicable laws, standards or regulations.

G. Protect all new or existing lines from damage by traffic, etc. during construction.

H. Protect existing trees, indicated to remain with fencing or other approved method. Hold all new subsurface lines outside the drip line of trees, offsetting as necessary to protect root structures. Refer to planting or landscaping plans, or in their absence, consult with the Architect.

26. SMOKE AND FIRE PROOFING

A. The Contractor shall not penetrate rated fire walls, ceilings or floors with conduit, cable, bus duct, wireway or other raceway system unless all penetrations are protected in a code compliant manner which maintains the rating of the assembly. Smoke and fire stop all openings made in walls, chases, ceiling and floors. Patch all openings around conduit, wireway, bus duct, etc., with appropriate type material to smoke stop walls and provide needed fire rating at fire walls, ceilings and floors. Smoke and fire proofing materials and method of application shall be approved by the local authority having jurisdiction.

27. QUIET OPERATION, SUPPORTS, VIBRATION AND OSCILLATION

A. All work shall operate under all conditions of load without any objectionable sound or vibration, the performance of which shall be determined by the Engineer. Noise from moving machinery or vibration noticeable outside of room in which it is installed, or annoyingly noticeable noise or vibration inside such room, will be considered objectionable. Sound or vibration conditions considered objectionable by the Engineer shall be corrected in an approved manner by the Contractor (or Contractors responsible) at his expense.

B. All equipment subject to vibration and/or oscillation shall be mounted on vibration supports suitable for the purpose of minimizing noise and vibration transmission, and shall be isolated from external connections such as piping, ducts, etc., by means of flexible connectors, vibration absorbers or other approved means. Surface mounted equipment such as panels, switches, etc., shall be affixed tightly to their mounting surface.

C. The Contractor shall provide supports for all equipment furnished by him using an approved vibration isolating type as needed. Supports shall be liberally sized and adequate to carry the load of the equipment and the loads of attached equipment,

piping, etc. All equipment shall be securely fastened to the structure either directly or indirectly through supporting members by means of bolts or equally effective means. No work shall depend on the supports or work of unrelated trades unless specifically authorized in writing by the Architect or Engineer.

28. FINAL CONNECTIONS TO EQUIPMENT

A. The roughing-in and final connections to all electrically operated equipment furnished under this and all other sections of the contract documents or by others, shall be included in the Contract and shall consist of furnishing all labor and materials for connection. The Contractor shall carefully coordinate with equipment suppliers, manufacturers representatives, the vendor or other trades to provide complete electrical and dimensional interface to all such equipment (kitchen, hoods, mechanical equipment, panels, refrigeration equipment, etc.).

29. WELDING

A. The Contractor shall be responsible for quality of welding done by his organization and shall repair or replace any work not done in accordance with the Architect's or structural Engineer's specifications for such work. If required by the Engineer, the responsible Contractor shall cut at least three welds during the job for X-raying and testing. These welds are to be selected at random and shall be tested as a part of the responsible Contractor's work. Certification of these tests and X-rays shall be submitted, in triplicate, to the Engineer. In case a faulty weld is discovered, the Contractor shall be required to furnish additional tests and corrective measures until satisfactory results are obtained.

30. ACCESSIBILITY

A. The Contractor shall be responsible for the sufficiency of the size of shafts and chases, the adequate clearance in partitions and above suspended ceilings for the proper installation of his work. He shall cooperate with the General Contractor (or Construction Manager) and all other Contractors whose work is in the same space, and shall advise each Contractor of his requirements. Such spaces and clearances shall be kept to the minimum size required to ensure adequate clearance and access.

B. The Contractor shall locate all equipment which must be serviced, operated, or maintained in fully accessible positions. Equipment shall include but not be limited to junction boxes, pull boxes, contactors, panels, disconnects, controllers, switchgear, etc. Minor deviations from drawings may be made to allow for better accessibility, and any change shall be approved where the equipment is concealed.

C. Each Contractor shall provide (or arrange for the provision by other trades) the access panels for each concealed junction box, pull box, fixtures or electrical device requiring access or service as shown on Engineer's plans or as required. Locations of these panels shall be identified in sufficient time to be installed in the normal course of work.

All access panels shall be installed in accord with the Architect's standards for such work.

D. Access Doors; in Ceilings or Walls:

(1) In mechanical, electrical, or service spaces:

14 gauge aluminum brushed satin finish, 1" border.

(2) In finished areas:

14 gauge primed steel with 1" border to accept the architectural finishes specified for the space. Confirm these provisions with the Architect prior to obtaining materials or installing any such work.

(3) In fire or smoke rated partitions, access doors shall be provided that equal or exceed the required rating of the construction they are mounted in.

31. ELECTRICAL CONNECTIONS

A. The Contractor shall furnish and install all power wiring complete from power source to motor or equipment junction box, including power wiring through starters. The Contractor shall install all starters not factory mounted on equipment. Unless otherwise noted, the supplier of equipment shall furnish starters with the equipment. Also refer to Divisions 11, 14, 20, 21, 22, 23 and 25 of the Specifications, shop drawings and equipment schedules for additional information.

B. All control, interlock, sensor, thermocouple and other wiring required for equipment operation shall be provided by the Contractor. All such installations shall be fully compliant with all requirements of Division 26 and 27 regardless of which trade actually installs such wiring. Motors and equipment shall be provided for current and voltage characteristics as indicated or required. All wiring shall be enclosed in raceways unless otherwise noted.

C. Each Contractor or sub-contractor, prior to bidding the work, shall coordinate power, control, sensor, interlock and all other wiring requirements for equipment or motors with all other contractors or sub-contractors, to ensure all needed wiring is provided in the Contract. Failure to make such coordination shall not be justification for claims of extra cost or a time extension to the Contract.

32. MOTORS

A. Each motor shall be provided by the equipment supplier, installer or manufacturer with conduit terminal box and N.E.C. required disconnecting means as indicated or required. Three-phase motors shall be provided with external thermal overload protection in their starter units. Single-phase motors shall be provided with thermal overload protection, integral to their windings or external, in control unit. All motors

shall be installed with NEMA-rated starters as specified and shall be connected per the National Electrical Code.

B. The capacity of each motor shall be sufficient to operate associated driven devices under all conditions of operation and load and without overload, and at least of the horsepower indicated or specified. Each motor shall be selected for quiet operation, maximum efficiency and lowest starting KVA per horsepower as applicable. Motors producing excessive noise or vibration shall be replaced by the responsible contractor. See Division 20, 22 and 23 of the Specifications for further requirements and scheduled sizes.

C. All three-phase motors shall be tested for proper rotation. Correct wiring if needed and retest. Document testing and corrective action in operations and maintenance manual.

33. CUTTING AND PATCHING

A. Unless otherwise indicated or specified, the Contractor shall provide cutting and patching necessary to install the work specified in this Division. Patching shall match adjacent surfaces to the satisfaction of the Engineer and shall be in accord with the Architect's standards for such work, as applicable.

B. No structural members shall be cut without the approval of the Structural Engineer and all such cutting shall be done in a manner directed by him.

C. When installing conduit, pipe, or any other work in insulated concrete form (ICF) walls, the responsible subcontractor for the work shall provide spray foam insulation to patch the rigid insulation to maintain full integrity of the insulating value of the wall after the mechanical and electrical work is complete. Furthermore all new work shall NOT be installed in concrete center of wall. All mechanical and electrical installations shall be on the interior side of the concrete.

34. ANCHORS

A. Each Contractor shall provide and locate all inserts required for his work before the floors and walls are built, or shall be responsible for the cost of cutting and patching required where inserts were not installed, or where incorrectly located. Each Contractor shall do all drilling required for the installation of his hangers. Drilling of anchor holes may be prohibited in post-tensioned concrete construction, in which case the Contractor shall request approved methods from the Architect and shall carefully coordinate setting of inserts, etc., with the Structural Engineer and/or Architect.

35. WEATHERPROOFING

A. Where any work pierces waterproofing, including waterproof concrete, the method of installation shall be as approved by the Architect and/or Engineer before work is done.

The Contractor shall furnish all necessary sleeves, caulking and flashing required to make openings absolutely watertight.

B. Wherever work penetrates roofing, it shall be done in a manner that will not diminish or void the roofing guarantee or warranty in any way. Coordinate all such work with the roofing installer.

36. OPERATING INSTRUCTIONS

A. Upon completion of all work and all tests, each Contractor shall furnish the necessary skilled labor and helpers for operating his systems and equipment for a period of three days of eight hours each, or as otherwise specified. During this period, instruct the Owner or his representative fully in the operations, adjustment, and maintenance of all equipment furnished. Give at least one week's written notice to the Owner, Architect and Engineer in advance of this period. The Engineer may attend any such training sessions or operational demonstrations. The Contractor shall certify in writing to the Engineer that such demonstrations have taken place, noting the date, time and names of the Owner's representative that were present.

B. Each Contractor shall furnish three complete bound sets for approval to the Engineer of typewritten and/or blueprinted instructions for operating and maintaining all systems and equipment included in this contract. All instructions shall be submitted in draft, for approval, prior to final issue. Manufacturer's advertising literature or catalogs will not be acceptable for operating and maintenance instructions.

C. Each Contractor, in the above-mentioned instructions, shall include the maintenance schedule for the principal items of equipment furnished under this contract and a detailed, easy to read parts list and the name and address of the nearest source of supply.

D. Formatting & content shall follow the guidelines outlined in the latest version of ASHRAE Applications Handbook, Guideline 4. As a minimum, the following shall be included:

- The operation and maintenance document directory should provide easy access and be well organized and clearly identified.
- Emergency information should be immediately available during emergencies and should include emergency and staff and/or agency notification procedures.
- The operating manual should contain the following information:

I. General Information
   a. Building function
   b. Building description
   c. Operating standards and logs

II. Technical Information
   a. System description

b. Operating routines and procedures
c. Seasonal start-up and shutdown
d. Special procedures
e. Basic troubleshooting

- The maintenance manual should contain the following information:
  I. Equipment data sheets
     a. Operating and nameplate data
     b. Warranty

  II. Maintenance program information
     a. Manufacturer's installation, operation, and maintenance instructions
     b. Spare parts information
     c. Preventive maintenance actions
     d. Schedule of actions
     e. Action description
     f. History
- Test reports document observed performance during start-up and commissioning.

37. SCAFFOLDING, RIGGING AND HOISTING

A. The Contractor shall furnish all scaffolding, rigging, hoisting, and services necessary for erection and delivery into the premises of any equipment and apparatus furnished. Remove same from premises when no longer required.

38. CLEANING

A. The Contractor shall, at all times, keep the area of his work presentable to the public and clean of rubbish caused by his operations; and at the completion of the work, shall remove all rubbish, all of his tools, equipment, temporary work and surplus materials, from and about the premises, and shall leave the work clean and ready for use. If the Contractor does not attend to such cleaning immediately upon request, the Engineer may cause cleaning to be done by others and charge the cost of same to the responsible Contractor. Each Contractor shall be responsible for all damage from fire which originates in, or is propagated by, accumulations of his rubbish or debris.

B. After completion of all work and before final acceptance of the work, each Contractor shall thoroughly clean all equipment and materials and shall remove all foreign matter such as grease, dirt, plaster, labels, stickers, etc., from the exterior of materials, equipment and all associated fabrication. Pay particular attention to finished area surfaces such as lighting fixture lenses, lamps, reflectors, panels, etc.

39. PAINTING

A. Each fixture device, panel, junction box, etc., that is located in a finished area shall be provided with finish of color and type as selected or approved by the Architect or

Engineer. If custom color is required, it shall be provided at no additional cost to the Owner. All other equipment, fixtures or devices located in finished or unfinished areas, that are not required to have or are provided with finish color or coating shall be provided in a prime painted condition, ready to receive finish paint or coating. All galvanized metal in finished areas shall be properly prepared with special processes to receive finish paint as directed and approved by the Architect.

40. INDEMNIFICATION

A. The Contractor shall hold harmless and indemnify the Engineer, employees, officers, agents and consultants from all claims, loss, damage, actions, causes of actions, expense and/or liability resulting from, brought for, or on account of any personal injury or property damage received or sustained by any person, persons, (including third parties), or any property growing out of, occurring, or attributable to any work performed under or related to this contract, resulting in whole or in part from the negligence of the Contractor, any subcontractor, any employee, agent or representative.

41. HAZARDOUS MATERIALS

A. The Contractor is hereby advised that it is possible that asbestos and/or other hazardous materials are or were present in this building(s). Any worker, occupant, visitor, inspector, etc., who encounters any material of whose content they are not certain shall promptly report the existence and location of that material to the Contractor and/or Owner. The Contractor shall, as a part of his work, insure that his workers are aware of this potential and what they are to do in the event of suspicion. He shall also keep uninformed persons from the premises during construction. Furthermore, the Contractor shall insure that no one comes near to or in contact with any such material or fumes therefrom until its content can be ascertained to be non-hazardous.

B. CMTA, Inc., Consulting Engineers, have no expertise in the determination of the presence of hazardous materials. Therefore, no attempt has been made by them to identify the existence or location of any such material. Furthermore, CMTA nor any affiliate thereof will neither offer nor make any recommendations relative to the removal, handling or disposal of such material.

C. If the work interfaces, connects or relates in any way with or to existing components which contain or bear any hazardous material, asbestos being one, then, it shall be the Contractor's sole responsibility to contact the Owner and so advise him immediately.

D. The Contractor by execution of the contract for any work and/or by the accomplishment of any work thereby agrees to bring no claim relative to hazardous materials for negligence, breach of contract, indemnity, or any other such item against CMTA, its principals, employees, agents or consultants. Also, the Contractor further agrees to defend, indemnify and hold CMTA, its principals, employees, agents and

consultants, harmless from any such related claims which may be brought by any subcontractors, suppliers or any other third parties.

42. ABOVE-CEILING AND FINAL PUNCH LISTS

A. The Contractor shall review each area and prepare a punch list for each of the subcontractors, as applicable, for at least two stages of the project:

(1) For review of above-ceiling work that will be concealed by tile or other materials well before substantial completion.

(2) For review of all other work as the project nears substantial completion.

B. When all work from the Contractor's punch list is complete at each of these stages and prior to completing ceiling installations (or at the final punch list stage), the Contractor shall request that the Engineer develop a punch list. This request is to be made in writing seven days prior to the proposed date. After all corrections have been made from the Engineer's punch list, the Contractor shall review and initial off on each item. This signed-off punch list shall be submitted to the Engineer. The Engineer shall return to the site once to review each punch list and all work prior to the ceilings being installed and at the final punch list review.

C. If additional visits are required by the Engineer to review work not completed by this review, the Engineer shall be reimbursed directly by the Contractor by check or money order (due net 10 days from date of each additional visit) at a rate of $140.00 per hour for extra trips required to complete either of the above-ceiling or final punch lists.

Phone: (859) 253-0892 – Fax: (859) 231-8357

The following is CMTA's guide for required electrical information relative to the Schedule of Values. Please utilize all items that pertain to this project and add any specialized system as required. A thorough and detailed schedule of values will allow for fair and equitable Pay Application approval and minimize any discrepancies as to the status of the job.

Electrical

Description of Work	Scheduled Value	Labor	Material
Shop Drawings			
Mobilization/Permits			
Temporary Utilities			
Demolition			
Switchgear			
Branch Panels			
Transformers			
Feeder Conduit			
Branch Conduit			
Feeder Wire			
Branch Wiring			
Bus duct and accessories			
Fire Alarm Conduit & Wiring			
Fire Alarm Devices			
Light Fixture Interior			
Wiring Devices			

Electrical Inspection			
Owner Training			
Record Drawings			
O & M Manuals			
Punch List / Closeout			

END OF SECTION 260501

SECTION 260502 - SCOPE OF THE ELECTRICAL WORK

1. GENERAL

   Each Electrical Contractor's attention is directed to Section 260501 - General Provisions, Electrical, and all other Contract Documents as they apply to his work.

2. SCOPE OF THE ELECTRICAL WORK

   The Electrical work for this project includes all labor, materials, equipment, fixtures, excavation, backfill and related items required to completely install, test, verify place in service and deliver to the Owner complete electrical systems in accordance with the accompanying plans and all provisions of these specifications. This work shall primarily include, but is not limited to the following:

   A. All conduits, conductors, outlet boxes, fittings, etc.

   B. All switchgear, panels, disconnect switches, fuses, transformers, contactors, starters, etc.

   C. Fault Current, Arc Flash and Coordination Studies.

   D. All wiring devices and device plates.

   E. All light fixtures and lamps.

   F. Electrical connection to all electrically operated equipment furnished and/or installed by others, including powered casework, kitchen equipment, etc.

   G. Fire alarm system.

   H. All necessary coordination with electric utility company, telephone company, cable television company, etc. to ensure that work, connections, etc., that they are to provide is accomplished and that service to this facility is delivered complete prior to occupancy.

   I. Paying all necessary fees and cost for permits, inspections, work by utility companies (power, telephone, CATV, etc). The Contractor shall contact the utility companies prior to submitting a bid to determine exactly these charges will be.

   J. Prior to submitting a bid, the Contractor shall contact all serving utility companies to determine exactly what each utility company will provide and exactly what is required of the Contractor and the Contractor shall include all such requirements in his base bid.

   K. Obtaining, coordinating and paying all necessary fees and costs for permits and inspections required by local, state and federal law. The Contractor shall contact the appropriate agencies prior to submitting a bid to determine exactly these charges will be.

END OF SECTION 260502

SECTION 260503 - SHOP DRAWINGS, LITERATURE, MANUALS, PARTS LISTS, AND SPECIAL TOOLS

1. SHOP DRAWINGS

A. Each Contractor shall submit to the Architect and/or Engineer, within thirty days after the date of the Contract, a digital set (PDF format) of shop drawings and/or manufacturer's descriptive literature on all equipment required for the fulfillment of his contract. Each shop drawing and/or manufacturer's descriptive literature shall have proper notation indicated on it and shall be clearly referenced so the specifications, schedules, light fixture numbers, panel names and numbers, etc., so that the Architect and/or Engineer may readily determine the particular item the Contractor proposes to furnish. All data and information scheduled, noted or specified by hand shall be noted in color red on the submittals. The Contractor shall make any corrections or changes required and shall resubmit for final review as requested. Review of such drawings, descriptive literature and/or schedules shall not relieve the Contractor from responsibility for deviation from drawings or specifications unless they have, in writing, directed the reviewer's attention to such deviations at the time of submission of drawings, literature and manuals; nor shall it relieve them from responsibility for errors or omissions of any nature in shop drawings, literature and manuals. The term "as specified" will not be accepted.

B. If the Contractor fails to comply with the requirements set forth above, the Architect and/or Engineer shall have the option of selecting any or all items listed in the specifications or on the drawings, and the Contractor will be required to provide all materials in accordance with this list.

C. Review of shop drawings by the Engineer applies only to conformance with the design concept of the project and general compliance with the information given in the contract documents. In all cases, the installing Contractor alone shall be responsible for furnishing the proper quantity of equipment and/or materials required, for seeing that all equipment fits the available space in a satisfactory manner and that piping, electrical and all other connections are suitably located.

D. The Engineer's review of shop drawings, schedules or other required submittal data shall not relieve the Contractor from responsibility for the adaptability of the equipment or materials to the project, compliance with applicable codes, rules, regulations, information that pertains to fabrication and installation, dimensions and quantities, electrical characteristics, and coordination of the work with all other trades involved in this project.

E. No cutting, fitting, rough-in, connections, etc., shall be accomplished until reviewed equipment shop drawings are in the hands of the Contractors concerned. It shall be each Contractor's responsibility to obtain reviewed shop drawings and to make all connections, etc. in the neatest and most workmanlike manner possible. Each Contractor shall coordinate with all the other Contractors having any connections,

roughing-in, etc., to the equipment, to make certain proper fit, space coordination, voltage and phase relationships are accomplished.

F. In accord with the provisions specified hereinbefore, shop drawings, descriptive literature and schedules shall be submitted on each of the following indicated items as well as any equipment or systems deemed necessary by the Engineer:

Power Equipment

- Fault current coordination study (submit along with switchgear & panelboards).
- Switchgear and panelboards.
- Circuit breakers or fusible switches, per each type.
- Dry-type transformers.
- Liquid-filled pad-mount transformers and their accessories.
- Power and lighting contactors.
- Disconnect switches.
- Fuses, per each type required.
- Magnetic starters, if not submitted with unit equipment by supplier.
- Control components (relays, timers, selector switches, pilots, etc.)
- Primary cable (over 600 volts) and each style of termination fitting for primary cable.
- Building service grounding electrode components.
- Metering devices.
- Bus duct and each type of fitting for bus duct.
- Emergency generator, engine fuel system and transfer switch, with all required generator system accessories, such as battery charger, batteries, exhaust system and its insulation, fuel pumps, day tanks, etc.
- Lightning protection system.
- Transient voltage surge suppression system.
- Grounding system.

Raceways

- Cable tray and each type of cable tray fitting.
- Wireways and each type of wireway fitting.
- Surface-mounted metal or plastic raceways, with each type of fitting.
- J-hook or Bridle ring assemblies.

Devices

- Each type of wiring device and their coverplates.
- Floor boxes, each by type, with required accessories.
- Data/voice/video wallplates, each by type.
- Any special items not listed above.

Lighting

- Light fixtures, each by type, marked to indicate all required accessories and lamp selection. Also provide original color selection chart to allow Architect and/or Engineer to indicate color selection.
- Lamps, each by type.
- Ballast, each by type.
- Lighting standards or poles.
- Photocells, time clocks or other lighting accessories.
- Lighting control system schematic, functional & programming data, along with building specific floor plan drawings indicating each device, master controller, input device locations and specific interconnect/wiring requirements for each device.

Systems

Note: Each system submittal is to be complete with legible cutsheets for all devices, equipment, special wiring, etc. Include system specific wiring schematics showing each device and its specific interconnect/wiring requirements. For rack mounted equipment, provide a scalable elevation drawing with proposed component locations & specific interconnect wiring requirements for each component/panel. Also provide scale building specific layout drawings that indicate device placement, wiring, etc. Refer to the specific system's specification for additional submittal requirements where required.

- Fire alarm system.
- Closed circuit television security system.
- Intrusion detection system.
- Building paging/intercom audio system.
- Clock/program system.
- Telephone system.
- Video system.
- Data network.
- Sound reinforcement system(s).
- Wireless intercom system.

Miscellaneous

- Control panel assemblies.
- Non-standard junction/pullboxes.
- Manholes, hand holes, and all outdoor electrical equipment and fittings.

2. SPECIAL WRENCHES, TOOLS AND KEYS

A. Each Contractor shall provide, along with the equipment provided, any special wrenches or tools necessary to dismantle or service equipment or appliances installed by him. Wrenches shall include necessary keys, handles and operators for valves, switches, breakers, etc. and keys to electrical panels, emergency generators, alarm pull boxes and panels, etc. At least two of any such special wrench, keys, etc. shall be turned over to the Architect prior to completion of the

project. Obtain a receipt that this has been accomplished and forward a copy to the Engineer.

3. FIRE ALARM SHOP DRAWINGS

A. The Contractor and equipment supplier shall submit to the Architect and/or Engineer, fire alarm system shop drawings complete with catalog cuts, descriptive literature and complete system wiring diagrams for their review prior to the Contractor's submittal to the Commonwealth's Department of Housing, Buildings and Construction or other governing authority for their review. No work shall be done until drawings are approved by the Kentucky Department of Housing, Buildings and Construction.

4. MAINTENANCE AND OPERATION MANUALS

A. Prior to substantial completion of the project, the Contractor shall deliver to the Engineers (in addition to the required Shop Drawings) three complete copies of operation and maintenance instructions and parts lists for all equipment provided. Formatting and content shall follow the guidelines outlined in the latest version of ASHRAE Application Handbook, Guideline 4. As a minimum, the following shall be included:

- The **operation and maintenance document directory** should provide easy access and be well organized and clearly identified.
- **Emergency information** should be immediately available during emergencies and should include emergency and staff and/or agency notification procedures.
- **The operating manual** should contain the following information:
  I. General Information
     a. Building function
     b. Building description
     c. Operating standards and logs

  II. Technical Information
     a. System description
     b. Operating routines and procedures
     c. Seasonal start-up and shutdown
     d. Special procedures
     e. Basic troubleshooting

- **The maintenance manual** should contain the following information:
  I. Equipment data sheets
     a. Operating and nameplate data
     b. Warranty

  II. Maintenance program information
     a. Manufacturer's installation, operation, and maintenance instructions
     b. Spare parts information

c. Preventive maintenance actions
d. Schedule of actions
e. Action description
f. History

- **Test reports** document observed performance during start-up and commissioning.

END OF SECTION 260503

SECTION 260504 - SLEEVING, CUTTING, PATCHING AND REPAIRING

1. GENERAL

A. The Contractor shall be responsible for all openings, sleeves, trenches, etc. that he may require in floors, roofs, ceilings, walls, etc. and shall coordinate all such work with the General Contractor and all other trades. He shall determine and coordinate any openings which he is to provide before submitting a bid proposal in order to avoid conflict and disagreement during construction. Improperly located openings shall be reworked at the expense of the responsible Contractor.

B. The Contractor shall plan his work ahead and shall place sleeves, frames or forms through all walls, floors and ceilings during the initial construction, where it is necessary for conduit, buss duct, conductors, wireways, etc. to go through; however, when this is not done, this Contractor shall do all cutting and patching required for the installation of his work, or he shall pay other trades for doing this work when so directed by the Architect. Any damage caused to the building by the workmen of the responsible Contractor must be corrected or rectified by him at his own expense.

C. The Contractor shall cut holes in casework, equipment panels, etc. (if any), as required to pass pipes in and out.

D. The Contractor shall notify other trades in due time where he will require openings of chases in new concrete or masonry. He shall set all concrete inserts and sleeves for his work. Failing to do this, he shall cut openings for his work and patch same as required at his own expense.

E. Openings in slabs and walls shall be cut with core drill. Hammer devices will not be permitted. Edges of trenches and large openings shall be scribe cut with a masonry saw.

F. Cast iron sleeves shall be installed through all walls where pipe enters the building below grade. Sleeves shall be flush with each face of the wall and shall be sufficiently larger than the entering pipe to permit thorough caulking with lead and oakum between pipe and sleeve for waterproofing.

G. In all cases, sleeves shall be at least two inches larger than nominal pipe diameter.

H. Sleeves passing through roof or exterior wall or where there is a possibility of water leakage and damage shall be caulked water tight for horizontal sleeves and flashed and counter-flashed with lead (4 lb.) or copper and soldered to the piping, lapped over sleeve and properly weather sealed. Any roof penetration shall not void or lessen the warranty in any way.

I. All rectangular or special shaped openings in plaster, stucco or similar materials including gypsum board shall be framed by means of plaster frames, casing beads, wood or metal angle members as required. The intent of this requirements is to provide

smooth even termination of wall, floor and ceiling finishes as well as to provide a fastening means for lighting fixtures, panels, etc. Lintels shall be provided where indicated over all openings in bearing walls, etc.

J. No cutting is to be done at points or in a manner that will weaken the structure and unnecessary cutting must be avoided. If in doubt, contact the Architect.

K. The Contractor shall be responsible for properly shoring, bracing, supporting, etc. any existing and/or new construction to guard against cracking, settling, collapsing, displacing or weakening while openings are being made. Any damage occurring to the existing and/or new structures, due to failure to exercise proper precautions or due to action of the elements, shall be promptly and properly made good to the satisfaction of the Architect.

L. All work improperly done or not done at all as required by the Contractor will be performed by others. The cost of this work shall be paid for by the Contractor who is in non-compliance with the Contract.

2. SLEEVES, PLATES AND ESCUTCHEONS

A. The Contractor shall provide and locate all sleeves required for his work before the floors and surface being penetrated are built, otherwise the Contractor shall core drill for conduits where sleeves were not installed, or where incorrectly located. Core drilling is the only acceptable alternative to sleeves. Do not chisel openings. Where sleeves are placed in exterior walls or in slabs on grade, the space between the conduit and the sleeves shall be made completely and permanently water tight.

B. Conduits that penetrates fire and/or smoke rated assemblies shall have sleeves installed as required by the manufacturer of the rating seal used.

C. At all other locations either pipe sleeves or core drilled openings are acceptable.

D. Where thermal expansion does not occur, the wall may be sealed tight to the conduit.

E. Sleeves shall be constructed of rigid steel conduit. Sleeves in floors shall extend 6" above finished floor level.

F. Fasten sleeves securely in floors, walls, so that they will not become displaced when concrete is poured or when other construction is built around them. Take precautions to prevent concrete, plaster or other materials being forced into the space between pipe and sleeve during construction.

G. In all areas where ducts are exposed and ducts pass thru floors, the opening shall be surrounded by a 4 inch high by 3 inch wide concrete curb.

H. Escutcheon plates shall be provided for all conduit passing thru walls, floors and ceilings. Plates shall be nickel plated, of the split ring type, of size to match the pipe or

conduit. Where plates are provided for pipes passing thru sleeves which extend above the floor surface, provide deep recessed plates to conceal the sleeves.

I. When installing conduit, pipe, or any other work in insulated concrete form (ICF) walls, the responsible subcontractor for the work shall provide spray foam insulation to patch the rigid insulation to maintain full integrity of the insulating value of the wall after the mechanical and electrical work is complete. Furthermore all new work shall NOT be installed in concrete center of wall. All mechanical and electrical installations shall be on the interior side of the concrete.

END OF SECTION 260504

SECTION 260505 - DEMOLITION, RESTORATION AND SALVAGE

1. GENERAL

   A. Drawings and General Provisions of the Contract, including General and Supplementary Conditions and all other divisions of these specifications apply to work specified in this section.

2. DESCRIPTION OF WORK

   A. This section covers all demolition, restoration and salvage required to perform the electrical work indicated on the drawings, specified and/or as required to complete the project. It is the intent of this section of work to remove all existing electrical equipment, materials, etc. which are not required for the completed building and to restore any and all finished surfaces to their original type and conditions. To accomplish these requirements, the Contractor(s) shall, at his own expense, engage the services of others already performing finish work on this project. All work shall be completed to the satisfaction of the Architect/Engineers whose decisions shall be final. This requirement shall apply to all restoration work whether indicated or specified.

   B. The Contractor shall lawfully dispose of any removed P.C.B.-bearing ballasts (containing polychlorinated biphenyl), and all mercury-vapor bearing lamps, in accordance with all state, local, federal and other applicable laws and regulations.

3. ELECTRICAL

   A. Where electrical fixtures, equipment or other materials are removed and/or relocated, all abandoned conduit and conductors shall be removed in exposed areas. In concealed areas, materials shall be abandoned in place or removed as indicated and patch all openings.

   B. The Contractor shall be responsible for the removal and/or relocation of any electrical equipment, fixtures, devices, appurtenances, etc., which may, in the course of construction, interfere with the installation of any new and/or relocated Architectural, Mechanical, Electrical, Structural or Fire Protection Systems whether indicated or not.

4. REPAIR

   A. Unless otherwise indicated, the Contractor shall be responsible for the patching and repairing of all holes, etc. in the ceiling, wall and floors where electrical equipment is removed.

5. SALVAGE

   A. It is the intent of this section to deliver to the Owner all components of any electrical system which may be economically reused by him. The Contractor shall make every

effort to remove reusable components without damage and deliver them to a location designated by the Owner.

END OF SECTION 260505

SECTION 260508 - COORDINATION AMONG TRADES, SYSTEMS INTERFACING AND CONNECTION OF EQUIPMENT FURNISHED BY OTHERS

1. COORDINATION

   A. The Contractor is expressly directed to read the General Conditions and all sections of these specifications for all other trades and to study all drawings applicable to his work, including Architectural, Plumbing, Fire Protection, Mechanical and Structural drawings, to the end that complete coordination between trades will be affected. Each Contractor shall make known to all other contractors the intended positioning of materials, raceways, supports, equipment and the intended order of his work. Coordinate all work with other trades and proceed with the installation in a manner that will not create delays for other trades or affect the Owner's operations.

   B. Special attention to coordination shall be given to points where raceways, fixtures, etc., must cross other ducts or conduit, where lighting fixtures must be recessed in ceilings, and where fixtures, conduit and devices must recess into walls, soffits, columns, etc. It shall be the responsibility of each Contractor to leave the necessary room for other trades. No extra compensation or time will be allowed to cover the cost of removing fixtures, devices, conduit, ducts, etc. or equipment found encroaching on space required by others.

   C. The Contractor shall be responsible for coordination with all trades to insure that they have made provision for connections, operational switches, disconnect switches, fused disconnects, etc., for electrically operated equipment provided under this or any other division of the specifications, or as called for on the drawings. Any connection, circuiting, disconnects, fuses, etc., that are required for equipment operation shall be provided as a part of this contract.

   D. If any discrepancies occur between accompanying drawings and these specifications and drawings and specifications covering other trade's work, each trade shall report such discrepancies to the Architect far enough in advance so that a workable solution can be presented. No extra payment will be allowed for relocation of fixtures, devices, conduit, and equipment not installed or connected in accordance with the above instructions.

   E. In all areas where air diffusers, devices, lighting fixtures and other ceiling-mounted devices are to be installed, the Mechanical Trade(s) and the Electrical Trade and the General Trades shall coordinate their respective construction and installations so as to provide a combined symmetrical arrangement that is acceptable to the Architect and Engineer. Where applicable, refer to reflected ceiling plans. Request layouts from the Architect or Engineer where in doubt about the potential acceptability of an installation.

2. INTERFACING

Each Electrical Trade, Specialty Controls Trade, Mechanical Trade and the General Trades, etc., shall insure that coordination is effected relative to interfacing of all systems. Some typical interface points are (but not necessarily all):

A. Connection of Telecommunications (voice, video, data) lines to Owner's existing or new services.

B. Connection of Power lines to Owner's existing or new services.

C. Connection of fuel oil and exhaust piping to emergency generator and furnishing of fuel for testing unit. Provide a full tank at final acceptance.

D. Connection of all controls to equipment.

E. Electrical power connections to electrically operated (or controlled) equipment.

F. Electrical provisions for all equipment provided by other trades or suppliers within this contract.

3. CONNECTION OF EQUIPMENT FURNISHED BY OTHERS

A. Each Contractor shall make all connections to equipment furnished by others, whenever such equipment is shown on any part of the drawings or mentioned in any part of the Specifications, unless otherwise specifically specified hereinafter.

B. All drawings are complementary, one trade of the other. It is the Contractor's responsibility to examine all drawings and specifications to determine the full scope of his work. The project Engineers have arranged the specifications and drawings in their given order solely as a convenience in organizing the project, and in no way shall they imply the assignment of work to specific trades, contractors, subcontractors or suppliers.

C. Supervision to assure proper installation, functioning and operation shall be provided by the Contractor furnishing the equipment or apparatus to be connected.

D. Items indicated on the drawings as rough-in only (RIO) will be connected by the equipment supplier or Owner, as indicated. The Contractor shall be responsible for rough-in provisions only as indicated. These rough-ins shall be in accord with the manufacturer's or supplier's requirements.

E. For items furnished by others, relocated, or RIO, the Contractor shall obtain from the supplier or shall field determine as appropriate, the exact rough-in locations and connection sizes for the referenced equipment.

F. The Contractor shall be responsible for coordinating with the General and all other trades, as necessary, to determine any and all final connections that he is to make to equipment furnished by others.

END OF SECTION 260508

SECTION 260519 - CONDUCTORS, IDENTIFICATION, SPLICING DEVICES & CONNECTORS

1. GENERAL

   A. This section of the Specifications covers all of the electrical power, lighting, and control power (line voltage) conductors, but does not include communications, data or signal system conductors, which are specified separately in these specifications.

   B. All conduits installed without conductors shall have a 200 lb. test nylon string installed for future use, tied off securely at each end.

   C. **No more than 40% conduit fill is permitted for <u>any</u> conduit system, including video, intercom, data, power or other signal circuits unless specifically indicated otherwise on the plans.**

   D. Lighting circuits: No more than five conductors shall be installed in conduit except for switch legs and travelers in multi-point switching arrangements.

   E. Receptacle circuits: If multiple circuits are pulled in a single homerun, a dedicated neutral shall be provided for each phase conductor. In these cases, a maximum of seven conductors are permitted in a single conduit. Conductors shall be derated per N.E.C.

   F. Intentional or unintentional painting of exposed low voltage or line voltage cabling is prohibited. The contractor shall ensure that exposed cabling is adequately protected from direct painting or overspray whether painting is required within the electrical specifications or required by other disciplines/trades. The contractor shall review the painting requirements for all disciplines and shall provide cabling protection as required. Where exposed cabling is being installed in exposed ceiling or wall spaces that are required to be painted, the contractor shall provide alternate options for cable colors and shall provide submittals for such cabling to engineer for approval.

2. MATERIALS

   A. CONDUCTORS

      (1) All conductors shall be 98% conductive annealed copper unless otherwise noted, UL listed and labeled.

      (2) Lighting and receptacle branch circuits shall be not less than No. 12 copper wire or of the sizes shown on the drawings with Type THW, THHN or THWN insulation. All feeder circuits shall be Type THW or THWN of the size as shown on the Contract Drawings. THHN wiring shall only be installed in overhead, dry or damp locations. THWN or THW wiring shall be used for all circuits pulled in underground or other wet locations.

(3) Conductors No. 10 and smaller sizes of wire shall be solid. Conductors No. 8 and larger sizes shall be stranded.

(4) Conductors for fire alarm wiring shall be stranded and in full compliance with N.E.C. 760. All fire alarm conductors shall be installed within conduit and enclosed junction boxes.

(5) All wire on the project shall be new, in good condition, and shall be delivered in standard coils or reels.

(6) The color of the wire shall be selected to conform with Section 210-5 of the latest edition of the National Electrical Code. Refer also to 260519-4, Color Coding.

(7) All equipment grounding conductors shall have green color insulation or if larger than #8, shall be taped for two inches, green color at every termination and pullbox access point.

(8) Conductors used for motor connections and connections to vibrating or oscillating equipment shall be extra flexible.

(9) Conductors for main ground from neutral bus, equipment grounding bus, building steel, grounding grid and main cold water pipe connection shall be bare copper.

(10) All conductors shall be identified by color code and by means of labels placed on conductors in all junction boxes and at each terminal point with Brady, Ideal, T & B or approved equivalent labels indicating source, circuit No. or terminal No.

(11) Branch wiring and feeder conductors that are greater than 100' in length shall be increased at least one size to compensate for voltage drop. All circuits shall be installed and sized for a maximum 2% voltage drop. As calculated using 80% of the supply breaker rating as the load. Adjust conductors and conduit size accordingly for actual field installed conditions.

B. SPLICING DEVICES & CONNECTORS

(1) Splicing devices for use on No. 14 to No. 10 AWG conductors shall be pressure type such as T & B "STA-KON", Burndy, Reliable or approved equivalent.

(2) Wire nuts shall be spring pressure type, insulation 600V, 105°C insulation, up to #8 size. Greater than #6 Cu shall be a compression type connection, 600V insulation, cold shrink tubing, taped to restore full insulation value of the wire being spliced.

(3) Pressure crimp-applied ring type (or fork with upturned ends) terminations shall be employed on motor and equipment terminals where such terminals are provided on motor and equipment leads or on all stranded wire terminations using No. 10 AWG or smaller conductors.

(4) Splices, where necessary, shall be made with hydraulically-set "Hy-press" or equivalent crimped connectors. All splices shall be insulated to the full value of the wiring insulation using a cold-shrink kit or the equivalent in built-up materials.

(5) Large connectors (lugs) at terminals shall be mechanical type, hex-head socket or crimp-on style, installed per the manufacturer's recommendations.

(6) Exterior underground connections made between bare ground wires or to ground rods shall be exothermically welded, "Cadweld" or equivalent.

(7) The use of split-bolt clamps will be permitted in wireways at service entrance only. Torque to 55 foot-pounds or as recommended by manufacturer.

(8) No aluminum conductors shall be used.

3. INSTALLATION

A. The pulling of all wires and cable on this project shall be performed in strict compliance with applicable sections of the National Electrical Code. No conductor entering or leaving a cabinet or box shall be deflected in such a manner as to cause excess pressure on the conductor insulation. Conductors shall only be installed after insulating bushings are in place.

B. The radius of bending of conductors shall be not less than eighteen times the outside diameter of the conductor insulation or more, if recommended by the manufacturer.

C. Conductors installed within environmental air plenums shall be per N.E.C. Article 800 and other applicable codes, with FEP-type insulation or an approved equivalent. Also provide plenum-rated tie-wraps where plastic straps or other supports, etc., are installed in plenum areas.

D. Where indicated, communications conductors that are installed exposed shall not be routed across ceilings or ductwork. They shall be held up against building structure or against permanent support members. They shall be installed in such a manner that they do not interfere with the access to or operation of equipment or removal of ceiling tiles. Tie-wraps shall be installed in such a manner so as to bundle conductors neatly, allowing runouts of single conductors or groups to drop down to equipment served. Install grommeting where dropping out of trays or into panels or service columns. Install sleeves with bushings where penetrating partitions. Firestop sleeves with approved material. Do not penetrate firewalls if so indicated on plans. Refer to the drawings for support requirements and details on routing exposed communications conductors.

E. Conductors for isolated power systems shall be installed in as short a run of conduit as practicable. No pulling soap shall be used on conductors in isolated power systems.

F. Where conductors are installed in industrial facilities, they shall be per J.I.C. standards.

G. Maximum permissible pulling tensions, as recommended by the manufacturer for any given type of cable or wire installed shall not be exceeded. Utilize special remote readout equipment as required to ensure compliance. Use particular caution when installing twisted pair data cable or fiber optic cables -- forces permitted for pulling in are typically very low for these cable types.

H. All cables and wiring, regardless of voltage, installed in manholes or cable vaults shall be routed in such a manner to provide a minimum of 6 feet of slack cable for future splicing. Install cables along walls by utilizing the longer route from entry to exit. If both routes are symmetrical, provide a loop of cable secured to wall. All cables shall be tied to insulated cable supports on wall-mounted racks, spaced a maximum of three feet apart.

I. Where multiwire branch circuits are allowed, the phases and neutral shall be wire-tied together in the panelboard and in all pull boxes.

4. COLOR CODING DISTRIBUTION VOLTAGE CONDUCTORS, 600 VOLT OR LESS

A. Conductors to be color coded as follows:

(1) 120/208 Volt Conductors
Phase A - Black
Phase B - Red
Phase C - Blue
Neutral - Solid White or White with tracer stripe to match phase conductor

(2) 277/480 Volt Conductors
Phase A - Brown
Phase B - Orange
Phase C - Yellow
Neutral – Solid Gray or White with tracer stripe to match phase conductor

(3) Isolated Power Conductors (Type XLP or XHHN)
Phase A – Brown with colored stripe other than white, green or grey
Phase B Device or Neutral- Orange with colored stripe other than white, green or grey
Phase C - Yellow with colored stripe other than white, green or grey
Neutral on Three-Phase Systems- Solid White or White with tracer stripe to match phase conductor

Note: Further identify isolated power conductors with 2" wide purple tape at all terminations and junctions.

(4) Control Wiring - Red, or as indicated.

(5) Conductors within enclosures that may be energized when enclosure disconnect is off - yellow, or taped with 1/2" yellow tape every 6" of length, inside enclosure.

Provide lamacoid plate warning sign on front of enclosure where this condition occurs.

(6) D.C. Wiring - Positive - Light Blue
Negative - Dark Blue

5. COMMUNICATIONS CONDUCTORS

A. Communications conductors shall be of type suitable for the service, installed in accordance with the manufacturer's recommendations for pulling tensions, support, terminations, proximity to high power fields, etc. Types not indicated on this schedule but indicated on plans shall be as noted or required for the service. If in doubt, contact the Engineer for clarification.

B. Plenum-rated conductors (per N.E.C.) shall be installed where required by codes. If installation is thru an approved raceway system that excludes the wiring from the plenum, non-plenum type may be used.

C. All communications cables shall be furnished and installed in compliance with U.L. 444, U.L. 13, N.E.C. 800, 725, 760 and all applicable codes and standards, for premises or riser installations.

D. Riser cables shall be provided in accord with current edition of the N.E. Code.

E. Schedule of Wiring Types - Plenum-Rated

Data Circuits	24 AWG, 4 Pair Certified Category Six augmented U.T.P. Plenum-Rated	Anixter #CMP-00424 FAS-5B Superior Essex TE Connectivity Belden Equivalent Berk-Tek Equivalent
Voice Circuits	24 AWG, 4 Pair Certified Category Six augmented U.T.P. Plenum-Rated	Anixter #CMP-00424 FAS-5B Superior Essex TE Connectivity Belden Equivalent Berk-Tek Equivalent
Voice Circuits	24 AWG, 4 Pair Category Five U.T.P. Plenum-Rated	Anixter #CMP-00422 HAH-3 Superior Essex TE Connectivity Belden Equivalent Berk-Tek Equivalent
Video Drops	RG-6/U Coaxial, 18 AWG Solid Conductor, Plenum-Rated	Belden #89120 Superior Essex TE Connectivity

		Belden Equivalent Berk-Tek Equivalent
Video Trunks	RG-11/U Coaxial, 14 AWG Solid Conductor, Plenum-Rated	Belden #89292 Superior Essex TE Connectivity Belden Equivalent Berk-Tek Equivalent
T-1 Premises Extension Cable	T-1, 4 Pair 22 AWG, Plenum-Rated Pairs Individually Shielded	Anixter #CMP-00422T1-3 Superior Essex TE Connectivity Belden Equivalent Berk-Tek Equivalent
6-Strand Fiber (or # of Strands as Noted)	Multimode 50/125 Micron, Plenum-Rated	Anixter #370-COROM2-TBD-06 Superior Essex TE Connectivity Siecor Equivalent Berk-Tek Equivalent
Speaker Cable	22 AWG. 1 Pair Shielded	Belden #88761 Superior Essex TE Connectivity W.P.W. Equivalent Anixter Equivalent
Speaker Cable, with Call-In Unshielded Pair	22 AWG. 1 Pair Shielded, 1 Pair 22 AWG. Unshielded	Belden #88723 Superior Essex TE Connectivity W.P.W. Equivalent Anixter Equivalent
100 Pair Telephone Cable	24 AWG. 100 Pairs, Non-Plenum Exchange Cable, Wet Location Rated, Gel-Filled Certified Category Three	Anixter #E-010024DFC Superior Essex TE Connectivity Belden Equivalent A.T.&T. Equivalent

- OR -

F. Schedule of Wiring Types - Non-Plenum Rated

Data Circuits	24 AWG, 4 Pair Certified Category Six	Anixter #CM-00423PND-6A-06

	augmented U.T.P.	Superior Essex TE Connectivity Belden Equivalent Berk-Tek Equivalent
Voice Circuits	24 AWG, 4 Pair Certified Category Six augmented U.T.P.	Anixter #CM-00423PND-6A-06 Superior Essex TE Connectivity Belden Equivalent Berk-Tek Equivalent
Voice Circuits	24 AWG, 4 Pair Category Three U.T.P.	Anixter #CM-00422 BAG-3 Superior Essex Belden Equivalent W.P.W. Equivalent
Video Drops	RG-6/U Coaxial 18 AWG Solid Conductor	Belden #9060 Superior Essex Anixter Equivalent W.P.W. Equivalent
Video Trunks	RG-11/U Coaxial, 14 AWG Solid Conductor	Belden #1523A Superior Essex E Connectivity Anixter Equivalent W.P.W. Equivalent
T-1 Premises Extension Cable	T-1, 4 Pair 22 AWG, Pairs Individually Shielded	Anixter #CM-00422 MIGT-3 Superior Essex TE Connectivity Belden Equivalent Berk-Tek Equivalent
6-Strand Fiber (or # of Strands as Noted)	Multimode 50/125 Micron	Anixter #370-947-SMODE-12 Superior Essex TE Connectivity Siecor Equivalent Berk-Tek Equivalent
12-Strand Fiber (or # of Strands as Noted)	Singlemode 8.3/125 Micron	Superior Essex TE Connectivity Siecor Equivalent Berk-Tek Equivalent
Speaker Cable	22 AWG. 1 Pair Shielded, Plenum-Rated, Stranded	Belden #9414 Superior Essex TE Connectivity Equivalent W.P.W. or Anixter

Speaker Cable with Call-In Pair	22 AWG. 1 Pair Shielded, 1 Pair 22 AWG. Unshielded for Call-In, Plenum-Rated	Belden #8730 Superior Essex TE Connectivity W.P.W. Equivalent Anixter Equivalent
100 Pair Telephone Cable	24 AWG. 100 Pairs, Non-Plenum Exchange Cable, Wet Location Rated, Gel-Filled, Certified Category Three, Installed in Metal Conduit	Anixter #E-010024DFC Superior Essex TE Connectivity Belden Equivalent A.T.&T. Equivalent

6. HIGH VOLTAGE PRIMARY CABLE

A. High voltage primary cable shall be rated for aerial, direct burial, open tray, wet location and submersible underground service. Cable shall be I.P.C.E.A. - listed and UL listed for the use indicated.

B. Cable shall be rated 15 K.V., nominal. Insulation shall be XLP, XLPE or approved equivalent with a nominal 133% value.

C. Cable shall be shielded, grounded, with extruded 8 mil. semiconducting layer bonded to the insulation. Provide with copper drain wires served over semiconducting layer.

D. Cable shall be installed in accordance with manufacturer's recommendations, with particular attention to termination, handling, bending radii and pull tension recommendations.

E. The conductor shall be copper with Class "B" stranding per ASTM B-8.

F. Cable shall be as manufactured by G.E., Anaconda, Phelps-Dodge, Okonite, or approved equivalent.

G. Cable shall be manufactured per the following standards: UL 1072 and ICEA for medium voltage cable.

H.

manufactured load-break, dead-front elbows and fittings compatible with cable and rated for the purpose. Pre-manufactured elbows and other types of fittings indicated shall be as manufactured by Elastimold Co., Blackburn-ITT, R.T.E. Corporation, S & C Company or other approved equivalent.

1877 200 amp hot-stick operable load break elbow with voltage test point. The

elbow shall be furnished with the necessary cable adapter for terminating the copper cable used.

Voltage.....15 KV class
Continuous and Load Break Current .....200 amps, rms
BIL .....95 KV
Withstand Voltage (AC) .....34 KV, 60 HZ, 1 minute
Short-Time Current.....10,000 amps, rms, sym., 17 seconds.

1977 premolded dead break unit for terminating 15 KV shielded cable. The connector shall be fully shielded, of dead front operation and shall be fully submersible. The connector shall be furnished with proper adapters for terminating the copper cable used.

Voltage.....15 KV Class
Continuous Current .....600 amps, rms
BIL .....95 KV
8 Hour Overload.....900 amps, rms
Withstand Voltage (AC).....35 KV, 60 Hz, 1 minute
Momentary.....25,000 amps, rms, sym, .17 seconds

I. Cable shall be color coded at all terminations and junctions as follows:

Phase A - Black
Phase B - Red
Phase C - Blue

Follow the above color coding unless otherwise indicated or required by system user.

J. Cable grounding at all terminations shall be in accord with the manufacturer's recommendations and applicable codes.

K. A full size (matching phase conductors) copper 600 volt insulated ground is to be provided with each primary circuit.

L. Installation, termination and testing of primary power cables shall be accomplished by Journeymen Electricians with at least three years experience with such work.

M. In lieu of using pre-manufactured elbows and other fittings, installer may substitute field-build and taped stress cones or other type of termination, subject to written prior approval of the engineer. In requesting such approval, submit complete data on materials proposed to be used and tools to be used in cutting and stripping cable.

N. All new primary cable shall be high-potential tested in accord with criteria outlined herein. Where taps, splices or terminations to existing primary cables are indicated on the plans, the Engineer reserves the right to request high-potential testing of the existing cable or systems to determine their suitability and safety, if not so indicated on the plans.

O. Always field verify exact primary power voltage potentials with the supplying utility and report any discrepancy from that indicated on the plans to the Engineer prior to placing any primary cable in service.

7. TESTING OF PRIMARY CABLE

A. All new primary cable shall be tested prior to energization in accord with the following criteria, or other approved method.

(1) Use equipment made by one of the following (or approved equivalent) and abide by their operation rules for their respective equipment:

a. Associated Research, Inc.
b. J.G. Biddle Company
c. Hipotronics, Inc.
d. Von Corporation

(2) Clear cable of all equipment, switchgear, etc. for elbows, install insulation plugs. On cable end, insulate by high voltage taping, insulating jar or plastic. All terminations and splices shall be completely and properly grounded. All adjacent equipment shall be grounded, where danger of flashover exists.

(3) A sphere gap in parallel with the 100,000 volt D.C. "Hipot" tester shall be calibrated for sparkover at 70 KV D.C.

(4) The direct current test voltage shall be applied in increments of 5 KV and shall be left at the step for 1 minute. Saturate cable for 15 minutes at test voltage as in (5) below.

(5) Test: (as appropriate)

a. 15 KV cables with open terminations at 55 KV D.C.
b. 15 KV cables with elbow termination at 45 KV D.C., or to the limit of the elbow or splice. Verify with manufacturer.

SPECIAL NOTE: It is suggested that tests be performed when relative humidity is 50 to 60% or less in clear, dry weather for greater safety.

(6) Record the leakage current at each step and at end of saturation time.

(7) Acceptance: The above procedure with less than 100 microamperes of current registered.

(8) Proof test on existing cable at 35 KV for 5a and 35 KV for 5b above.

(9) After test (in order listed):

a. Turn tester power off.
b. Discharge tester and cable thru a resistive discharge device (8 MEGOHM discharge stick).
c. Ground cable thru a grounding means (#12 AWG THW wire to ground).
d. Disconnect tester.

(10) For Safety:

a. Wear high voltage gloves at all times.
b. Treat cable and tester as high voltage at all times.
c. Remember, D.C. static charges can be very harmful.

(11) All tests must be made in the presence of the Engineer and shall be recorded on a form sheet signed by the person performing the test and dated. Three (3) copies shall be submitted to the Engineer. Provide 48 hour advance written notice to Engineer.

END OF SECTION 260519

SECTION 260526 - GROUNDING

1. GENERAL

   A. All metallic conduit, raceways, cable trays, wireways, supports, cabinets and equipment shall be grounded in accordance with the latest issue of the National Electrical Code, as shown on the Contract Drawings and in accord with the requirements of the local authority having jurisdiction, as applicable.

   B. The size of the equipment grounding conductors, grounding electrode conductors and service grounding conductors shall be not less than that given in Article No. 250 of the National Electrical Code, and/or as shown on the Contract Drawings. Where ungrounded conductor sizes are increased to minimize voltage drop, grounded conductor sizes shall be increased in the proper proportion.

   C. Grounding bus and non-current carrying metallic parts of all equipment and raceway systems shall be securely grounded by connection to common ground.

   D. The service entrance main ground bus shall also be connected to the main cold metallic water pipe within three feet of where it enters the building, on both the house and street sides of the main shut-off valve with a properly sized bonding jumper. A properly sized bonding jumper shall also be provided to the frame of any steel structure utilized in the construction. The steel frame of the building (if any) shall be made electrically continuous.

2. MATERIALS

   A. Ground wires and cables shall be of the AWG sizes shown on the Contract Drawings or shall be sized in accord with the prevailing codes. All ground wires and cables shall be copper.

   B. All grounding fittings shall be heavy cast bronze or copper of the mechanical type except for underground installations or interconnection of grounding grid to cable, columns and ground electrodes, which shall be thermically welded type as manufactured by Cadweld, Burndy Co., Therm-O-Weld, or approved equivalent. Other bonding clamps or fittings in above ground locations shall be as manufactured by O.A. Co., T & B, Burndy, or approved equivalent.

   C. Ground electrode pipe systems shall be solid copper construction. Ground rods shall be 5/8" minimum diameter, eight feet long, copperweld steel. All ground electrode systems shall be installed in accord with manufacturer's recommendations, U.L. listings, National Electrical and National Electrical Safety Codes.

3. INSTALLATION

   A. All grounding conductors shall be protected from mechanical injury and shall be rigidly supported. Where ground conductors are run through flexible conduit and through

panelboard switchboard or motor control center feeders, they shall be securely bonded to such conduit thru the use of grounding bushings at the entrance and exit. All connection of equipment shall be made with an approved type of solderless connection and same shall be bolted or clamped to equipment or conduit.

B. All equipment grounding conductors to lighting fixtures, devices, receptacles, electric heaters, furnace and other equipment not exceeding No. 8 AWG in size shall be green colored Type "THWN".

C. Equipment ground connections to GFI circuit breakers shall be carried and bonded to each outlet on the circuit. Provide a separate equipment grounding conductor with green color insulation.

D. Resistance to the grounding at the service entrance equipment shall be in accordance with the N.E.C. for style of construction and shall not exceed ten ohms as measured by the described testing method.

E. All circuits shall have a separate grounding conductor, except as otherwise noted.

F. When grounding systems are completely installed and all grading in the area of the service grounding electrode has been completed up to finish elevations, perform a fall-of potential or other approved test to determine actual system resistance to earth. Report results to the Engineer in writing. Refer to testing provisions in this section of specifications.

G. Where separately-derived systems are utilized as part of the power distribution network, the neutral leg of the secondary side of generators, transformers, etc., shall be connected to a grounding electrode in accordance with the manufacturer's recommendations.

H. The Contractor shall ensure that the ground return path thru building structural steel or other means is electrically continuous back to the service grounding electrode and is of adequate capacity and impedance to carry the maximum expected fault or other current. Where no electrically continuous steel building frame is available, the Contractor shall provide a properly sized ground bar and ground conductor routed back to the main facility ground bus.

I. Where a building's steel frame is made electrically discontinuous by masonry breaks (as at firewalls, etc.), the Contractor shall provide an accessible thermically welded bonding jumper of #500MCM copper to bond the building steel frame sections together, making the entire steel frame electrically continuous. The installation of these bonding jumpers shall be reviewed by the Engineer prior to their being covered by construction.

J. Where lightning protection systems are utilized on the work, their electrodes and conductors shall be electrically segregated from the building service ground, except where connections to structural elements are required for the proper installation of these

systems. Lightning protection grounds shall only be utilized for lightning grounding applications, in accord with U.L. and manufacturer's recommendations.

K. Grounding connections shall **never** be made to fire protection, natural gas, flammable gas or liquid fuel piping, except where specifically indicated on the plans.

L. Where dielectric fittings are utilized in piping systems, the piping system shall **not** be utilized as a ground path. Bonding jumpers shall not be utilized to bridge over such fittings. Piping systems shall not be utilized as ground paths except where specifically required by codes in the case of water piping.

4. GROUNDING ELECTRODE SYSTEM

A. The ground electrode system shall be as specified herein. The system shall not require maintenance throughout the expected life span of the materials.

B. Ground system shall be an electrolytic rod type, as manufactured by Lyncole XIT Grounding, Superior Grounding Systems, L.E.C., Inc. (Chem-Rod), or approved equivalent. Electrode(s) shall be placed as shown on the plans, installed exactly per manufacturer's recommendations. Electrodes shall be installed vertically, 12 feet of overall length (or length as indicated), set in a drilled hole and backfilled per manufacturer's instructions with a special clay slurry surrounding the rod. Provide a concrete protection box with cast iron grate for the top of the rod termination. Ground system shall be per the following:

(1) Manufacturer: Lyncole XIT Grounding (or approved equivalent).
(2) Source: Lyncole XIT Grounding, 22412 S. Normandie Ave., Torrance, CA 90502 1-800-962-2610
(3) Shaft Configuration: Straight.
(4) Shaft Length: 12 feet (or as otherwise indicated).
(5) Listings: U.L.-467J, ANSI 633.8.
(6) Material: Type K Copper.
(7) Construction: Hollow tube, 2.125" O.D., chemical filled with non-hazardous metallic salts.
(8) Weight 3.5 lbs. per foot of length, nominal.
(9) Ground Wire Termination: Exothermic ("Cadweld" by Contractor) connection to 4/0 conductor, with U-bolt with pressure plate provided as test point.
(10) Average Life Expectancy: 25 Years.
(11) Model Number: K2-(length)CS.
(12) Provide grounding system with the following components: protective box, backfill material. Box to be concrete with cast iron, tamper-resistant lid, backfill to be "Bentonite" clay.

C. Installation of Pipe Ground System

(1) **Pipe ground systems shall be installed exactly as required by the system manufacturer. The Contractor shall be diligent to observe the excavation, sealing tape removal, slurry backfill and all other critical requirements.**

(2) **Note: <u>NEVER</u> USE SAND OR ORDINARY EARTH AS A BACKFILL MATERIAL**

D. Pipe grounding system shall be warranted unconditionally by the Contractor for a period of one year from the date of substantial completion.

5. GROUND TESTING PROCEDURE

A. The actual resistance to earth of the service grounding electrode shall be measured by the Contractor via the fall-of-potential method. This testing shall be accomplished after the grounding electrode has been completely installed and the finished grade is achieved.

B. The results of the testing shall be summarized in a written report by the Contractor, which shall be forwarded to the Engineer for review. The report shall also be included with the operation and maintenance manuals for the Owner's information and future reference. This report is to also contain a detailed description and illustrations of the testing procedure, along with the name and model number of the testing instrument(s).

C. For the actual testing, the Contractor shall follow the procedures outlined below. A self-contained instrument such as a "Megger" or "Ground OHMMETER" shall be used that is designed to eliminate the influence of stray current effects on the accuracy of the measurements.

(1) Connect one side of the instrument to the grounding electrode conductor where it connects to the facility main ground bus (point C1). Disconnect and isolate the grounding electrode conductor for the test.

(2) Drive a copperweld reference electrode probe (point C2) into earth between 300 and 500 feet away from C1 and connect to measurement instrument.

(3) Drive the movable grounding probe (C3) into earth at ten equally spaced intervals, in a straight line between C1 and C2 points and note the E/I=R resistance readings on a graph at each point.

(4) The resistance measurements in OHMS taken from the flat part of the curve shall be averaged to determine the true grounding electrode resistance to earth.

(5) At completion of testing, remove reference electrode C2 and all temporary wiring and connections.

(6) If actual measurements of grounding electrode indicate a resistance greater than five OHMS, contact the Engineer for instructions. If deemed necessary by the

Engineer, additional electrodes shall be placed and the measurement process repeated until the desired ground potential achieved.

END OF SECTION 260526

SECTION 260529 - HANGERS AND SUPPORTS FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes the following:

1. Hangers and supports for electrical equipment and systems.
2. Construction requirements for concrete bases.

B. Related Sections include the following:

1. Division 26 Section "Vibration and Seismic Controls for Electrical Systems" for products and installation requirements necessary for compliance with seismic criteria.

1.3 DEFINITIONS

A. EMT: Electrical metallic tubing.

B. IMC: Intermediate metal conduit.

C. RMC: Rigid metal conduit.

1.4 PERFORMANCE REQUIREMENTS

A. Delegated Design: Design supports for multiple raceways, including comprehensive engineering analysis by a qualified professional engineer, using performance requirements and design criteria indicated.

B. Design supports for multiple raceways capable of supporting combined weight of supported systems and its contents.

C. Design equipment supports capable of supporting combined operating weight of supported equipment and connected systems and components.

D. Rated Strength: Adequate in tension, shear, and pullout force to resist maximum loads calculated or imposed for this Project, with a minimum structural safety factor of 5 times the applied force.

1.5 ACTION SUBMITTALS

A. Product Data: For the following:

1. Steel slotted support systems.
2. Nonmetallic slotted support systems.
3. Trapeze hangers. Include Product Data for components.
4. Steel slotted channel systems. Include Product Data for components.
5. Nonmetallic slotted channel systems. Include Product Data for components.
6. Equipment supports.

1.6 QUALITY ASSURANCE

A. Comply with NFPA 70.

1.7 COORDINATION

A. Coordinate size and location of concrete bases. Cast anchor-bolt inserts into bases. Concrete, reinforcement, and formwork requirements are specified in Division 03.

B. Coordinate installation of roof curbs, equipment supports, and roof penetrations. These items are specified in Division 07 Section "Roof Accessories."

PART 2 - PRODUCTS

2.1 SUPPORT, ANCHORAGE, AND ATTACHMENT COMPONENTS

A. Steel Slotted Support Systems: Comply with MFMA-4, factory-fabricated components for field assembly.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. Allied Tube & Conduit.
b. Cooper B-Line, Inc.; a division of Cooper Industries.
c. ERICO International Corporation.
d. GS Metals Corp.
e. Thomas & Betts Corporation.
f. Unistrut; Tyco International, Ltd.
g. Wesanco, Inc.

2. Metallic Coatings: Hot-dip galvanized after fabrication and applied according to MFMA-4.

3. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
4. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

    a. Allied Tube & Conduit.
    b. Cooper B-Line, Inc.; a division of Cooper Industries.
    c. Fabco Plastics Wholesale Limited.
    d. Seasafe, Inc.

5. Fittings and Accessories: Products of channel and angle manufacturer and designed for use with those items.
6. Fitting and Accessory Materials: Same as channels and angles.
7. Rated Strength: Selected to suit applicable load criteria.

B. Raceway and Cable Supports: As described in NECA 1 and NECA 101.

C. Conduit and Cable Support Devices: Steel hangers, clamps, and associated fittings, designed for types and sizes of raceway or cable to be supported.

D. Support for Conductors in Vertical Conduit: Factory-fabricated assembly consisting of threaded body and insulating wedging plug or plugs for non-armored electrical conductors or cables in riser conduits. Plugs shall have number, size, and shape of conductor gripping pieces as required to suit individual conductors or cables supported. Body shall be malleable iron.

E. Structural Steel for Fabricated Supports and Restraints: ASTM A 36/A 36M, steel plates, shapes, and bars; black and galvanized.

F. Mounting, Anchoring, and Attachment Components: Items for fastening electrical items or their supports to building surfaces include the following:

1. Powder-Actuated Fasteners: Threaded-steel stud, for use in hardened portland cement concrete, steel, or wood, with tension, shear, and pullout capacities appropriate for supported loads and building materials where used.

    a. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
    b. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

        1) Hilti Inc.
        2) ITW Ramset/Red Head; a division of Illinois Tool Works, Inc.
        3) MKT Fastening, LLC.
        4) Simpson Strong-Tie Co., Inc.; Masterset Fastening Systems Unit.

2. Mechanical-Expansion Anchors: Insert-wedge-type, [zinc-coated] [stainless] steel, for use in hardened portland cement concrete with tension, shear, and pullout capacities appropriate for supported loads and building materials in which used.

    a. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
    b. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

        1) Cooper B-Line, Inc.; a division of Cooper Industries.
        2) Empire Tool and Manufacturing Co., Inc.
        3) Hilti Inc.
        4) ITW Ramset/Red Head; a division of Illinois Tool Works, Inc.
        5) MKT Fastening, LLC.

3. Concrete Inserts: Steel or malleable-iron, slotted support system units similar to MSS Type 18; complying with MFMA-4 or MSS SP-58.
4. Clamps for Attachment to Steel Structural Elements: MSS SP-58, type suitable for attached structural element.
5. Through Bolts: Structural type, hex head, and high strength. Comply with ASTM A 325.
6. Toggle Bolts: All-steel springhead type.
7. Hanger Rods: Threaded steel.

PART 3 - EXECUTION

3.1 APPLICATION

A. Comply with NECA 1 and NECA 101 for application of hangers and supports for electrical equipment and systems except if requirements in this Section are stricter.

B. Maximum Support Spacing and Minimum Hanger Rod Size for Raceway: Space supports for EMT, IMC, and RMC as required by NFPA 70. Minimum rod size shall be 1/4 inch (6 mm) in diameter.

C. Spring-steel clamps designed for supporting single conduits without bolts may be used for 1-1/2-inch (38-mm) and smaller raceways serving branch circuits and communication systems above suspended ceilings and for fastening raceways to trapeze supports.

3.2 SUPPORT INSTALLATION

A. Comply with NECA 1 and NECA 101 for installation requirements except as specified in this Article.

B. Raceway Support Methods: In addition to methods described in NECA 1, EMT, RMC may be supported by openings through structure members, as permitted in NFPA 70.

C. Strength of Support Assemblies: Where not indicated, select sizes of components so strength will be adequate to carry present and future static loads within specified loading limits. Minimum static design load used for strength determination shall be weight of supported components plus 200 lb (90 kg).

D. Mounting and Anchorage of Surface-Mounted Equipment and Components: Anchor and fasten electrical items and their supports to building structural elements by the following methods unless otherwise indicated by code:

1. To Wood: Fasten with lag screws or through bolts.
2. To New Concrete: Bolt to concrete inserts.
3. To Masonry: Approved toggle-type bolts on hollow masonry units and expansion anchor fasteners on solid masonry units.
4. To Existing Concrete: Expansion anchor fasteners.
5. To Steel: Spring-tension clamps.
6. To Light Steel: Sheet metal screws.
7. Items Mounted on Hollow Walls and Nonstructural Building Surfaces: Mount cabinets, panelboards, disconnect switches, control enclosures, pull and junction boxes, transformers, and other devices on slotted-channel racks attached to substrate by means that meet seismic-restraint strength and anchorage requirements.

E. Drill holes for expansion anchors in concrete at locations and to depths that avoid reinforcing bars.

3.3 INSTALLATION OF FABRICATED METAL SUPPORTS

A. Cut, fit, and place miscellaneous metal supports accurately in location, alignment, and elevation to support and anchor electrical materials and equipment.

B. Field Welding: Comply with AWS D1.1/D1.1M.

3.4 CONCRETE BASES

A. in both directions than supported unit, and so anchors will be a minimum of 10 bolt diameters from edge of the base.

B. Use 3000-psi, 28-day compressive-strength concrete.

C. Anchor equipment to concrete base.

1. Place and secure anchorage devices. Use supported equipment manufacturer's setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.

2. Install anchor bolts to elevations required for proper attachment to supported equipment.
3. Install anchor bolts according to anchor-bolt manufacturer's written instructions.

3.5 PAINTING

A. Touchup: Clean field welds and abraded areas of shop paint. Paint exposed areas immediately after erecting hangers and supports. Use same materials as used for shop painting. Comply with SSPC-PA 1 requirements for touching up field-painted surfaces.

1. Apply paint by brush or spray to provide minimum dry film thickness of 2.0 mils.

B. Galvanized Surfaces: Clean welds, bolted connections, and abraded areas and apply galvanizing-repair paint to comply with ASTM A 780.

END OF SECTION 260529

SECTION 260531 - CABINETS, OUTLET BOXES AND PULL BOXES

1. GENERAL

   A. This section of the specifications covers all electrical cabinets, outlet boxes and pull boxes.

   B. Continuous runs of conduit shall have properly sized pull boxes at least each eighty-five feet of run, or as near as possible to that limit.

2. MATERIALS & INSTALLATION

   A. Cabinets, Outlet and Pull Boxes:

      (1) Cabinets for lighting and power, telephone, pull boxes, outlet boxes, or any other purposes specified or shown on the Contract Drawings, shall be constructed of code gauge, galvanized steel with sides formed and corner seams riveted or welded before galvanizing. Boxes assembled with sheet metal screws will not be accepted. Pull boxes shall include all boxes used to reduce the run of conduit to the required number of feet or bends, supports, taps, troughs, and similar applications and shall also be constructed as specified above.

      (2) All cabinets and boxes for NEMA 1 and 1A application shall be provided with knockouts, as necessary, or shall be cut in the field by approved cutting tools which will provide a clean, symmetrically cut opening. All boxes, except panelboards, shall be provided with code gauge fronts with hex head or pan head screw fasteners. Outdoor cabinets shall be hinged cover with pad locking provisions. Fronts for panelboards shall be as specified for panelboards.

      (3) Ceiling outlet boxes shall be galvanized steel, 4" octagonal, not less than 2 1/8" deep, with lugs or ears to secure covers. Those for use with ceiling lighting fixtures shall be fitted with 3/8" fixture studs fastened to the back of the boxes, where applicable. Provide adequate support with at least a 2 x safety factor for the anticipated fixture weight.

      (4) Special size concealed outlet boxes for clocks, speakers, alarms, panels, etc., shall be provided by the manufacturer of the equipment.

      (5) Floor outlet boxes shall be as specified in Section 262726, fully adjustable unless noted or specified otherwise.

      (6) Unless otherwise noted on the drawings or in the specifications, outlet boxes shall be installed at the following heights to centerline of box:

         Wall Switches, Control Stations .....3'-10"
         Convenience Outlets .....1'-6"
         Convenience Outlets - Above Counters .....Bottom at 2" above top of backsplash

T.V. Outlets .....1'-6"
T.V. Outlets - At Wall Brackets .....7'-2"
Desk Telephones.....1'-6"
Wall-Mounted Telephone.....4'-6"
Weatherproof Outlets .....2'-2"
Disconnects, Branch Panelboards .....5'-0" max. to centerline
Fire Alarm Manual Stations.....3'-10"
Fire Alarm Audio and/or Visual Units80" AFF to bottom of device or 6" below ceiling, whichever is lo

(7) The location of outlets, as shown on the drawings, shall be considered as approximate only. It shall be incumbent upon this Contractor to study the general building drawings, with relation to spaces surrounding each outlet, in order to make his work fit the work of others and in order that when the devices or fixtures are installed, they will be symmetrically located and will not interfere with any other work or equipment. Any change in fixture or layout shall be coordinated with and approved by the Engineer before this change is made. Regardless of the orientation shown on the drawings, all devices shall be easily accessible when installed.

(8) Boxes installed in fire rated assemblies shall not compromise the rating of the assembly. The Contractor is responsible for identifying assembly ratings and construction requirements prior to rough-in.

a. Listed single and double gang metallic outlet and switch boxes with metallic or nonmetallic cover plates may be used in bearing and nonbearing wood stud and steel stud walls with rating not exceeding 2 h. The boxes shall be fastened to the studs with the openings in the wallboard facing cut so that the clearance between the boxes and the wallboard do not exceed 1/8 in. The boxes shall be installed so that the surface area of individual boxes do not exceed 16 sq in, and the aggregate surface area of the boxes do not exceed 100 sq in per 100 sq ft of wall surface unless approved alternate protection materials are used.

b. Boxes located on opposite sides of walls or partitions shall be separated by a minimum horizontal distance of 24 in. This minimum separation distance between the boxes may be reduced when listed Wall Opening Protective Materials are installed according to the requirements of their Classification.

c. Boxes installed on opposite sides of walls or partitions of staggered stud construction shall have listed Wall Opening Protective Materials installed with the boxes in accordance with Classification requirements for the protective materials.

d. All installation shall be done in accordance with AHJ requirements.

(9) All outlets, pull boxes, junction boxes, cabinets, etc., shall be sized per the current edition of the National Electrical Code.

B. Cabinets, outlet boxes and junction or pull boxes shall be threaded for rigid-threaded conduit, dust-tight, vapor-tight or weatherproof as required for areas other than for NEMA 1 or 1A application. These shall be as manufactured by Crouse-Hinds, Appleton, Killark, or approved equivalent.

(1) NEMA 1 or 1A cabinets, outlet boxes or pull or junction boxes shall be as manufactured by Appleton, Steel City, T & B, or approved equivalent.

(2) Outlet boxes for switches, receptacles, telephone, etc., concealed in walls shall be galvanized steel, 2" X 4" X 2" with plaster cover for the number of devices as required. Where outlet boxes are installed in walls of glazed tile, brick, concrete block, or other masonry which will not be covered with plaster or in walls covered by wood wainscot or paneling, deep sectional masonry boxes shall be used and they shall be completely covered with the plates or lighting fixtures. This Contractor shall cooperate with the brick layers, block layers and carpenters to insure that the outlet boxes are installed straight and snugly in the walls. Receptacles shall be set vertically in walls, unless noted otherwise.

(3) Outlet boxes mounted in glazed tile, brick, concrete block or other types of masonry walls shall be mounted above or below the mortar joint. Do Not Split The Mortar Joint.

(4) Boxes for more than two devices shall be for the number of devices required and shall be one piece. No ganging of single switch boxes will be allowed.

(5) Outlets provided shall have only the holes necessary to accommodate the conduit at the point of installation and shall be rigidly secure in position. Boxes with knockouts removed and openings not used shall be replaced or be provided with a listed knockout closure.

(6) Openings for conduit entrance in cabinets and boxes shall be prefabricated, punched, drilled and/or reamed. The use of a cutting torch for this purpose is prohibited.

END OF SECTION 260531

SECTION 260533 - RACEWAYS & FITTINGS

1. GENERAL

A. This section is intended to specify the raceways, conduit, conduit fittings, hangers, junction boxes, splice boxes, specialties and related items necessary to complete the work as shown on the drawings and specified herein.

B. This section specifies basic materials and methods and is a part of each Division 26, 27 and 28 that implies or refers to electrical raceways specified therein.

C. The types of raceways specified in this section include the following:

(1) Steel electrical metallic tubing. (E.M.T.)
(2) Rigid galvanized steel conduit. (G.R.S.)
(3) Intermediate metal conduit (I.M.C.).
(4) Rigid aluminum conduit.
(5) Flexible metal conduit (aluminum or steel)
(6) Liquid - tight flexible metal conduit.
(7) Rigid nonmetallic conduit.
(8) Surface metal raceways.
(9) Wireways, wall ducts and trench ducts.
(10) Cable tray or cable trough.
(11) Duct banks, and their construction.

D. All raceways, as listed in 1C. above and otherwise specified herein shall be provided in compliance with latest editions of all applicable U.L., NEMA, N.E.C. and A.N.S.I. standards. All conduit, raceways and fittings shall be Underwriters Laboratories listed and labeled, or bear the listing of an agency acceptable to the local authority having jurisdiction.

E. Conduit and raceways, as well as supporting inserts in contact with or enclosed in concrete shall comply with the latest edition of all A.C.I. standards and the equipment manufacturer's recommendations for such work.

F. P.V.C. or other non-metallic conduit shall be rated for the maximum operating temperature that could be developed by the conductors it encloses, while in normal operation.

G. The decision of the Engineer shall be final and binding in any case where a question or inquiry arises regarding the suitability of a particular installation or application of raceways, supports or materials, if other than outlined herein.

H. Minimum size of conduit shall be 3/4" trade size. All conduit and raceways shall be sized for the number of conductors contained, in accord with the latest edition of the National Electrical Code or any other applicable standards.

I. The installer of raceway systems shall avoid the use of dissimilar metals within raceway installations that would result in galvanic-action corrosion.

2. MATERIALS

A. STEEL ELECTRICAL METALLIC TUBING

(1) Electrical metallic tubing, (E.M.T.) of corrosion-resistant steel construction shall be permitted for concealed installation in dry interior locations. Electrical metallic tubing shall not be installed in concrete slabs or where exposed to physical damage. Electrical metallic tubing shall be permitted for exposed work in mechanical and electrical rooms and other exposed structure areas where not subjected to physical damage, as determined by the Engineer.

B. RIGID GALVANIZED STEEL CONDUIT

(1) Rigid galvanized steel conduit shall be used where subject to physical damage for exposed work in mechanical spaces, within factory or other industrial work areas, for exposed fit-up work on machinery, for exposed exterior damp or wet location work, in hazardous atmospheres, in exterior underground locations where installed beneath roadways, where ells occur in underground P.V.C. conduits, or where turning out of concrete encased duct banks, and at other locations as specifically called out on the drawings.

(2) Rigid galvanized steel conduit shall be used for all building interior power wiring or cables of over 600 Volts.

C. INTERMEDIATE METAL CONDUIT

(1) Unless otherwise indicated on the drawings, intermediate metal conduit (I.M.C.) may be used in any location in place of rigid galvanized steel conduit, as permitted by codes, and as approved by the Engineer.

D. RIGID ALUMINUM CONDUIT

(1) Rigid aluminum conduit, shall be permitted for installation indoors in dry locations only. Under no conditions shall it be cast into concrete slabs or pass thru construction where prolonged contact will degrade the aluminum. All ells used in rigid aluminum conduit systems shall be rigid galvanized steel. Rigid aluminum conduit shall always be used for power wiring greater than 5 KVA and higher than 60 Hz frequency.

E. FLEXIBLE METAL CONDUIT

(1) Unless specifically noted otherwise, flexible conduit shall be permitted for final connections to fixtures or equipment only. Flexible conduit may be constructed of aluminum or steel and shall be installed with connectors designed for the purpose.

All flexible metal conduit shall be installed as a single piece. No joints shall be permitted. Flexible conduit shall not be used in wet or dusty locations or where exposed to oil, water or other damaging environments. An equipment grounding conductor or bonding jumper shall be used at all flexible conduit installations. Maximum permitted length of flexible metal conduit shall be 72” unless approved in writing by the Engineer.

F. LIQUIDTIGHT FLEXIBLE METAL CONDUIT

(1) Unless specifically noted otherwise, liquidtight flexible conduit shall be permitted for final connections to furniture, fixtures or equipment only. Weatherproof flexible metal conduit shall be wound from a single strip of steel, neoprene covered, equivalent to "Liquatite" or "Sealtite" Type "UA". It shall be installed in such a manner that it will not tend to pull away from the connectors. Provide strain relief fittings equivalent to "Kellems" as required where subject to vibration. Flexible connections to motors in dusty areas shall be dust-tight. Connections in areas exposed to the weather shall be weatherproof. Liquidtight flexible non-metallic conduit is not allowed unless approved by the Engineer.

G. RIGID NON-METALLIC CONDUIT

(1) Rigid non metallic conduit shall be constructed of P.V.C, nominally schedule 40 weight, except where encased in concrete, where it may be "EB" type. If installation will enclose utility company provided conductors, verify exact type required and install in accord with their standards, if more stringent than this specification.

(2) Rigid non-metallic conduit may be used in exterior wet or damp locations where installed underslab or underground. It shall not be run in interior locations, except with special permission from the Engineer for use in corrosive environments, and then only if protected from physical damage. No rigid nonmetallic conduit may be installed in environmental air plenums or cast into above-grade concrete slabs. No rigid nonmetallic conduit may be installed in locations where the ambient temperature might exceed the rating of the raceway.

(3) Where rigid non metallic conduit is placed underground, as for feeder circuits, secondaries or branch circuit runs and where ell is made upward thru a slab on grade, transition the turning ell and the riser to rigid steel conduit to a height of 6" above the concrete slab. Transition may then be made to E.M.T or other approved conduit for remainder of run.

(4) Flexible nonmetallic conduit shall not be used, except by special permission, obtained in writing from the Engineer.

(5) Provide equipment grounding conductors of copper, sized as required by codes, in all circuits installed in rigid nonmetallic raceways.

H. SURFACE METAL RACEWAYS

(1) Surface metal raceways shall be constructed of code gauge corrosion-resistant galvanized steel or aluminum extrusions, and finished in an ivory, buff or grey color as selected by the Architect. Finishes shall be suitable for field painting, prepared by the installing contractor as necessary.

(2) Surface metal raceways, where used as raceways only, shall be sized for the conductors indicated. Nominal minimum size of such raceways shall be equivalent to Wiremold Co. Series #700, or equivalent by Isotrol or other approved manufacturer.

(3) Surface metal raceways to be furnished with integral receptacles shall have Simplex Nema 5-20R outlets spaced on centers as indicated on plans. These shall be Wiremold Co. #2200 Series or equivalent Isotrol or other approved manufacturer.

(4) Surface metal raceways and all components and fittings shall be furnished by a single manufacturer, wherever practical. All trim and cover fittings, flush feed boxes, splices, outlet fittings, etc, necessary for a complete installation shall be provided by the installing contractor. These raceways shall be rigidly mounted with approved fasteners on not to exceed 24" centers in a run, or 6" from ends and on either side of a corner. Refer to plans for notations on exact types of these raceways and outlet configurations.

I. WIREWAYS, WALL DUCT, FLUSH FLOOR TRENCH DUCT

(1) WIREWAYS

a. Wireways of painted steel construction shall be corrosion-resistant, moisture and oil resistant where indicated or necessary. Wireways shall be furnished in nominal sizes of 2 1/2" X 2 1/2", 4" X 4", 6"" X 6", 8" X 8" or 12" X 12", as indicated on plans. Furnish with hinged covers on all runs and removable covers on all fittings, to allow a continuous unobstructed path for conductor installation. Provide knockouts on all runs, unless otherwise indicated or prohibited by codes.

b. Provide wireways with hangers of same manufacturer, installed so as to allow unobstructed access to wireway interior. Install at not to exceed 8'-0" centers, closer as needed at fittings and turns. Use 1/4" rod hangers minimum for up to 4"X4", 3/8" rod minimum up to 8"X8", 1/2" rod minimum for 12" X 12".

c. Wireways shall be equivalent to Square "D" Co. "LD" series, as a minimum standard of construction and quality.

(2) WALL DUCTS

a. Where wall duct type raceways are indicated to be installed flush, they shall be a minimum 3 1/2" deep by 10" wide (or 18" width, as indicated), furnished with screw covers to overlap flange 1" on each side. Covers shall be furnished in

nominal 3'-0" lengths. Provide fully grommeted openings or bushed nipples as needed in coverplates to pass cables thru. Where indicated or required, provide transition fittings between horizontal runs of wireway and wall ducts to properly interface each raceway system.

b. Where wall ducts are installed flush either vertically or horizontally as a collector duct, provide proper blocking and support in stud walls, adding a layer of studs as needed to prevent undercutting major structural elements of walls. Trim flange shall be set tight to wall surface with 1/16" tolerance each way.

c. Wall ducts, if indicated to be surface mounted, shall be furnished with flangeless coverplates.

d. All completed systems shall be provided with a factory prime painted finish, suitable for field finish painting.

e. Wall ducts shall be equivalent to Square D Company "RWT" Series, as a standard of construction and quality.

(3) TRENCH DUCTS

a. Trench duct is to be installed flush with finished concrete floor slab with a vertical tolerance to adjacent surfaces of 1/16" plus or minus. Nominal depth of trench duct shall be adjustable from 2 3/8" to 3 1/2", minimum 12" width unless otherwise noted on plans.

b. Trench duct shall be constructed of code-gauge steel, 14 gauge minimum, with corrosion resistant finish. Surfaces of duct or fittings in contact with concrete shall be painted with two coats of "Asphaltum" or receive equivalent coating or taping prior to placement of concrete.

c. Furnish trench duct with flat turns, riser transition fittings to wall duct or panelboard as shown, concrete tight couplings, internal barriers as required to separate services, reducers, end closers, tees and all other fittings as indicated or required.

d. Furnish coverplates of aluminum, 1/4" thickness minimum, with flush fasteners in nominal 24" lengths. Furnish grommeted openings or nipples with insulated bushings as required. Coverplates shall not deflect more than .085" with application of a 200 pound concentrated load. Any compartment over 16" in width shall have additional coverplate support, to meet the deflection criteria above.

e. Provide (as standard) an aluminum tile trim flange (verify and coordinate with floor finishes). Refer to architectural drawings, where applicable.

f. Trench duct and coverplates shall be equivalent to Square "D" Company RSV/RCP-AL series, as a standard of quality and construction.

J. CABLE TRAY OR CABLE TROUGH

(1) Cable tray shall be furnished in all-aluminum construction or galvanized steel construction, as noted and sized on the drawings.

(2) Galvanized finishes on tray shall be hot-dipped after fabrication for all trays in exterior locations. Mill finished galvanizing may be used where tray is installed indoors in dry locations.

(3) The installing contractor shall carefully follow the manufacturer's recommendations for hanger sizing and hanger support spacing. The weight per linear foot of tray, fully loaded with a 200% safety factor shall be accounted for in sizing hangers. Refer to manufacturer's instructions and/or the drawings, as applicable for hangers and supports. In no case shall supports be spaced further than 8'-0" apart.

(4) Cable tray shall be of the ladder type with rungs spaced 12" apart. Side rails shall be of I-Beam or C-Channel construction with welded rungs, depth and width as indicated on the drawings.

(5) Cable trough shall be similar to cable tray, except bottom shall be a ribbed solid piece, depth and width as indicated on the drawings.

(6) Cable tray or trough shall be provided with all required fittings for a complete installation. Fittings shall include, but not be limited to: Horizontal and vertical elbows and tees, smooth dropout fittings, end closure plates, fixed (or adjustable) splices as needed for field offsets, reducers, barriers or box connector flanges.

(7) Cable tray and trough shall be equivalent to Square "D" Company Series CLA/CLG (ladder tray) or CTA/CTG (trough) as a standard of quality and construction.

K. OPEN WIRE MESH CABLETRAY

(1) Section includes continuous, rigid, welded steel wire mesh cable management system.

(2) References

a. ASTM A 123 - Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.

b. ASTM A 510 - General Requirements for Wire Rods and Coarse Round Wire, Carbon Steel.

c. ASTM B 633 - Electrodeposited Coatings of Zinc on Iron and Steel.

(3) Design Requirements

a. Maximum Deflection Between Supports: L/240.

(4) Submittals

a. Product Data: Submit manufacturer's product data, including UL classification.

b. Shop Drawings: Submit shop drawings indicating materials, finish, dimensions, and accessories. Show layout, support, and installation details.

c. Manufacturer Qualifications: Submit manufacturer's certification indicating ISO 9002 quality certified.

(5) Delivery, Storage and Handling

a. Delivery: Deliver materials to site in manufacturer's original, unopened containers and packaging, with labels clearly indicating manufacturer and material.

b. Storage: Store materials in a dry area indoors, protected from damage, and in accordance with manufacturer's instructions.

c. Handling: Protect materials and finishes during handling and installation to prevent damage.

(6) Manufacturer

a. Cablofil, Inc., 8319 State Route 4, Mascoutah, IL, 62258. Phone (618) 566-3230. Toll Free (800) 658-4641. Fax (618) 566-3250. www.cablofil.com, or approved equivalent. Part numbers included in this section are not meant to restrict truly equivalent manufacturers.

(7) Open Wire Mesh Cabletray System

a. Description: Continuous, rigid, welded steel wire mesh cable management system.

1) Mesh System: Permitting continuous ventilation of cables and maximum dissipation of heat.

2) Safety Edge: Continuous safety edge T-welded wire lip.

3) Wire Mesh: Welded at all intersections.

b. UL Classification: Straight sections 4” x 8”, 12”, and 18 inches.

c. Material: Carbon steel wire, ASTM A 510, Grade 1008. Wire welded, bent, and surface treated after manufacture.

d. Finish for Carbon Steel Wire: Finish applied after welding and bending of mesh.

1) Hot-Dip Galvanizing: ASTM A 123. (Only in exterior, wet or corrosive locations)

2) Flat Black: Powder painted surface treatment using ASA 61 black polyester coating. (In indoor dry locations)

e. Nominal Dimensions:

1) Nominal Mesh: 2 x 4 inches.

2) Nominal Straight Section Lengths: 80 inches and 118 inches.

3) Width: [6 inches] [8 inches] [12 inches] [18 inches] [24 inches].

4) Depth: Four inches in depth for all but 6” wide, which shall be 2” depth.

5) Wire Diameter: Nominal .177 inch, minimum.

f. Fittings: Field fabricated in accordance with manufacturer's instructions from straight sections.

g. Support System: Standard.

1) Wall Installation: CS Bracket. Maximum tray width of 12 inches (300 mm).

2) Trapeze Mounting to Ceilings: CS Profile. Maximum tray width of 18 inches (450 mm).

3) Ceiling Installation: CSC Bracket. Maximum tray width of 12 inches (300 mm).
4) Fasteners: As required by tray widths. To be furnished by manufacturer.

h. Hardware: Hardware, including splice connectors, grounding fittings and support components to be furnished by the manufacturer.

i. Grounding: GTA-2-2 grounding lugs for attachment on tray of continuous ground conductor fixing system.

(8) Examination

a. Examine areas to receive cable management system. Notify the Engineer of conditions that would adversely affect the installation or subsequent utilization of

the system. Do not proceed with installation until unsatisfactory conditions are corrected.

(9) Installation

a. Install open wire mesh cabletray system at locations indicated on the drawings and in accordance with manufacturer's instructions.

b. Load Span Criteria: Install open wire mesh cabletray system in accordance with span load criteria of L/240.

c. Cutting:

1) Cut wires in accordance with manufacturer's instructions.

2) Cut wires with side action bolt cutters to ensure integrity of galvanic protective layer.

3) Cut each wire with 1 clean cut to eliminate grinding or touch-up.

d. Install open wire mesh cabletray system using hardware, splice connectors, support components, and accessories furnished by manufacturer.

e. Coordinate with other trades to provide as straight and accessible runs as possible. Not all offsets are shown on drawings, but Contractor shall make accessible offsets as required around ductwork, structure, piping or other interferences as required.

L. DUCT BANKS

(1) Duct banks are defined as a raceway or raceways installed in underground locations, enclosed in a steel-reinforced concrete envelope. They shall be installed where indicated on the drawings or otherwise required.

(2) All concrete used in duct bank construction shall be 3000 PSI minimum 28 day compressive strength unless otherwise noted, in accord with latest A.C.I. standards. Testing of concrete shall be the responsibility of the Contractor, as directed by the engineer. Place concrete against undisturbed earth, or provide forming as needed.

(3) Duct bank raceways shall receive a minimum of 3" concrete cover all sides. Minimum size of any duct bank shall be 12" x 12" square, in cross section. In all cases, local and national codes shall apply to duct bank construction where they exceed the requirements of this specification.

(4) Each corner of duct bank shall receive a minimum No. 4 steel reinforcing bar with 2" minimum concrete cover on all sides. Lap bars fifteen diameters at all splices. Provide stirrup bars bury 60” on center to tie bars together. Stirrups may be #3 bar.

Reinforcing steel shall be rigidly supported during pour and vibration, and shall be constructed to ASTM standards.

(5) Support for encased raceways shall be as recommended by raceway manufacturer, spaced 8'-0" maximum on centers, rigidly fastened to prevent floating of ducts during concrete pours. Supports shall be of a material compatible with the raceway, and shall be of the interlocking type, forming a rigidly braced installation. Provide base type and intermediate type spacers to suit conduit configurations and sizes.

(6) Where rigid nonmetallic raceways leave concrete duct banks, a transition to rigid steel conduit shall be made 18" inside the concrete envelope. Under no circumstances shall PVC, EB or similar ducts exit concrete envelope, except where duct bank ties into a manhole wall. Provide bell ends at such terminations and dowel duct bank rebars 4" into manhole wall with non-shrink grout. Refer to details on drawings, as applicable. Slope all raceways within duct bank systems such that they shall drain into manholes or pull boxes. Provide proper drainage at manholes or pull boxes to prevent water accumulation.

(7) Where ducts transition thru manholes, pull boxes or at terminating end, each duct shall be specifically identified. A nomenclature as shown on the drawings or as agreed upon by the installer and engineer shall be utilized to identify each individual duct. A permanent means of identifying each duct, such as engraved lamacoid plates or stamped metal tags shall be used.

M. RACEWAY FITTINGS

(1) Raceway fittings (or condulets) shall be of gray iron, malleable iron or heavy copper-free cast aluminum. They shall be furnished in proper configurations, avoiding excessive plugged openings. Any openings that are left shall be properly plugged. All coverplates shall be gasketed with neoprene or similar approved materials, rated for the environment.

(2) Where required, raceway fittings shall be provided in explosion-proof configurations rated for the atmosphere. Place conduit seal off fittings at each device in accord with applicable codes. Seal off fittings shall be packed with wadding, and poured with an approved non-shrink sealing compound.

(3) Where conduit transitions in a run from a cold to a warm environment, (such as at a freezer, refrigerator or exterior wall) sealoff fittings shall be placed on the warm side immediately at the boundary to prevent migration of condensation within raceway systems.

(4) Expansion fittings shall be provided at all locations where conduits or other raceways cross over expansion joints. Provide copper ground bonding jumpers across expansion fittings.

(5) Conduit bodies, junction boxes and fittings shall be dust tight and threaded for dusty areas, weatherproof for exterior locations and vapor tight for damp areas. Conduit fittings shall be as manufactured by Crouse Hinds, Appleton, Killark or approved equivalent. All surface mounted conduit fittings as with "FS", "FD", "GUB" Types etc., shall be provided with mounting hubs.

(6) Where lighting fixtures, appliances or wiring devices are to be suspended from ceiling outlet boxes, they shall be provided with 3/4" rigid conduit pendants. Outlet boxes shall be malleable iron, provided with self-aligning covers with swivel ball joint and No. 14 gauge steel locking ring. Provide safety chain between building structure and ballast housing of light fixtures for all fixtures, appliances or devices greater than 10 lbs weight. Fixtures shall be installed plumb and level.

(7) Fittings for threaded raceways shall be tapered thread with all burrs removed, reamed ends and cutting oil wiped clean.

(8) Fittings for E.M.T. conduit shall be of the compression type. Conduit stops shall be formed in center of couplings. All EMT connectors and couplings shall be of formed steel construction.

(9) Indentation or die-cast fittings shall not be permitted in any raceway system.

(10) All conduit fittings shall be securely tightened. All threaded fittings shall be engaged seven full threads. Fasteners shall be properly torqued to manufacturer's recommendations.

N. SUPPORTS AND HANGERS

(1) Supports and hangers shall be installed in accord with all applicable codes and standards. They shall be corrosion - resistant, galvanized or furnished with an equivalent protective coating. All electrical raceways shall be hung independently from the building structure with U.L. listed and approved materials. Hangers and supports depending on the support systems of other trades' work shall not be permitted, except with specific approval in writing from the Engineer. The use of tie wire for support or fastening of any raceway system is prohibited. Perforated metal tape shall not be used for raceway support.

(2) No raceway shall be installed on acoustic tile ceiling tees, or in any location that will impair the functioning, access or code-required clearances for any equipment or system.

(3) Supports for raceways shall be of materials compatible with the raceway, of malleable iron, spring steel, stamped steel or other approved material. Die-cast fittings are not permitted for supports.

(4) The installing contractor shall provide all necessary supports and braces for raceways, in a rigid and safe installation, complying with all applicable codes.

(5) Individual conduits run on building walls or equipment shall be secured by one hole galvanized malleable iron or stamped steel pipe strap or "minerallac" 2-piece straps. The straps are to be anchored by an approved means such as expansion anchors, toggle bolts, through bolts, etc. Where required by codes or other standards, provide spacers behind mounting clamps to space conduits off walls.

(6) Individual conduits run on building steel shall be secured by means of clamp supports similar and equal to those manufactured by the C.C. Korn Company, Elcen Co., B-Line or approved equivalent. Provide korn clamps, bulb tee clamps, flange clamps, beam clamps, "minerallacs", etc.

(7) Where feasible, vertical and/or horizontal runs of conduit shall be grouped in common hangers on "trapezes" of channel stock as manufactured by "Unistrut" or equivalent, 1-5/8" minimum depth, 12 gauge. Utilize conduit clamps appropriate to the channel.

(8) Channel strut systems for supporting electrical equipment or raceways in outdoor wet or corrosive locations shall be constructed of 12 gauge minimum hot dip galvanized steel with 9/16" diameter holes on 8" centers, with finish coat of paint as manufactured by Unistrut, B-Line, Kindorf, or approved equivalent. In indoor dry locations, factory finish paint will be acceptable.

(9) The minimum diameter of round all-thread steel rods used for hangers and supports shall be 1/4", 20 threads per inch. All-thread rod shall be furnished with a corrosion-resistant finish.

(10) Welding directly on conduit or fittings is <u>not</u> permitted.

(11) Provide riser support clamps for vertical conduit runs. Riser support clamps shall be of heavy gauge steel construction. Install riser support clamps at each floor level penetration, or as otherwise required.

(12) Provide conduit cable support clamps for vertical conductor runs as required or indicated on plans. Clamps to be insulating wedging plug, with malleable iron support ring. Install within properly sized and anchored junction box.

(13) Spring steel clips and fittings such as those manufactured by HITT-Thomas, Caddy-Erico, or approved equivalent, with black oxide finish are permitted in any indoor dry location for concealed work, where acceptable to the local authority having jurisdiction.

3. INSTALLATION

A. This Contractor shall lay out and install all conduit systems so as to avoid any other service or systems, the proximity of which may prove injurious to the conduit, or conductors which it confines. All conduit systems, except those otherwise specifically shown to the contrary, shall be concealed in the building construction or run above

ceilings. Size of all conduit shall as a minimum conform to the National Electrical Code, unless larger size is indicated on the Contract Drawings.

B. No conduit larger shall be installed in poured concrete slabs except with permission of the structural engineer. All other shall be held below slab. Conduit shall be held at least 6" from flues or hot water pipes.

C. All exposed conduit shall be installed with runs parallel or perpendicular to walls, structural members or intersections of vertical planes and ceilings, with right angle turns consisting of cast metal fittings or symmetrical bends unless otherwise shown. All conduit shall have supports spaced not more than eight feet apart.

D. Conduit shall be installed in such a manner so as to insure against collection of trapped condensation. All runs of conduit shall be arranged so as to be devoid of traps. Trapped conduit runs shall be provided with explosion proof drains at low points. Runs of conduit between junctions shall not have more than the equivalent of three 90º bends.

E. Junction boxes shall be installed so that conduit runs will not exceed 85', as shown on the Contract Drawings.

F. Underground electric, cable TV, telephone service or other rigid steel conduit and underfloor rigid steel conduit below the concrete floor slab shall be painted with two coats of bitumastic paint, such as "Asphaltum".

G. All underground or underfloor conduits shall be swabbed free of all moisture and debris before conductors are pulled.

H. At least two 1 inch and four 3/4 inch conduits shall be stubbed from flush-mounted panelboards into the nearest accessible area for future use. Provide suitable closures for these stubs. Identify each stub with a suitable hang tag.

I. Install electrical raceways in accordance with manufacturer's written instructions, applicable requirements of latest edition of the N.E.C., and NECA "Standard of Installation", complying with recognized industry practices.

J. Coordinate with other trades, including metal and concrete deck trades, as necessary to interface installation of electrical raceways and components.

K. Level and square raceway runs, and install at proper elevations and required heights. Hold tight to structure or route through joists webbing wherever possible, to maximize available space and not restrict other trades.

L. Complete installation of electrical raceways before starting installation of cables or wires within raceways.

M. All underground conduits shall be buried to minimum depth of 24" from the top of the concrete encasement or raceway to finished grade, unless otherwise noted on plans. Observe minimum burial requirements of local utility company where their standards or regulations apply. Conduits containing primary power conductors, (higher than 600 volts to ground) shall be 42" to top below finished grade, unless otherwise noted on plans.

N. All raceways shall be installed to maintain a minimum of 4” clearance below roof decking.

4. SPECIALTIES

A. All EMT terminations at junction boxes, panels, etc. shall be made with case hardened locknuts and appropriate fittings, with insulated throat liners. Insulating terminations shall be manufactured as a single unit. The use of split sleeve insulators is not permitted.

B. All rigid conduit, except main and branch feeders, shall have heavy fiber insulating bushings reinforced with double locknuts. All branch and main feeders shall have insulated bushings with grounding lugs and shall be bonded to enclosures with appropriately sized copper jumpers, except at pad mounted transformers. Bonding jumpers shall be installed as required by the N.E.C. and other applicable codes.

C. All conduit stubbed through floor during construction shall have openings protected with plastic caps approved for this purpose. Connections on both ends of all flexible conduit shall be equivalent to Thomas and Betts, Ideal, Appleton, Efcor, or approved equivalent, rated for the environment.

D. All pulling lines left in open conduit systems shall be non-metallic, left securely tied off at each end.

E. Where spare raceways terminate in switchboards or motor control centers a fishtape barrier shall be provided.

END OF SECTION 260533

SECTION 260553 - IDENTIFICATIONS

1. GENERAL

A. Equipment, disconnect switches, motor starters, pushbutton stations, special device plates, and similar materials shall be clearly marked as to their function and use. Markings shall be applied neatly and conspicuously to the front of each item of equipment with 1/2" white lamacoid plate (or equivalent) with black (or red for emergency power) letters 1/4" high.

B. The Contractor shall provide clearly legible typewritten directories in each electrical panel indicating the area, item of equipment, etc., controlled by each switch, breaker, fuse, etc. These directories are to be inserted into plastic card holders in each panel. The Contractor shall be required to demonstrate the accuracy of the panel directory for a random sampling of circuits in each panelboard as directed in the field by the Engineer with corrections made immediately so it is imperative that care be taken during installation to insure 100% accurate directories.
   (1) Room numbers shall match the final numbering as indicated by building signage and owner-approved numbering scheme.
   (2) The contractor shall provide electronic copies of all final schedules in Excel or Word format at project closeout.

C. All circuit breakers and disconnects serving fire alarm equipment shall be painted red and clearly labeled as Fire Alarm Circuits.

D. Branch circuit panelboards and switch gear shall be provided with a white lamacoid plastic plate with 1/2" black (or red for emergency power) letters for panel designation and 1/4" letters showing voltage and feeder information. Branch circuit switches shall be designated as to function. Panelboard and switchgear labels shall indicate the source they are fed from, and the circuit number at that source. Panelboards shall also indicate color coding of the branch circuit phase conductors supplied. Clearly indicate the exact label legend to be furnished with each panelboard and switchgear on the shop drawings for each item of equipment prior to submission of shop drawings.

EXAMPLE:

PANEL “XYZ” FED FROM “MDP – 2” 120/ 208/ 3PH/ 4W – 225A BLACK-RED-BLUE CONDUCTORS

E. Where branch circuit panelboards and switchgear are connected to an emergency source, the lamacoid plate shall be red, and the word "emergency" shall be incorporated into the legend. In healthcare applications, the NEC – designated branch (life safety, critical or equipment branch) shall also be incorporated into the legend, all in ¼” letters.

Also provide similar plates and legends for automatic transfer switches, and equipment disconnects 100 amps and larger.

F. Lamacoid plates shall be located at center of top of trim for branch circuit panels, switch gear, and centered at side for branch circuit switches. Fasten with self-tapping stainless-steel screws or other approved method.

G. The building service disconnect(s) shall be marked with the maximum available fault current available at that location in accordance with NEC Article 110. If a fault current study is not required by this contract, the Contractor shall obtain fault current availability data from the utility company. This requirement applies to both new and existing services if any distribution equipment is changed.

H. All receptacles and light switches shall be labelled with the circuit number. Labelling shall be by printed adhesive label with clear background and black capitalized 3/16” high lettering.

I. All disconnects, enclosed breakers, motor starters and VFDs shall be labelled with the supplying circuit number. Markings shall be applied neatly and conspicuously to the front of each item of equipment with 1/2" white lamacoid plate (or equivalent) with black (or red for emergency power) letters 1/4" high.

J. All fire alarm and security addressable devices shall be labelled with their unique address. Labelling shall be by printed adhesive label with clear background and black capitalized 3/16” high lettering.

END OF SECTION 260553

SECTION 260573 - ELECTRICAL STUDIES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

B. All services, materials and installation shall comply with the owners' construction standards. Special attention shall be given to Divisions 02, 16 and 17. In the event of a conflict between these standards and the Contract Documents the most stringent requirement shall be met.

C. The Contractor is directed to examine each and every section of these specifications, all drawings relating to the Contract Documents, any and all Addenda, etc., for work described elsewhere that may relate to the provision of the work described herein. Materials and performance requirements are specified elsewhere herein that relate to these systems.

D. Each Electrical Contractor's attention is directed to Section 260501 - General Provisions, Electrical, and all other Contract Documents as they apply to his work.

1.2 SUMMARY

A. This Section includes computer-based, fault-current, arc flash and overcurrent protective device coordination studies. Protective devices shall be set based on results of the protective device coordination study.

B. The contractor shall field verify ratings, lengths, sizes, etc of equipment required to complete the study including feeder sizes, fuse ratings, elevator and equipment horsepowers, etc.

C. Electrical Studies shall be performed by the Low-Voltage Switchboard manufacturer. All Electrical Studies required by this specification shall be completed within five (5) weeks from award of project. The Electrical Contractor shall provide all required data to Low-Voltage Switchboard manufacturer within one (1) week and the manufacturer will have four (4) weeks to complete the studies.

D. A licensed professional engineer employee of the Low-Voltage Switchboard manufacturer shall provide electrical power system studies for the project using the latest version of one of the approved software packages. The software model files shall be submitted with the report. The analysis shall follow the latest IEEE 1584 guidelines.

E. Studies specified herein must be submitted and approved prior to release of any affected equipment. Revisions to equipment or devices necessary to meet study recommendations shall be at the Manufacturer's expense.

F. All adjustments and settings recommended by these studies shall be made prior to any testing.

G. The analysis shall be submitted to the engineer of record prior to receiving final approval of the distribution equipment shop drawings and/or prior to release of equipment drawings for manufacturing.

1.3 SUBMITTALS

A. Product Data: For computer software program to be used for studies.

B. Product Certificates: For coordination-study and fault-current-study computer software programs, certifying compliance with IEEE 399.

C. Qualification Data: For coordination-study specialist.

D. Other Action Submittals: The following submittals shall be made after the approval process for system protective devices has been completed. Submittals shall be in digital form.

1. Coordination-study input data, including completed computer program input data sheets.
2. Study and Equipment Evaluation Reports.
3. Coordination-Study Report.

E. Owners Record Copy: The as-built software model and all electronic files are to be provided to the owner at project closeout. Electronic files are to be compatible with the latest version of SKM software. The owner shall receive rights to use and/or modify the electronic files and data for operations planning, maintenance and modification of their electrical system.

1.4 QUALITY ASSURANCE

A. Studies shall use computer programs that are distributed nationally and are in wide use. Software algorithms shall comply with requirements of standards and guides specified in this Section. Manual calculations are not acceptable.

B. Coordination-Study Specialist Qualifications: An entity experienced in the application of computer software used for studies, having performed successful studies of similar magnitude on electrical distribution systems using similar devices.

1. Professional engineer, licensed in the state where Project is located, shall be responsible for the study. All elements of the study shall be performed under the direct supervision and control of engineer.

C. Comply with IEEE 242 for short-circuit currents and coordination time intervals.

1.5 Commissioning

A. This section specifies a system or a component of a system being commissioned as defined in Section 019113 Commissioning. Testing of these systems is required, in cooperation with the Owner and the Commissioning Authority. Refer to Section 019113 Commissioning for detailed commissioning requirements.

PART 2 - PRODUCTS

2.1 COMPUTER SOFTWARE DEVELOPERS

A. Computer Software Developers: Software utilized shall be capable of converting all data to SKM formatting. Subject to compliance with requirements, provide products by one of the following:

1. CGI CYME.
2. EDSA Micro Corporation.
3. ESA Inc.

4. Operation Technology, Inc.
5. SKM Systems Analysis, Inc.

2.2 COMPUTER SOFTWARE PROGRAM REQUIREMENTS

A. Comply with IEEE 399.

B. Analytical features of fault-current-study computer software program shall include "mandatory," "very desirable," and "desirable" features as listed in IEEE 399.

C. Computer software program shall be capable of plotting and diagramming time-current-characteristic curves as part of its output. Computer software program shall report device settings and ratings of all overcurrent protective devices and shall demonstrate selective coordination by computer-generated, time-current coordination plots.

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.

3.2 POWER SYSTEM DATA

A. Gather and tabulate the following input data to support coordination study:

1. Product Data for overcurrent protective devices specified in other Division 26 Sections and involved in overcurrent protective device coordination studies. Use equipment designation tags that are consistent with electrical distribution system diagrams, overcurrent protective device submittals, input and output data, and recommended device settings.
2. Impedance of utility service entrance.
3. Electrical Distribution System Diagram: In hard-copy and electronic-copy formats, showing the following:

    a. Circuit-breaker and fuse-current ratings and types.
    b. Relays and associated power and current transformer ratings and ratios.
    c. Transformer kilovolt amperes, primary and secondary voltages, connection type, impedance, and X/R ratios.
    d. Generator kilovolt amperes, size, voltage, and source impedance.
    e. Cables: Indicate conduit material, sizes of conductors, conductor material, insulation, and length.
    f. Busway ampacity and impedance.
    g. Motor horsepower and code letter designation according to NEMA MG 1.

4. Data sheets to supplement electrical distribution system diagram, cross-referenced with tag numbers on diagram, showing the following:

    a. Special load considerations, including starting inrush currents and frequent starting and stopping.
    b. Transformer characteristics, including primary protective device, magnetic inrush current, and overload capability.
    c. Motor full-load current, locked rotor current, service factor, starting time, type of start, and thermal-damage curve.
    d. Generator thermal-damage curve.

e. Ratings, types, and settings of utility company's overcurrent protective devices.
f. Special overcurrent protective device settings or types stipulated by utility company.
g. Time-current-characteristic curves of devices indicated to be coordinated, including arc-reduction features where applicable.
h. Manufacturer, frame size, interrupting rating in amperes rms symmetrical, ampere or current sensor rating, long-time adjustment range, short-time adjustment range, and instantaneous adjustment range for circuit breakers.
i. Manufacturer and type, ampere-tap adjustment range, time-delay adjustment range, instantaneous attachment adjustment range, and current transformer ratio for overcurrent relays.
j. Panelboards, switchboards, motor-control center ampacity, and interrupting rating in amperes rms symmetrical.

B. Data shall be obtained for the power sources (utility system and generators), impedance components (transformers, cables and busway), overcurrent protective devices (fuses, circuit breakers and relays) and other relevant equipment such as automatic transfer switches. Cable data (length, quantity per phase, size and type) shall be provided by the electrical contractor. Assumptions should only be used when the actual data is not available and the assumptions should be clearly listed in the report. Assumptions shall be kept to a minimum.

C. A one-line diagram shall be provided as part of the analysis and shall clearly identify individual equipment buses, bus numbers used in the analysis, cable information (length, quantity per phase, size and type), overcurrent device information (manufacturer, type and size), transformers, motors, transfer switches, generators, etc.

D. The one line and analysis shall use a numbering scheme where each bus begins with a three digit number followed by a description (e.g., 102 MDPA or 103 ELEV DISC) and each connected circuit breaker or fuse shall have a corresponding designation (e.g., 102-1 MAIN CB, 102-2 ELEVATOR FDR or 103-1 ELEV DISC CB).

3.3 FAULT-CURRENT STUDY

A. Calculate the maximum available short-circuit current in amperes rms symmetrical at circuit-breaker positions of the electrical power distribution system. The calculation shall be for a current immediately after initiation and for a three-phase bolted short circuit at each of the following:

1. Switchgear and switchboard bus
2. Medium-voltage switch and transformers
3. Distribution panelboards
4. Branch circuit panelboards
5. Variable Frequency Drives
6. Motor Control Centers
7. Company switches
8. Fused and non-fused disconnects
9. Low-voltage transformers
10. Individual circuit breakers
11. Automatic transfer switches
12. Generator
13. Combination starter/disconnects

B. Study electrical distribution system from normal and alternate emergency power sources throughout electrical distribution system for Project, using approved computer software program. Include studies of system-switching configurations and alternate operations that could result in maximum fault conditions.

C. Calculate momentary and interrupting duties on the basis of maximum available fault current.

D. Calculations to verify interrupting ratings of overcurrent protective devices shall comply with IEEE 241 and IEEE 242.

1. Transformers:

a. ANSI C57.12.10
b. ANSI C57.12.22
c. ANSI C57.12.40
d. IEEE C57.12.00
e. IEEE C57.96

2. Low-Voltage Circuit Breakers: IEEE 1015 and IEEE C37.20.1.
3. Low-Voltage Fuses: IEEE C37.46.
4. Circuit Breakers: IEEE c37.13.

E. Study Report: Show calculated X/R ratios and equipment interrupting rating (1/2-cycle) fault currents on electrical distribution system diagram.

F. Equipment Evaluation Report:

1. For overcurrent protective devices, ensure that interrupting ratings are equal to or higher than calculated 1/2-cycle symmetrical fault current.
2. For devices and equipment rated for asymmetrical fault current, apply multiplication factors listed in the standards to 1/2-cycle symmetrical fault current.
3. Verify adequacy of phase conductors at maximum three-phase bolted fault currents; verify adequacy of equipment grounding conductors and grounding electrode conductors at maximum ground-fault currents. Ensure that short-circuit withstand ratings are equal to or higher than calculated 1/2-cycle symmetrical fault current.

G. A table shall be included which lists the calculated short-circuit currents (rms symmetrical three phase), equipment short-circuit interrupting or withstand current ratings, and notes regarding the adequacy or inadequacy of the equipment at each bus.

H. Any inadequacies shall be called to the attention of the engineer of record and recommendations made for improvements as soon as they are identified.

3.4 COORDINATION STUDY

A. Perform coordination study using approved computer software program. Prepare a written report using results of fault-current study. Comply with IEEE 399.

1. Calculate the maximum and minimum 1/2-cycle short-circuit currents.
2. Calculate the maximum and minimum interrupting duty (5 cycles to 2 seconds) short-circuit currents.
3. Calculate the maximum and minimum ground-fault currents.

B. Comply with IEEE 242 recommendations for fault currents and time intervals.

C. Transformer Primary Overcurrent Protective Devices:

1. Device shall not operate in response to the following:

    a. Inrush current when first energized.
    b. Self-cooled, full-load current or forced-air-cooled, full-load current, whichever is specified for that transformer.
    c. Permissible transformer overloads according to IEEE C57.96 if required by unusual loading or emergency conditions.

2. Device settings shall protect transformers according to IEEE C57.12.00, for fault currents.

D. Motors served by voltages more than 600 V shall be protected according to IEEE 620.

E. Conductor Protection: Protect cables against damage from fault currents according to ICEA P-32-382, ICEA P-45-482, and conductor melting curves in IEEE 242. Demonstrate that equipment withstands the maximum short-circuit current for a time equivalent to the tripping time of the primary relay protection or total clearing time of the fuse. To determine temperatures that damage insulation, use curves from cable manufacturers or from listed standards indicating conductor size and short-circuit current.

F. Coordination-Study Report: Prepare a written report indicating the following results of coordination study:

1. Tabular Format of Settings Selected for Overcurrent Protective Devices:

    a. Device tag.
    b. Relay-current transformer ratios; and tap, time-dial, and instantaneous-pickup values.
    c. Circuit-breaker sensor rating; and long-time, short-time, and instantaneous settings.
    d. Fuse-current rating and type.
    e. Ground-fault relay-pickup and time-delay settings.

2. Coordination Curves: Prepared to determine settings of overcurrent protective devices to achieve selective coordination. Graphically illustrate that adequate time separation exists between devices installed in series, including power utility company's upstream devices. Prepare separate sets of curves for the switching schemes and for emergency periods where the power source is local generation. Show the following information:

    a. Device tag.
    b. Voltage and current ratio for curves.
    c. Three-phase and single-phase damage points for each transformer.
    d. No damage, melting, and clearing curves for fuses.
    e. Cable damage curves.
    f. Transformer inrush points.
    g. Maximum fault-current cutoff point.

G. Completed data sheets for setting of overcurrent protective devices.

H. A table shall be included which lists the recommended settings of each circuit breaker and relay.

I. 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.

J. Deficiencies in protection and/or coordination shall be called to the attention of the engineer of record and recommendations made for improvements as soon as they are identified.

K. The electrical engineer that performed the study shall be responsible to set the circuit breakers according to the analysis once the report has been approved by the engineer of record.

3.5 ARC FLASH HAZARD ANALYSIS

A. The arc flash hazard analysis shall be performed according to the IEEE 1584 equations that are presented in NFPA70E-2004, Annex D.

B. The analysis shall consider multiple possible utility scenarios as well as multiple system configurations where appropriate such as normal and emergency transfer switch positions and different main-tie-main configurations. Where manually activated arc energy reduction means are utilized, the analysis shall calculate energy available downstream for normal operation and for maintenance mode operation.

C. The flash protection boundary and the incident energy shall be calculated at all significant locations in the electrical distribution system. This includes all switchboards, switchgear, motor-control centers, panelboards, busway and splitters.

D. Safe working distances shall be based upon the calculated arc flash boundary considering an incident energy of 1.2 cal/cm^2.

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 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 locations. Calculations must be performed to represent the maximum and minimum contributions of fault current magnitude for all normal and emergency operating conditions. The minimum calculation will assume that the utility contribution is at a minimum and will assume a minimum motor contribution (all motors off). Conversely, the maximum calculation will assume a maximum contribution from the utility and will assume the maximum amount of motors to be operating. Calculations shall take into consideration the parallel operation of synchronous generators with the electric utility, where applicable.

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 and generators should be decremented as follows:

1. Fault contribution from induction motors should not be considered beyond 3-5 cycles.
2. Fault contribution from synchronous motors and generators should be decayed to match the actual decrement of each as closely as possible (e.g. contributions

from permanent magnet generators will typically decay from 10 per unit to 3 per unit after 10 cycles).

H. For each equipment location with a separately enclosed main device (where there is adequate separation between the line side terminals of the main protective device and the work location), calculations for incident energy and flash protection boundary shall include both the line and load side of the main breaker.

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. Mis-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. Maximum clearing time will be capped at 2 seconds based on IEEE 1584-2002 section B.1.2. 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. Incident energy and flash protection boundary calculations

1. Arcing fault magnitude
2. Protective device clearing time
3. Duration of arc
4. Arc flash boundary
5. Working distance
6. Incident energy
7. Hazard Risk Category
8. Recommendation for arc flash energy reduction

M. The Arc Flash Hazard Analysis shall include recommendations for reducing Arc Flash Incident Energy (AFIE) levels and enhancing worker safety.

N. Results of the Arc Flash Hazard Analysis shall be submitted in tabular form and shall include the following information for each bus location: bus name, protective device name, bus voltage, bolted fault, arcing fault, trip/delay time, equipment type, working distance, arc flash boundary, incident energy and protective clothing category.

3.6 ARC FLASH WARNING LABELS

A. Arc flash labels shall be furnished and installed by the contractor of the Arc Flash Hazard Analysis.

B. The labels shall be 4 inches high by 6 inches wide and printed on a Brady THTEL-25-483-1-WA label type or similar. The arc flash label shall be as required by NFPA 70E or as required by the owner’s standards.

C. After labels will be based on recommended overcurrent device settings and will be provided after the results of the analysis have been presented to the owner and after any system changes, upgrades or modifications have been incorporated in the system.

3.7 Labels shall be machine printed, with no field markings.

3.8 Arc flash labels shall be provided in the following manner and all labels shall be based on recommended overcurrent device settings. Provide one arc flash label for all electrical equipment including:

A. For each 480 and applicable 208 volt panelboard, one arc flash label shall be provided.

B. For each 480 and applicable 208 volt distribution panelboard, one arc flash label shall be provided.

C. For each motor control center, one arc flash label shall be provided.

D. For each low-voltage switchboard, one arc flash label shall be provided.

E. For each switchgear, one flash label shall be provided.

F. For medium voltage switches and transformers, one arc flash label shall be provided.

G. For each fused or non-fused disconnect switch, one arc flash label shall be provided.

H. For each generator and automatic transfer switches, one arc flash label shall be provided.

I. For each variable frequency drives, one arc flash label shall be provided.

J. For each combination starter/disconnects, one arc flash label shall be provided.

K. For each fused or non-fused disconnect switch and individual circuit breakers, one arc flash label shall be provided.

L. For each low-voltage transformer, one arc flash label shall be provided.

M. For each company switch, one arc flash label shall be provided.

END OF SECTION 260573

SECTION 262400 - ELECTRICAL DISTRIBUTION EQUIPMENT

1. GENERAL

   A. All electrical distribution equipment shall be dead front UL listed for the purpose and application. All equipment shall meet or exceed all applicable requirements of the National Electrical Code (N.E.C.). Any device or component, i.e., switchboard, panel, breaker, switch, etc., used as service entrance equipment, shall be listed for use at 100% of the rated capacity.

2. UL RE-CERTIFICAITON OF EXISTING EQUIPMENT

A. Where existing switchboards, panelboards, motor control centers, and similar are modified in a manner that changes how the original equipment was shipped from the factory the contractor shall obtain a UL Field Evaluation and the equipment shall be provided with new UL certifications and UL Field Evaluation Marking. Modifications include but are not limited to tapping of bussing, dismantling and rebuilding of gear, or the installation of aftermarket breakers, components, etc. UL re-certification shall not be required for the following conditions:

(1) If a new breaker listed or classified by the manufacturer for installation in the gear is provided in an existing prepared space. Contractor must submit documentation of this classification if the breaker type is not specifically noted on the panelboard product data.

(2) Removal of existing breakers

(3) Removal of conductors to/from gear

(4) Addition of conductors to/from gear

The contractor shall carry all costs associated with the evaluation and re-certification. The contractor shall submit the service agreement with the UL certified for review by the engineer prior to execution. All work shall be approved by the Authority Having Jurisdiction.

3. MAIN SWITCHBOARD - CIRCUIT BREAKER STYLE

   A. Switchboard shall be dead front, totally enclosed, free standing or wall mounted, as required or herein specified, housing the equipment as indicated. The switchboard shall meet Underwriters' Laboratories enclosure requirements, and be furnished with an Underwriters' Laboratories label. The entire switchboard is to be Square D I-Line or equivalent construction, G.E., Siemens, Eaton / Cutler - Hammer or approved equivalent. Where switchboards are floor-mounted, provide concrete housekeeping pad, 3" high, with #4 rebar on 6" X 6" centers, per A.C.I. standards. Chamfer edges of pad 1/2".

   B. The switchboard shall be dead-front with front accessibility. The switchboard framework shall consist of steel channels bolted to the frame to rigidly support the entire shipping section for moving on rollers and floor mounting. The framework is to be formed of

code gauge steel, rigidly welded together to support all cover plate, bussing and component devices. All unused positions shall have closures.

C. Each switchboard section shall have an open bottom (closed for wall-mounted style) and a top plate for installation and termination of conduit. Top and bottom conduit areas are to be clearly shown and dimensioned on the shop drawings. The wireway front covers shall be secured by screws and hinged, to permit access to the branch circuit breaker load side terminals. The paint finish shall be medium light gray, per ANSI #49, applied by the electro-deposition process over an iron phosphate pre-treatment. Enclosure shall be NEMA 1, with drip shield on top. Provide top covers without knockouts. All conduit entries to be field cut. At top conduit entries, provide weatherproof sealing lock nuts on terminator.

D. The switchboard bussing shall be of sufficient cross-sectional area to meet UL Standard 891 on temperature rise. Main and/or through busses shall be 100% annealed copper. The through bus shall have an ampacity in amperes as indicated on the drawings and shall be braced to have a short circuit current rating of 100,000 RMS symmetrical amperes unless otherwise indicated. (Where through bus is provided, it shall have provisions for the addition of future sections on the branch or distribution side.) The through bus supports, connections and joints are to be bolted with hex head bolts and belleville washers to minimize maintenance requirements.

E. Neutral bussing shall be of the same ampacity bussing and insulated from the enclosure. Ground bussing shall be sized and shall be bonded to the enclosure per N.E.C., current edition. Service grounding electrode connection shall be made between ground and neutral busses. Provide ground bushings and equipment ground conductor connection on each feeder conduit leaving switchboard and at the terminal end for each continuous metallic feeder conduit.

F. Each switchboard, as a complete unit, shall be given a single short circuit current rating by the manufacturer. Such a rating shall be established by actual tests by the manufacturer, in accordance with UL specifications, on equipment constructed similarly to the subject switchboard.

G. The service disconnect device(s) shall be thermal-magnetic molded case circuit breaker(s) installed totally front accessible and front connectable. Line side of branch circuit breaker connections are to be jaw type plug-on. Ground fault protection shall be provided as required by N.E.C. Article 230-95, where switchboard is rated for 277/480 volts and circuit breaker frame sizes are 1000 amperes or greater, regardless of trip setting.

H. Group mounted molded case circuit breakers for branch distribution are to be totally front accessible. These circuit breakers are to be mounted in the switchboard to permit installation, maintenance and testing without reaching over any line side bussing. All line and load side connections are to be individual to each circuit breaker. Common mounting brackets or electrical bus connectors will not be acceptable. Line side circuit

breaker connections are to be jaw type plug-on, arranged to withstand the anticipated fault currents.

I. Each circuit breaker is to be furnished with an externally operable mechanical means to trip the circuit breaker, enabling maintenance personnel to verify the ability of the circuit breaker trip mechanism to operate as well as exercise the circuit breaker operating mechanisms.

J. Include kw, kwh, voltage, amperage metering per phase along with appropriate digital output to interface with campus DDC control system for remote monitoring of power system. Coordinate with controls supplier for a 100% complete installation.

K. Provide an arc energy reducing maintenance switch with local status indicator for all breakers or equipment rated or adjustable to 1,200 Amps or greater. Provide a local status indicator light for all breakers equipped with maintenance switches. Maintenance switch and indicator shall be mounted to the breaker face or immediately adjacent to the breaker in the switchboard enclosure. Maintenance switch shall have permanently mounted lockout/tagout provisions. Provide labelling to indicate operation instructions for maintenance switch at each switch.

L. All circuit breakers shall have a minimum ISCA rating of 65,000 amps, A.I.C., unless otherwise noted on the One-Line Diagram.

M. Arc Flash Hazard warning labels shall be affixed to all switchboards in accordance with Article 110.16 of the National Electrical Code. All components protected by a manually-operated arc energy reduction means shall have an additional label affixed that describes the location of the energy reduction means.

N. Switchboard shall be Square "D", G.E., Siemens, Eaton/Cutler–Hammer or approved equivalent.

O. Lockable breakers shall be provided for all breakers serving all HVAC equipment, Plumbing equipment, and kitchen appliances.

4. DISTRIBUTION PANELBOARDS (600 AMPERE OR GREATER)

A. Panelboard assembly shall be enclosed in a steel cabinet. The rigidity and gauge of steel to be as specified in UL Standard 50 for cabinets. The size of wiring gutters shall be in accordance with UL Standard 67. Cabinets to be equipped with latch and tumbler-type lock on door of trim. Doors over 48" long shall be equipped with three-point latch and vault lock. All locks shall be keyed alike. End walls shall be removable. Fronts shall be of code gauge steel, with gray baked enamel finish electrodeposited over cleaned, phosphatized steel.

B. The panelboard interior assembly shall be dead front with panelboard front removed. Main lugs or main breakers shall have barriers on five sides. The barrier in front of the

main lugs shall be hinged to a fixed part of the interior. The end of the bus structure opposite the mains shall have barriers. Bus structure shall be full height of panel.

C. Panelboard bus structure and main lugs or main breaker shall have current ratings as shown on the panelboard schedule. Such ratings shall be established by heat rise tests with maximum hot spot temperature on any connector or bus bar not to exceed 50ºC. rise above ambient. Heat rise tests shall be conducted in accordance with Underwriters Laboratories Standard UL 67. The use of conductor dimensions will not be accepted in lieu of actual heat tests. All panelboards unless otherwise noted shall have space to accept forty-two 20 amp one pole circuit breakers.

D. Circuit breakers shall be equipped with individually insulated, braced and protected connectors. The front faces of all circuit breakers shall be flush with each other. Large, permanent, individual circuit numbers shall be affixed to each breaker in a uniform position. Tripped indication shall be clearly shown by the breaker handle taking a position between "ON" and "OFF." Provisions for additional breakers shall be such that no additional connectors will be required to add breakers. All panelboards shall be capable of accepting 225 amp 3 pole branch breakers as a minimum unless otherwise noted.

E. Each panelboard, as a complete unit, shall have a short circuit current rating equal to or greater than the integrated equipment rating shown on schedules on the plans or as determined by verification with local utility company. This rating shall be established by testing with the overcurrent devices mounted in the panelboard. The short circuit tests on the overcurrent devices and on the panelboard structure shall be made simultaneously by connecting the fault to each overcurrent device with the panelboard connected to its rated voltage source. Method of testing shall be per Underwriters Laboratories Standard UL 67. The source shall be capable of supplying the specified panelboard short circuit current or greater. Testing of panelboard overcurrent devices for short circuit rating only while individually mounted is not acceptable. Also, testing of the bus structure by applying a fixed fault to the bus structure alone is not acceptable. Panelboards shall be marked with their maximum short circuit current rating at the supply voltage and shall be UL listed.

F. Arc Flash Hazard warning labels shall be affixed to all panelboards in accordance with Article 110.16 of the National Electrical Code. All components protected by a manually-operated arc energy reduction means shall have an additional label affixed that describes the location of the energy reduction means.

G. Provide energy reducing maintenance switch with local status indicator for any breaker or equipment rated or adjustable to 1,200 Amps or greater.

H. Distribution panelboards shall be Square "D", G.E., Siemens, Eaton/Cutler–Hammer or approved equivalent.

I. Lockable breakers shall be provided for all breakers serving all HVAC equipment, Plumbing equipment, and kitchen appliances.

5. BRANCH PANELBOARDS

A. This section covers lighting and power panelboards (refer to schedules, notes on Drawings and the Electrical One-Line Diagram, of the Contract Drawings).

B. All panelboards shall be of the circuit breaker type, and shall be of one manufacturer.

C. Branch panelboards shall be as indicated on the drawings and as specified herein. The lighting panelboards shall be of the dead-front, quick-make, quick-break, plug-in circuit breaker type, with trip indicating and trip free handles. All circuits shall be clearly and properly numbered and shall be provided with thermal magnetic protection. The panelboards shall be enclosed in code gauge, galvanized steel cabinets with smooth finished hinged doors without visible external fasteners and heavy chrome locks. Locks shall all be keyed alike. Each door shall have a directory card inside, covered with a plastic shield, filled in with black india ink or typewritten with circuit numbers and description indicated. Room numbers shall be coordinated with final room numbers as selected by Owner -- not numbers on Contract Documents.

   Special Note: The room numbers used to fill out the panel directories shall match the actual final name and numbering scheme selected by the Owner. They shall not be filled out per the construction drawing numbering scheme, unless the Contractor is directed to do so by the Architect or Engineer.

D. Branch panelboards shall be surface or flush mounted as indicated on the Contract Drawings.

E. Circuit breakers for 120/208 volt systems shall be of 10,000 A.I.C. RMS symmetrical rating unless otherwise indicated on the Contract Drawings. For 277/480 volt systems, provide circuit breakers with 14,000 A.I.C. ratings unless otherwise indicated.

F. All main bus and connections thereto in branch panelboards shall be copper. All bus bars shall extend full length of panelboards.

G. All circuit breakers used to switch lights shall be SWD (switching duty) rated and U.L. listed for the purpose.

H. Where required by the National Electrical Code, provide branch arc-fault circuit interrupters (A.F.C.I.'s) in branch panelboards, whether indicated on the panel schedule or not. They shall be U.L. listed, latest edition.

I. Where branch circuit breakers feed hermetically, sealed compressor for cooling or refrigeration equipment, provide U.L. listed H.A.C.R.-style circuit breakers.

J. Where branch circuit breakers are indicated or required to be ground-fault circuit-interrupting type (G.F.C.I.), they shall have test and reset buttons and be U.L. listed, latest edition. Do not share neutrals with other circuits.

K. Where branch circuit breakers are feeding H.I.D. (high-intensity-discharge) loads, they shall be rated and listed for such loads. Provide proper circuit breaker whether indicated on panel schedules or not.

L. Arc Flash Hazard warning labels shall be affixed to all panelboards in accordance with Article 110.16 of the National Electrical Code. All components protected by a manually-operated arc energy reduction means shall have an additional label affixed that describes the location of the energy reduction means.

M. Panels shall be Square "D", G.E., Siemens, Eaton/Cutler-Hammer or approved equivalent.

N. Lockable breakers shall be provided for all breakers serving all HVAC equipment, Plumbing equipment, and kitchen appliances.

6. INSTALLATION INSTRUCTIONS

A. Panelboards with circuit breakers installed before the building has been finished and cleaned shall be masked.

B. All dust and debris shall be removed from the panels before they are energized and placed in service.

C. All panelboard fronts shall be omitted until final punch list inspection is made. Directories for each panelboard shall be completed and available for review by the Engineer at that time.

D. All service equipment shall be marked with the maximum available fault current and the date of the calculation. This information shall be obtained in writing from the serving utility. Provide label adjacent to the service disconnecting means. Document action of the fault current shall be included in the operation and maintenance manual. This labeling shall be provided for all new service installations, service upgrades, and any project that adds or replaces distribution panels or branch panel boards.

E. Where applicable - Provide a warning sign on the service entrance equipment indicating type and location of all on-site emergency power sources in accordance with the NEC.

F. Where applicable – Provide warning sign(s) for alternative power devices (photovoltaic, wind, fuel cell, etc.) on all equipment in accordance with the NEC.

G. All emergency system switchgear, distribution panels and branch panelboards shall be provided with surge protection devices in accordance with the NEC. Refer to Section 264313 Surge Suppression Systems.

7. SAFETY SWITCHES

A. Provide heavy duty safety switches as a final disconnecting means as required by NEC and/or as indicated on the Contract Drawings.

B. All safety switches shall be NEMA Type 1, NEMA 3R, NEMA 4 stainless steel, NEMA 12, or as required by the operating environment, Heavy Duty Type HD, UL listed.

C. All safety switches shall have switch blades that are fully visible in the "OFF" (open) position with the door open.

D. All current carrying parts shall be plated by an electrolytic process to resist corrosion and to promote cooling.

E. Switch mechanism shall be quick-make, quick-break, load break rated, such that during normal operation of the switch, the operation of the contacts shall not be capable of being restrained by the operating handle after the closing and opening action of the contacts has started. The handle and mechanism shall be an integral part of the box (not cover) with facilities for pad locking in the open or closed position with up to three padlocks. Switch doors shall be interlocked with switch handle so that the door can only be opened when the switch is in the "OFF" (open) position.

F. Arc Flash Hazard warning labels shall be affixed to all switches in accordance with Article 110.16 of the National Electrical Code. All components protected by a manually-operated arc energy reduction means shall have an additional label affixed that describes the location of the energy reduction means.

G. Switches shall be as manufactured by Square D., G.E., Siemens, Eaton/Cutler-Hammer or approved equivalent.

8. FUSES

A. Upon completion of the building, the Contractor shall provide the owner with spare fuses as shown below. All fuses shall be Bussmann, Shawmut, Gould or Reliance.

(1) 10% (minimum of 3) of each type and rating of installed fuses shall be supplied as spares:

(2) Bussmann spare fuse cabinets - Catalog No. SFC - shall be provided to store the above spares.

B. No fuses shall be installed in the equipment until the installation is complete, including tests and inspections required prior to being energized. All fuses shall be of the same manufacturer to insure retention of selective coordination, as designed.

C. Circuits 601 to 6000 amperes shall be protected by current limiting BUSSMANN HI-CAP TIME DELAY FUSES KRP-C. Fuses shall employ "O" rings as positive seals between the end bells and the fuse barrel. Fuses shall be a time-delay type and must hold 500% of rated current for a minimum of 5 seconds, clear 20 times rated current in .01 seconds

or less and be listed by Underwriter's Laboratories, Inc., with an interrupting rating of 200,000 amperes R.M.S. symmetrical. The fuses shall be UL Class L.

D. Circuits 0 to 600 amperes shall be protected by current limiting BUSSMANN LOW-PEAK Dual Element Fuses, LPN-RK (250 volts) or LPS-RK (600 volts). All dual element fuses shall have separate overload and short circuit elements. Fuse shall incorporate a spring activated thermal overload element having a 284°F melting point alloy and shall be independent of the short-circuit clearing chamber. The fuse shall hold 500% of rated current for a minimum of l0 seconds and be listed by Underwriters Laboratories, Inc. with an interrupting rating of 200,000 amperes r.m.s. symmetrical. The fuses shall be UL Class RK1.

E. Motor Circuits - All individual motor circuits rated 480 amperes or less shall be protected by BUSSMANN LOW PEAK DUAL-ELEMENT FUSES LPN-RK (250 volts) or LPS-RK (600 volts). The fuses for 1.15 service factor motors shall be installed in rating approximately l25% of motor full load current except where high ambient temperatures prevail, or where the motor drives a heavy revolving part which cannot be brought up to full speed quickly, such as large fans. Under such conditions the fuse should be 150% to 200% of the Type KRP-C HI-CAP Time Delay Fuses of the rating shown on the drawings. 1.0 service factor motors shall be protected by BUSSMANN LOW-PEAK Dual-Element Fuses LPN-RK (250 volts) or LPS-RK (600 volts) installed in rating approximately 115% of the motor full load current except as noted above. The fuses shall be UL Class RK1 or L.

F. Circuit breaker panels shall be protected by BUSSMANN LOW-PEAK Dual Element fuses LPN-RK (250 volts) or LPS-RK (600 volts) as shown on the drawings. The fuses shall be UL Class RK1.

9. DISTRIBUTION TRANSFORMERS

A. The Contractor shall provide dry-type transformers as manufactured by Square "D", G.E., Siemens, Eaton/Cutler-Hammer or equivalent. KVA ratings shall be as indicated on the electrical plans and shall have copper windings.

B. Three phase transformers are to have 480 volt Delta primary and 120/208V/3 /4W secondary. 30 KVA transformers and larger are to be supplied with 2-22% full capacity taps above and (4) 2-1/2% full capacity taps below primary voltage. Exceptions to the above will be shown on the electrical plans.

C. Transformers 30 KVA and above shall be Class H, 115°C. and shall have the ability to carry a continuous 15% overload without exceeding a 115°C rise above 40° ambient.

D. Transformer coils shall be vacuum impregnated with non-hygroscopic, thermosetting varnish. Each layer shall have end fillers or tie downs to provide maximum mechanical strength. Insulation systems and their construction techniques shall be listed by Underwriters Laboratories.

E. Transformer coils shall have a final wrap of electrical insulating material designed to prevent injury to the coil wire. Transformers having coils with magnet wire visible will not be acceptable.

F. All cores to be manufactured from a high grade, non-aging, silicon steel with high magnetic permeabilities, low hysteresis and eddy current losses. Magnetic flux densities are to be kept well below saturation to allow for a minimum of 10% over voltage excitation. The cores shall be clamped with structural angles (formed angles not acceptable) and bolted to the enclosure to prevent damage during shipment or rough handling.

G. The core and coil unit shall be completely isolated from the enclosure by means of a vibration isolating system and shall be so designed as to provide for continual securement of the core and coil unit to the enclosure. Sound isolating systems requiring the removal of all tie down facilities will not be acceptable.

H. Transformers 15 KVA thru 45 KVA shall be provided with interchangeable mounting for floor or wall.

I. The maximum top of case temperature shall not exceed 35°C above ambient.

J. The entire transformer enclosure shall be degreased, cleaned, phosphatized, primed and finished with baked enamel.

K. The core and coils shall be visibly grounded to the frame of the transformer cubicle by means of a flexible grounding strap of adequate size.

L. Sound levels shall be guaranteed by the manufacturer and substantiated by certified tests on each unit furnished. The sound levels are not to exceed the following values: 10 to 45 KVA, 42 D.B. to 150 KVA; 45 D.B., 225 to 300 KVA; 50 D.B. and 500 KVA, 54 D.B.

M. If a particular “K” rating is specified for a dry-type transformer, that rating shall be provided.

N. Transformers shall be as manufactured by Square D, G.E., Eaton/Cutler-Hammer, Siemens, Niagara or approved equivalent.

10. CONTACTORS

A. General

(1) Contactors shall be continuously rated at the specified amperes per pole for all types of ballast and tungsten lighting, resistance and motor load. Contactors shall have totally enclosed, double-break silver-cadmium-oxide power contacts. Auxiliary arcing contacts will not be acceptable. Contact inspection and replacement shall be possible without disturbing line or load wiring. Contactors shall have straight-

through wiring with all terminals clearly marked. Contactors shall have a gasketed NEMA Type 1 (NEMA 12 for electrically-held) enclosure, unless otherwise noted or required.

(2) Contactors shall be approved per UL 508 and/or CSA, and be designed in accordance with NEMA Standards. They shall be industrial-duty rated for applications to 600 volts maximum. I.E.C.-style contactors are not acceptable.

(3) Contactors shall have provisions for factory or field addition of:

a. Four N.O. or N.C. auxiliary contacts rated 6 amperes continuous at 600 volts.

b. Single or double circuit, N.O. or N.C., 30 or 60 ampere 600 volt power-pole adder.

c. Control-circuit fuse holder, one or two fuses.

d. 0.2-60 second adjustable interval timer attachment, if so indicated on plans.

e. Transient-suppression module for coil control circuit. Coil control to be 120 volts. Provide circuit or step-down transformer.

B. Electrically Held Lighting Contactors

(1) Contactor coils shall be continuously rated and encapsulated, 120 volt rated. Enclosures shall be NEMA 12, to minimize noise transmission.

C. Mechanically Held Lighting Contactors

(1) Coil-clearing contacts shall be supplied so that the contactor coils shall be energized only during the instance of operation. Both latch and unlatch coils shall be encapsulated. Coils shall be rated for 120 volt operation.

(2) Lighting contactors shall be Square D Class 8903 or equivalent by G.E., Siemens, Eaton/Cutler-Hammer or Allen-Bradley.

END OF SECTION 262400

SECTION 262450 - ELECTRICAL DISTRIBUTION TRANSFORMERS

1. GENERAL

   A. All electrical distribution transformers shall be dead front UL listed for the purpose and application. All equipment shall meet or exceed all applicable requirements of the National Electrical Code (N.E.C.).

2. QUALITY ASSURANCE

   A. Manufacturer shall be ISO 9001 certified.
   B. Transformers shall be CSA certified and UL listed [CE certified outside North America],
   C. Transformers shall be factory tested to CSA C9,
   D. Transformers shall meet all relevant CSA, EPA, IEEE, NEMA, NFPA, and UL standards.

3. SHOP DRAWING SUBMITTALS

   A. Submit shop drawings, in accordance with Section 260503 – Submittals, that includes:

      (1) Enclosure dimensions,
      (2) Mounting devices,
      (3) Terminals,
      (4) Taps,
      (5) Internal and external component layout,
      (6) Amperage (neutral),
      (7) kVA rating,
      (8) Voltage,
      (9) Frequency,
      (10) BIL,
      (11) Insulation class.

4. INSTALLATION INSTRUCTIONS

   A. All Transformers shall be installed within 10 linear wire feet of the secondary means of disconnect, or a N.E.C. compliant means of disconnect shall be provided.
   B. A minimum of six (6”) inch air gap shall be provided between transformer and wall if located adjacent to wall.
   C. Provide a 4” concrete house keeping pad for all floor mounted transformers in accordance with A.C.I. standards.
   D. Provide 4” x 4” x ¾” nominal thick vibration isolation pads, four per transformer. Pads shall be Korfund Co. or equal. Transformer is to be anchored in a manner that minimizes transmission of vibration.

5. TYPE “D” DISTRIBUTION TRANSFORMERS

A. The Contractor shall provide dry-type transformers as manufactured by Power Smith, Power Quality International, Square “D” or equivalent. KVA ratings shall be as indicated on the electrical plans, transformers shall have copper windings.

B. Three phase transformers are to have 480 volt Delta primary and 120/208V/3 /4W secondary. 30 KVA transformers and larger are to be supplied with 2-1/2% full capacity taps above and (4) 2-1/2% full capacity taps below primary voltage. Exceptions to the above will be shown on the electrical plans.

C. Transformer coils shall be vacuum impregnated with non-hygroscopic, thermosetting varnish. Each layer shall have end fillers or tie downs to provide maximum mechanical strength. Insulation systems and their construction techniques shall be listed by Underwriters Laboratories.

D. Transformer coils shall have a final wrap of electrical insulating material designed to prevent injury to the coil wire. Transformers having coils with magnet wire visible will not be acceptable.

E. All cores to be manufactured from high grade, non-aging, silicon steel with high magnetic permeabilities, low hysteresis and eddy current losses. Magnetic flux densities are to be designed below saturation as required to allow for a minimum of 10% over voltage excitation. The cores shall be clamped with structural angles (formed angles not acceptable) and bolted to the enclosure to prevent damage during shipment or rough handling.

F. The core and coil unit shall be completely isolated from the enclosure by means of a vibration isolating system and shall be so designed as to provide for continual securement of the core and coil unit to the enclosure. Sound isolating systems requiring the removal of all tie down facilities will not be acceptable.

G. Primary winding configuration must be ‘Delta’.

H. Secondary winding configuration must provide a zero-sequence reactance of <0.2% at 60Hz at any primary to secondary phase shift.

I. Secondary winding configuration must provide a zero-sequence impedance of<0.9% at 60Hz at any primary to secondary phase shift.

J. Transformers 15 KVA thru 45 KVA shall be provided with interchangeable mounting for floor or wall.

K. The maximum top of case temperature shall not exceed 35°C above ambient.

L. The entire transformer enclosure shall be degreased, cleaned, phosphatized, primed and finished with baked enamel.

M. The core and coils shall be visibly grounded to the frame of the transformer cubicle by means of a flexible grounding strap of adequate size.

N. Sound levels shall be guaranteed by the manufacturer and substantiated by certified tests on each unit furnished. The sound levels are not to exceed the following values: 10 to 45 KVA, 42 D.B. to 150 KVA; 45 D.B., 225 to 300 KVA; 50 D.B. and 500 KVA, 54 D.B.

O. If a particular "K" rating is specified for a dry-type transformer, that rating shall be provided.

P. Insulation Class: R (220°C) and shall have the ability to carry a continuous 15% overload without exceeding a 220°C rise above 40° ambient.

Q. Magnetic field at 1.5 feet: max. 0.1 Gauss

R. Transformer shall provide an ultra-low zero-sequence impedance path in its secondary three-phase, four-wire subsystem for all zero-sequence currents, including 3^{rd}, 9^{th}, 15^{th}, 21^{st} harmonics, ---.

S. Transformer shall provide a primary-secondary phase-shift of 0 degree in order to achieve cancellation of 5th, 7th, 11th, 13th, 17th, 19th, 23rd, 25th, --- positive- and negative-sequence harmonic currents on the units' primary bus, equal to the lesser source of each individual harmonic current through each model, thereby treating all of the foregoing harmonic currents.

T. NEMA TP1 linear-load efficiency at 35% full load must be verified by NEMA TP2 test method. In addition, non-linear efficiency at 35% full load must be verified by Voltage & Current Difference Measurement Method.

U. Anti-vibration pads shall be used between the core and the enclosure.

V. e-Rated® Efficiency: US DOE-CSL3 efficiency requirements.

W. TVSS (parallel) – 160,000 Amps per Phase (L-N, L-L, N-G all at 80,000 Amps each)

X. Linear Load Efficiency: The transformer shall meet the efficiency requirements of NEMA TP1-2002, EPA Energy Star® and CSA C802.2-00, which are linear load efficiency requirements. Proof of compliance Type Tests, for each transformer type and rating, must be based on NEMA TP2-1998 – 'Standard Test Method for Measuring the Energy Consumption of Distribution Transformers'. Type Test are required with each submission

Y. Non-Linear Load Efficiency: The transformer shall meet the efficiency requirements of NEMA TP1-2002 under non-linear loading, which has 100% THDI and a harmonic profile that is based on IEEE Std. 519-1992, Table 4.3 – 'Spectrum of Typical Switch Mode Power Supplies'. Proof of compliance Type Tests, for each transformer type and

rating, must be based on the Voltage and Current Difference Measurement Method, with a minimum accuracy of 0.033%. Type Tests are required with each submission. The Power In – Power Out Measurements Method is not acceptable.

Z. Linear and non-linear losses and efficiencies, which are based on the Sections Y and Z, between 25% full load and 100% full load, must be plotted for each type and kVA rating.

6. REQUIREMENTS & CERTIFICATIONS

A. Evidence of significant relevant application experience.

B. Quantitative performance data including before/after effect on voltage distortion at load panels that demonstrates the capability to achieve the harmonic mitigation called for in this specification.

C. Manufacturer shall be ISO 9001 certified.

D. Device shall be UL Listed, CSA certified and CE Listed.

7. WARRANTY

A. Manufacturer shall guarantee that the product will perform as described in Section 2.2 of this specification.

B. Manufacturer shall warrant the product against defective materials and workmanship.

C. Minimum terms and conditions: 10 year pro-rated, with standard limited liability clauses.

END OF SECTION 262450

SECTION 262500 - ENCLOSED BUS ASSEMBLIES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes the following:
   1. Plug-in bus assemblies.
   2. Bus plug-in devices.

1.3 DEFINITIONS

A. TVSS: Transient voltage surge suppressor.

1.4 ACTION SUBMITTALS

A. Shop Drawings: For each type of bus assembly and plug-in device.

   1. Show fabrication and installation details for enclosed bus assemblies. Include plans, elevations, and sections of components. Designate components and accessories, including clamps, brackets, hanger rods, connectors, straight lengths, and fittings.
   2. Show fittings, materials, fabrication, and installation methods for listed fire-stop barriers.
   3. Indicate required clearances, method of field assembly, and location and size of each field connection.
   4. Detail connections to switchgear, switchboards, transformers, and panelboards.
   5. Wiring Diagrams: Power wiring.
   6. Seismic-Restraint Details: Signed and sealed by a qualified professional engineer.

      a. Design Calculations: Calculate requirements for selecting seismic restraints.
      b. Detail fabrication, including anchorages and attachments to structure and to supported equipment.

1.5 INFORMATIONAL SUBMITTALS

A. Coordination Drawings: Floor plans and sections, drawn to scale. Include scaled bus-assembly layouts and relationships between components and adjacent structural, mechanical, and electrical elements. Show the following:

1. Vertical and horizontal enclosed bus-assembly runs, offsets, and transitions.
2. Clearances for access above and to the side of enclosed bus assemblies.
3. Vertical elevation of enclosed bus assemblies above the floor or bottom of structure.
4. Support locations, type of support, and weight on each support.

B. Location of adjacent construction elements including light fixtures, HVAC and plumbing equipment, fire sprinklers and piping, signal and control devices, and other equipment.

C. Qualification Data: For testing agency.

D. Product Certificates: For each type of enclosed bus assembly, signed by product manufacturer.

E. Field quality-control test reports.

1.6 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For enclosed bus assemblies to include in emergency, operation, and maintenance manuals.

1.7 QUALITY ASSURANCE

A. Source Limitations: Obtain enclosed bus assemblies and plug-in devices through one source from a single manufacturer.

B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

C. Comply with NEMA BU 1, "Busways."

D. Comply with NFPA 70.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Deliver, store, and handle enclosed bus assemblies according to NEMA BU 1.1, "General Instructions for Proper Handling, Installation, Operation and Maintenance of Busway Rated 600 Volts or Less."

1.9 PROJECT CONDITIONS

A. Derate enclosed bus assemblies for continuous operation at indicated ampere ratings for ambient temperature not exceeding 122 deg F.

1.10 COORDINATION

A. Coordinate layout and installation of enclosed bus assemblies and suspension system with other construction that penetrates ceilings or floors or is supported by them, including light fixtures, HVAC equipment, fire-suppression system, and partition assemblies.

B. Coordinate size and location of concrete curbs around openings for vertical bus. Concrete, reinforcement, and formwork requirements are specified with concrete.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   1. Eaton Electrical Inc.; Cutler-Hammer Products.
   2. GE/ABB
   3. Siemens
   4. Square D; Schneider Electric.

2.2 ENCLOSED BUS ASSEMBLIES

A. Plug-in Bus Assemblies: NEMA BU 1, low-impedance bus assemblies in nonventilated housing; single-bolt joints; ratings as indicated.
   1. Voltage: 277/480V; 3 phase; 100 percent neutral capacity.
   2. Temperature Rise: 55 deg C above 40 deg C ambient maximum for continuous rated current.
   3. Bus Materials: Current-carrying copper conductors, fully insulated with Class 130C insulation except at stabs and joints; plated surface at stabs and joints.
   4. Ground: 50 percent capacity internal bus bar of material matching bus material.
   5. Enclosure: Steel, with manufacturer's standard finish, plug-in openings 24 inches o.c., and hinged covers over unused openings.
   6. Fittings and Accessories: Manufacturer's standard.
   7. Mounting: Arranged flat, edgewise, or vertically without derating.

2.3 PLUG-IN DEVICES

A. Molded-Case Circuit Breakers: NEMA AB 1; hookstick-operated handle, lockable with two padlocks, and interlocked with cover in closed position.

B. TVSS: NEMA 250, Type 1 enclosure with NEMA KS 1, fusible, disconnect switch and external handle to isolate TVSS from busway. TVSS product and installation requirements are specified in Section 264313 "Surge Protection for Low-Voltage Electrical Power Circuits."

PART 3 - EXECUTION

3.1 INSTALLATION

A. Support bus assemblies independent of supports for other elements such as equipment enclosures at connections to panelboards and switchboards, pipes, conduits, ceilings, and ducts.
   1. Design each fastener and support to carry 200 lb or 4 times the weight of bus assembly, whichever is greater.
   2. Support bus assembly to prevent twisting from eccentric loading.
   3. Support bus assembly with not less than 3/8-inch steel rods. Install side bracing to prevent swaying or movement of bus assembly. Modify supports after completion to eliminate strains and stresses on bus bars and housings.
   4. Fasten supports securely to building structure according to Section 260529 "Hangers and Supports for Electrical Systems."

B. Install expansion fittings at locations where bus assemblies cross building expansion joints. Install at other locations so distance between expansion fittings does not exceed manufacturer's recommended distance between fittings.

C. Construct rated fire-stop assemblies where bus assemblies penetrate fire-rated elements such as walls, floors, and ceilings. Seal around penetrations according to Section 078413 "Penetration Firestopping."

D. Install weatherseal fittings and flanges where bus assemblies penetrate exterior elements such as walls or roofs. Seal around openings to make weathertight. See Section 079200 "Joint Sealants" for materials and application.

E. Coordinate floor penetrations with existing structural elements. Image the existing area to be penetrated to determine structural elements affected and get approval from structural engineer prior to making penetration.

F. Install a concrete curb at least 4 inches high around bus-assembly floor penetrations.

G. Coordinate bus-assembly terminations to equipment enclosures to ensure proper phasing, connection, and closure.

H. Tighten bus-assembly joints with torque wrench or similar tool recommended by bus-assembly manufacturer. Tighten joints again after bus assemblies have been energized for 30 days.

I. Install bus-assembly, plug-in units. Support connecting conduit independent of plug-in unit.

3.2 CONNECTIONS

A. Ground equipment according to Section 260526 "Grounding and Bonding for Electrical Systems."

B. Connect wiring according to Section 260519 "Low-Voltage Electrical Power Conductors and Cables."

3.3 FIELD QUALITY CONTROL

A. Perform tests and inspections and prepare test reports.

1. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect components, assemblies, and equipment installations, including connections, and to assist in testing.

B. Tests and Inspections:

1. Perform each visual and mechanical inspection and electrical test stated in NETA Acceptance Testing Specification. Certify compliance with test parameters.

C. Remove and replace units that do not pass tests and inspections and retest as specified above.

D. Infrared Scanning: Two months after Substantial Completion, perform an infrared scan of bus assembly including joints and plug-in units.

1. Use an infrared-scanning device designed to measure temperature or detect significant deviations from normal values. Provide documentation of device calibration.
2. Perform 2 follow-up infrared scans of bus assembly, one at 4 months and the other at 11 months after Substantial Completion.
3. Prepare a certified report identifying bus assembly checked and describing results of scanning. Include notation of deficiencies detected, remedial action taken, and scanning observations after remedial action.

E. Test Labeling: On completion of satisfactory testing of each unit, attach a dated and signed "Satisfactory Test" label to tested component.

3.4 ADJUSTING

A. Set field-adjustable, circuit-breaker trip ranges as indicated.

3.5 CLEANING

A. Vacuum dirt and debris; do not use compressed air to assist in cleaning.

3.6 PROTECTION

A. Provide final protection to ensure that moisture does not enter bus assembly.

END OF SECTION 262500

SECTION 262726 - WIRING DEVICES AND PLATES

1. GENERAL

A. This section of the specifications includes wiring devices, cover plates, weatherproof and dust-tight closures, communications devices and floor outlets.

B. Wiring devices are listed by manufacturer and catalog numbers to establish the quality and type required. Equivalent devices of other manufacturers will be acceptable with prior approval of the Engineer. Submit cutsheets and/or samples of each type ten days prior to bid date for review and written approval to bid. Insofar as possible, standard application or special application devices shall be by one manufacturer.

2. MATERIALS

TYPE	**RATING**	**CONFIGURATION**	**COLOR**	**VENDOR - CAT. #**
RECEPTACLE - DUPLEX **COMMERCIAL GRADE**	125V, 20A 125V, 15A	NEMA 5-20R NEMA 5-15R	! !	HUBBELL CR5362* GE 5362* LEVITON 5362* HUBBELL CR5262** GE 5262** LEVITON 5262**
	* USE WHEN ON DEDICATED 20A CKT., OR CALLED OUT ** USE WHEN ON DEDICATED 15A CKT., OR WHEN MORE THAN ONE RECEPTACLE ON A CIRCUIT			
RECEPTACLE - DUPLEX G.F.I. (SHALL MEET U.L. 943 STANDARD)	125V, 20A	NEMA 5-20R	!	HUBBELL GFR5352A
RECEPTACLE - SIMPLEX	125V, 20A	NEMA 5-20R	!	HUBBELL 5361
RECEPTACLE - DUPLEX, SAFETY TYPE (WITH	125V, 20A	NEMA 5-20R	!	HUBBELL HBL-8300-SG

TAMPER-RESISTANT SCREWS)				
RECEPTACLE - DUPLEX, SAFETY TYPE (WITH TAMPER-RESISTANT SCREWS)	125V, 15A	NEMA 5-15R	!	HUBBELL HBL-8200-SG
RECEPTACLE, DUPLEX NEON PILOT FACE-RED	125V, 15A	NEMA 5-15R	!	HUBBELL 5262-LHR GE 5362-LHR LEVITON 5362-LHR
RECEPTACLE, SIMPLEX WITH CLOCK HANGER TAB, STAINLESS STEEL PLATE	125V, 15A	NEMA 5-15R	METAL	HUBBELL 5235 LEVITON 658-BR ARROW-HART 5760
RECEPTACLE, DUPLEX ISOLATED GROUND (WITH ORANGE LEGEND PLATE)	125V, 20A	NEMA 5-20R	ORANGE	HUBBELL IG-5362 GE 5362-IG LEVITON 5362-IG
RECEPTACLE, DUPLEX HOSPITAL GRADE (TO BE USED IN ALL PATIENT CARE AREAS, PER N.E.C., ART. 517)	125V, 20A	NEMA 5-15R NEMA 5-20R	!	HUBBELL 8200H GE 8200 LEVITON 8200 HUBBELL 8200H GE 8300 LEVITON 8300
RECEPTACLE, DUPLEX RED COLOR NYLON FACE (FOR EMERGENCY POWER OUTLETS)	125V, 20A	NEMA 5-20R	RED	HUBBELL 5352-RDB GE 5362-RDB LEVITON 5362-RDB
RECEPTACLE, DUPLEX ISOLATED	125V, 15A	NEMA 5-15R	BLUE DEVIC	HUBBELL 5250S LEVITON 5380

GROUND WITH SURGE SUPPRESSION, INCLUDING INDICATOR LIGHT			E	ARROW-HART 5362
RECEPTACLE, SINGLE	250V, 20A	NEMA 10-20R	BLACK	HUBBELL 6810 GE 4124 LEVITON 5032
RECEPTACLE, SINGLE	250V, 30A	NEMA 6-30R	BLACK	HUBBELL 9330 GE 4139 LEVITON 5372
RECEPTACLE, SINGLE	250V, 50A	NEMA 6-50R	BLACK	HUBBELL 9367 GE 4141 LEVITON 5374
SWITCH, SINGLE POLE	120/277V, 20A	SPST	!	HUBBELL HBL-1221 GE 5951 LEVITON 1221
SWITCH, SINGLE POLE - RED TOGGLE (WITH RED COVER PLATE, FOR EMERGENCY LIGHTING CONTROL)	120/277V, 20A	SPST	RED	HUBBELL HBL-1221-RDB GE 5951-RDB LEVITON 1221-RDB
SWITCH, THREE-WAY	120/277V, 20A	3-WAY	!	HUBBELL HBL-1223 GE 5953 LEVITON 5953
SWITCH, FOUR-WAY	120/277V, 20A	4-WAY	!	HUBBELL HBL-1224 GE 5954 LEVITON 5954
SWITCH, KEYED	120/277V, 20A	SPST	N/A	HUBBELL HBL-1221-L GE 5951-L LEVITON 1221-L

SWITCH, KEYED	120/277V, 20A	3-WAY	N/A	HUBBELL HBL-1223-L GE 5953-L LEVITON 1223-L
SWITCH, KEYED	120/277V, 20A	4-WAY	N/A	HUBBELL HBL-1224-L GE 5954-L LEVITON 1224-L

NOTE:

SWITCH, KEYED TO EACH BE FURNISHED WITH ONE HUBBELL #1209 KEY. TURN OVER TO OWNER AT CLOSE OF PROJECT AND OBTAIN RECEIPT FOR VERIFICATION THAT KEYS HAVE BEEN DELIVERED.

SWITCH, MOMENTARY, 3-POSITION, CENTER OFF SWITCH, PILOT (TOGGLE LIT IN OFF POSITION)	120/277V, 20A (VERIFY VOLTAGE USED)	SPDT	!	HUBBELL HBL SERIES GE EQUIVALENT LEVITON EQUIVALENT
SWITCH, PILOT (TOGGLE LIT IN OFF POSITION)	120/277V, 20A (VERIFY VOLTAGE USED)	SPDT OR AS NOTED	CLEAR "LEXAN"	HUBBELL HBL SERIES GE EQUIVALENT LEVITON EQUIVALENT
SWITCH, PILOT (TOGGLE LIT IN ON POSITION)	120/277V, 20A (VERIFY VOLTAGE USED)	SPST OR AS NOTED	CLEAR "LEXAN"	HUBBELL HBL-PL7 SERIES GE EQUIVALENT LEVITON EQUIVALENT
TIMER SWITCH	120V	SPST, 15 MINUTE	!	NUTONE VS63 GE EQUIVALENT LEVITON EQUIVALENT

NOTES:

1. PROVIDE MATCHING CAP (PLUG) FOR ALL RECEPTACLES 30 AMP RATED AND ABOVE AS REQUIRED FOR EQUIPMENT.

2. ALL RECEPTACLES SHALL BE BACK OR SIDE-WIRED, CLAMPING TYPE

3. FOR DRYERS AND RANGES, PROVIDE 3-POLE GROUNDING TYPE AS REQUIRED BY DEVICE. LOCATE DEVICE SO THAT DRYER OR RANGE CAN

BE PUSHED TIGHTLY AGAINST WALL.

4. RECEPTACLES SHALL BE TAMPER RESISTANT AND WEATHER RESISTANT AND MARKED ACCORDINGLY AS REQUIRED BY N.E.C.

5. ALL RECEPTACLES INSTALLED IN DAMP OR WET LOCATIONS SHALL BE UL LISTED WEATHER RESISTANT TYPE.

! SEE ARTICLE 3, COLOR.

A. Small Motor Control Switches:

(1) For small line-to-neutral motor loads of 3/4 HP or less, single phase, rated at 120 or 277 volts, provide snap-type, H.P. rated motor starter switch with thermal overloads. Overload heaters sized to match the motor nameplate amperes and the ambient temperature shall be provided. Provide with NEMA 1, NEMA 3R or other enclosure suitable for the location and atmosphere. All manual starters in finished areas shall be in flush-mounted enclosures.

3. COLOR

A. Color of devices shall be as selected by the architect. Samples (devices, plates or both) may be required to be submitted with other architectural color items by the Contractor. The Contractor shall coordinate any such submission required with other trades, the Prime Contractor or as needed.

B. Where devices are controlling or supplying emergency power from a standby source, the device color shall be red, as with switch toggles or receptacle fronts. Plate color shall match others on normal power in the building unless otherwise noted.

C. Where surface finishes next to the devices vary in color or shade throughout the project, the Contractor may be required to provide lighter or darker plates and devices to more closely match wall finishes. These variations are considered to be included in the original contract for construction.

4. MANUAL DIMMERS

A. Manual dimmers for incandescent, MR-lamp incandescent or fluorescent loads shall be matched to the type load intended to be controlled.

B. Power rating shall be verified by examining the plans and suitable for the load, but in no case less than circuit load. Furnish dimmers in nominal power ranges of 600W, 1000W, 1500 watts, etc.

C. Manual dimmers shall be provided with all solid state components, complete with choke coil and/or other R.F.I. suppression devices.

D. Manual dimmers shall be suitable for mounting in single gang outlet box, ganging together in multi-section boxes where indicated, without derating being necessary.

E. Manual dimmers shall be of the sliding-type, with detent stop at off position, full range control 0-100%. Lutron Company "Nova" Series or equivalent Lithonia, Lightolier.

F. Manual dimmers for fluorescent lighting or low voltage transformer-fed incandescent fixtures shall be matched to suit the characteristics of the particular manufacturer's electronic ballast or transformer used in the dimming - type fixture. Submit shop drawings of dimmer in the same submittal as the lighting fixtures.

5. PLATES AND COVERS

A. Unless otherwise specified or noted, all wiring device plates and covers shall be smooth thermoplastic, Hubbell "P" Series or equivalent G.E. or Leviton. Color shall match device unless otherwise indicated.

B. All kitchen, gymnasium or food service area plates shall be bright finish 302 stainless steel.

C. Cover plates shall be of one manufacturer insofar as possible.

D. Weatherproof plates for G.F.C.I. receptacles shall be cast aluminum, self-closing, gasketed, suitable for standard box mounting, U.L. listed for wet location use, cover closed. Vertical mounting - Hubbell WP26M, horizontal mounting - Hubbell WP26MH (die-cast zinc) or equivalent Leviton or G.E.

E. Weatherproof switch plates for toggle-handle switches shall be clear silicone rubber, for standard outlet boxes. Hubbell 1795 or equivalent G.E. or Leviton.

F. Cover plates for computer, telephone or other system outlets shall be as required to meet supplier or the owner's requirements, as applicable. Color to match

other plates on project. Furnish telephone plates with wall-mounting studs if mounted at 48" or higher. See devices schedule below.

6. COMMUNICATIONS DEVICES AND PLATES

A. Communications devices and wall plates furnished for this project shall all be standard products, of the same manufacturer. They shall consist of a wall plate bezel, capable of holding snap-in devices as indicated.

B. Color of communications wall plates shall match the color of all other plates furnished on the project, matching switch, receptacles, etc. Verify all color selections with the Architect.

C. The color of communications wall plate snap-in inserts shall be as noted herein, or shall be per the owner's standards, if applicable. Verify color requirements prior to ordering any materials.

D. Provide securely-fastened permanent labels in the faceplate of communications wall plates that clearly and legibly indicate the address or unique identifier for an individual jack.

E. All communications wall plates shall be provided with a bezel capable of holding a minimum of four separate device inserts, unless otherwise noted. Provide blank inserts to close any unused positions, of a color to match the plate.

F. Communications wall plates and devices shall be as manufactured by Panduit, Lucent Technologies, Leviton, AMP or approved equivalent.

DEVICE INSERT SCHEDULE	
Multimode Fiber Optic (Always Install in Pairs)	FDDI - Compatible 62.5/125µ, ST-Style Grey Color, Female (2 fibers terminated)
Ethernet Network Data	Category 5 - Enhanced or Category 6, 8 Pos/4 Pair Blue Color RJ-45, EIA/TIA 568AB (4 pairs terminated)
Voice Circuits 4 Pair	Category 5 - Enhanced or Category 6, 8 Pos/4 Pair White Color RJ-45, EIA/TIA 568B (4 pairs terminated)
Fiber Optic 2 Strands	"SC"-Style Connectors Mounted in Adjacent Pairs - Black Color
Voice Circuits 2 Pair	Category 3, 4 Pos/2 Pair Green Color RJ-11 (2 Pairs Terminated)
Video Circuits	"F" Connector Bulkhead Style White Color (RG-6 coax termination)
Blank Cover	Color to Match Wall plate
Wall Plate (4-Port/1 Gang)	Color to Match Wiring Devices Used in Adjacent Areas
Special Comm. Port for T-1 and Special Communication Circuits	Orange Color RJ-31X, 8 Pos/4 Pairs Terminated

7. STANDARD SINGLE-SERVICE FLOOR BOXES

A. In general, floor boxes to be used flush in concrete floors shall be of single-gang stamped steel construction, round, deep style, fully adjustable Hubbell B-2537 Series, Type 1 or equivalent.

B. Where multiple gangs are indicated on the plans (or elsewhere), multi-gang (up to 3 yokes maximum) stamped steel, rectangular, deep style units shall be used. They shall be fully adjustable, Hubbell B-2432 Series, Type 1, or equivalent.

Multiple-gang boxes shall be provided with removable partitions between each section in accord with N.E.C., where power and non-power circuits enter the same box.

C. In general, all cover plates for floor boxes shall be flush, solid brass. Provide typical plates as listed:

Duplex Outlet - Round, Duplex Flap - Hubbell S-3925
- Rectangular, Duplex Flap - Hubbell S-3825

Telephone or Data - Round, Combination 1" or 2 1/8" - Hubbell S-2725
-Rectangular, Combination 1" or 2 1/8" - Hubbell S-2625

D. Furnish floor boxes with threaded hubs as required to suit conduit routings, 3/4" minimum.

E. Furnish carpet flanges for all boxes installed in carpeted areas. Flanges to be clear polycarbonate plastic, round - Hubbell S-3079 or rectangular, for gangs indicated - Hubbell S-308 Series or equivalent.

F. Floor outlet boxes shall be installed dead level flush with wood, VCT, concrete or other hard surface type floor. Furnish special stop trims for terrazzo where required.

G. Outlets within floor boxes shall be as specified elsewhere in these specifications.

8. SPECIAL MULTI-SERVICE FLOOR BOXES

A. In general, floor boxes that are to contain multiple services such as power, data, voice, video, etc., shall be constructed of stamped steel and heavy thermoplastic with barriers or compartments to separate power from signal services per National Electrical Code.

B. Provide multi-service floor boxes with proper trim for carpet, wood, terrazo, tile or concrete floors, wiring slots, dust covers and proper device plates to hold outlets, jacks, etc. They shall be fully adjustable. Conduit rough-in shall be as required. All tops shall be capable of receiving an insert of the surrounding floor material.

C. Outlets for multi-service floor boxes shall be as specified elsewhere in these specifications.

D. Set boxes dead level with flooring and provide proper support by thickening concrete slab, welding angle iron across joists below or other approved means.

E. Multi-service floor boxes shall be capable of containing a minimum of two duplex receptacles and two 4-position single gang modular plates for voice, video or data jacks and shall be as manufactured by Hubbell #HBLCFB401 base with #HBLTCGNT cover, with all required accessories or equivalent Walker “RFS” Series or Lew. If not installed on carpeted floors, provide flush brass trim.

9. INSTALLATION

A. All wiring devices in dusty areas, exposed to weather and moisture shall be installed in Type "FS" or similar conduit fittings having mounting hubs, with appropriate cover plates.

B. Devices that have been installed before painting shall be masked. No plates or covers shall be installed until all finishing and cleaning has been completed.

C. Provide G.F.C.I. duplex feed-thru style receptacles in accordance with new U.L. Standard 943 where indicated or required by the National Electrical Code, whether specifically called out or not. When a G.F.C.I. receptacle is on a circuit with other non-G.F.C.I. receptacles, it shall always be placed at the homerun point of the circuit and shall be wired to ground-fault interrupt protect the downstream outlets on that circuit unless specifically indicated to the contrary. Provide a "G.F.C.I. protected" label on each downstream outlet.

D. GFCI devices shall be installed in a “readily accessible” location per NEC requirements. GFCI protected outlets required by plans or code shall be fed by a GFCI breaker or upstream GFCI device if they are not readily accessible.

E. Where surge suppression outlets are provided, they shall be ANSI Category "A" style. They shall be installed as dedicated-circuit outlets or where indicated with multiple outlets on a circuit, they shall be placed at the homerun point of that circuit and feed-thru wired to protect the downstream outlets on that circuit.

F. All receptacles shall be installed with ground prong at **top** position.

G. All outlets not provided with wiring devices shall be closed with a blank plate matching other plates in the area.

END OF SECTION 262726

SECTION 265113 – LED LIGHTING FIXTURES AND LAMPS

1. GENERAL

A. Furnish and install all lighting fixtures, as herein specified, complete with accessories for safe and effective operation. All fixtures shall be installed and left in an operable condition with no broken, damaged or soiled parts.

B. All items furnished shall comply with the latest standards applicable such as U.L., NEMA, etc., and shall bear labels accordingly. All fixtures shall be the color specified or as selected by the Architect. Wherever fixtures have evident damage, they shall be restored to new condition or shall be replaced. Likewise, fixtures showing dirt, dust or fingerprints shall be restored to new condition or shall be replaced.

C. A PDF copy of light fixture factory shop drawings and cuts, showing fixture dimensions, photometric data, installation data and, if applicable, air handling data, shall be submitted to the Engineer for written approval 30 days after bid date.

D. Locate pendant, surface mounted or chain-hung industrial fixtures in mechanical rooms and similar spaces to avoid ductwork and piping. Locate around and between equipment to maximize the available light. Request a layout from the Engineer if uncertain about an installation.

E. Alternate fixtures may be substituted for types specified by name or catalog number. Proposed substitutions must be submitted to the Engineer ten working days prior to bid date for written approval to bid. This written approval will only be issued in addendum form.

F. Where emergency battery packs are provided with fixtures (if any), they shall be connected to an unswitched power line and wired in accord with the manufacturer's recommendations. Test buttons and indicator lamps shall be visible and accessible with fixture door open, or shall be remotely flush mounted in the ceiling adjacent to the fixture.

G. Where remote emergency lighting transfer relays are provided, they shall be flush mounted in the ceiling adjacent to a controlled fixture. They shall be connected to an unswitched power line and installed in accord with the manufacturer's recommendations. Test buttons and indicator lamps shall be visible and accessible without removing ceiling tiles or access panels.

H. All reflecting surfaces, glass or plastic lenses, downlighting cones and specular reflectors shall be handled with care during installation to avoid fingerprints or dirt deposits. It is preferred that louvers be shipped and installed with clear plastic bags to protect louvers. At close of project, and after construction air filters are changed, remove bags. Any louver or cone showing dirt or fingerprints shall be cleaned with solvent recommended by the manufacturer to a like-new condition, or replaced as necessary in order to turn over to the Owner new fixtures at beneficial occupancy.

I. Refer to architectural details as applicable for recessed soffit fixtures or wherever fixture installations depend upon work of other trades. Coordinate all installations with other trades. Verify dimensions of spaces for fixtures, and if necessary, adjust lengths to assure proper fit and illumination of diffuser and/or area below.

J. Warranty shall start at Final Project Completion.

2. VOLTAGE

A. All lighting fixtures will be rated 120 volts.

3. LED FIXTURES

LED SOURCES

A. LED's shall be manufactured by a manufacturer who has produced commercial LEDs for a minimum of five (5) years.
B. Lumen Output – minimum initial delivered lumen output of the luminaire shall be as follows for the lumens exiting the luminaire in the 0-360 degree zone - as measured by IESNA Standard LM-79-08 in an accredited lab. Exact tested lumen output shall be clearly noted on the shop drawings.
C. Lumen output shall not decrease by more than 20% over the minimum operational life of 50,000 hours at the rated ambient operating temperature.
D. Individual LEDs shall be connected such that a catastrophic loss or the failure of one LED will not result in the loss of the entire luminaire.
E. LED Boards shall be suitable for field maintenance and have with plug-in connectors. LED boards shall be upgradable
F. Light Color/Quality:
    a) Correlated Color temperature (CCT) range as per specification, between 3000K, 3500K and 4000K shall be correlated to chromaticity as defined by the absolute (X,Y) coordinates on the 2-D CIE chromaticity chart.
    b) Color shift over 6,000 hours shall be <0.007 change in u' v' as demonstrated in IES LM80 report.
    c) The color rendition index (CRI) shall be 80 or greater
    d) LED boards to be tested for color consistency and shall be within a space of 2.5 MacAdam ellipses on the CIE chromaticity chart.

LED DRIVERS

A. Driver: Acceptable manufacturer: eldoLED, Sylvania, or Philips that meet or exceed the criteria herein.
B. Ten-year expected life while operating at maximum case temperature and 90 percent non-condensing relative humidity.
C. Driver should be UL Recognized under the component program and shall be modular for simple field replacement.

D. Electrical characteristics: 120 volt, UL Listed, CSA Certified, Sound Rated A+. Driver shall be > 80% efficient at full load across all input voltages. Input wires shall be 18AWG solid copper minimum.
E. Dimming: Driver shall be suitable for full-range dimming. The luminaire shall be capable of continuous dimming without perceivable flicker over a range of 100 percent to 0.1 percent of rated lumen output with a smooth shut off function unless specifically scheduled otherwise.
F. Dimming shall be controlled by a 0-10V signal unless specifically scheduled.
G. Driver shall include ability to provide no light output when the control signal drops below 0.5 V, and shall consume 0.5 watts or less in this standby.
H. Driver shall be capable of configuring a linear or logarithmic dimming curve.
I. Drivers shall track evenly across multiple fixtures at all light levels, and shall have an input signal to output light level that allows smooth adjustment over the entire dimming range regardless of the controller type
J. Flicker: Driver and luminaire electronics shall deliver illumination that is free from objectionable flicker as measured by flicker index (ANSI/IES RP-16-10). At all points within the dimming range from 100-0.1 percent luminaire shall have: Less than 1 percent flicker index at frequencies below 120 Hz and less than 12 percent flicker index at 120 Hz, and shall not increase at greater than 0.1 percent per Hz to a maximum of 80 percent flicker index at 800Hz
K. Driver disconnect shall be provided where required to comply with codes.

LED ELECTRICAL

A. THD: Total harmonic distortion (current and voltage) induced into an AC power line by a luminaire shall not exceed 20 percent at any standard input voltage and meet ANSI C82.11 maximum allowable THD requirements.
B. Surge Suppression: The luminaire shall include surge protection to withstand high repetition noise and other interference. Withstand up to a 1,000 volt surge without impairment of performance as defined by ANSI C62.41 Category A. To reduce false circuit breaker tripping due to turn on inrush, the following statement ensures that electronic dimming driver will meet NEMA inrush recommendations.
C. Rush Current: Meet or exceed NEMA 410 driver inrush standard of 430 Amps per 10 Amps load with a maximum of 370 Amps2 – seconds.
D. RF Interference: The luminaire and associated on-board circuitry must meet Class A emission limits referred in Federal Communications Commission (FCC) Title 47, Subpart B, Section 15 Non-Consumer requirements for EMI/RFI emissions
E. Driver must support automatic adaptation, allowing for future luminaire upgrades and enhancements and deliver improved performance.
F. Power Factor: The luminaire shall have a power factor of 90% or greater at all standard operating voltages and full luminaire output.

4. LIGHT FIXTURE GENERAL REQUIREMENTS

A. LED Recessed Lighting Fixtures - General Requirements

(1) The following are minimum requirements for recessed LED fixtures for lay-in grid, gypsum board, plaster and concealed spline ceilings. Surface-mounted LED fixture requirements shall be similar.

(2) Housings shall be a minimum of 4" depth, premium grade, constructed of a minimum 22 gauge die embossed or stiffened cold rolled pre-treated rust-resistant steel.

(3) All parts shall be finished with polyester powder or white baked enamel (85% minimum reflectance) painted after fabrication. All wiring shall be type TFN, or THWN and shall be covered by the steel driver cover or wiring channel. Exposed wiring is not acceptable. Connection wiring shall be accessible thru a hinged access plate above driver channel in top of unit.

(4) The complete light fixture unit shall be UL listed and labeled. Other agency listings may be acceptable with written approval from the Engineer.

(5) Fixture lens doors shall be reversible, hinged, painted after fabrication, with spring-loaded or other mechanically stable positive action latches.

(6) Lens shall be as specified for each fixture type. If a specific manufacturer and series number of lens is listed, the substitute shall be of the exact specification (thickness, prism configurations, transparency, efficiency, photometric distribution, hardness, vandal-resistance, etc.). Minimum average thickness of any prismatic lens shall be .125".

(7) Fixture trim and/or flanges shall conform with ceiling constructions as required. Verify all types prior to submission of shop drawings and indicate any special types on submittals. Fixtures installed in drywall or plaster ceilings to be provided with flange, screed and swing gate anchoring system.

(8) All fixtures shall be furnished with hold down clips to meet applicable seismic codes, four clips per fixture minimum or the equivalent thereof in the installation trim. Verify thickness of drywall or plaster ceilings prior to submission of shop drawings, to allow for proper trim adjustment.

(9) Support fixtures with one hanger wire at each end. Hanger wires shall be installed within 15° of plumb, maximum or additional support shall be provided. Wires shall be attached to the fixture body and to the building structure - not to the supports of other work or equipment.

(10) Each type of lay-in fixture shall be furnished with the proper housing flange or lip to suit the type of lay-in grid(s) being utilized on the project. The Contractor is to verify if narrow or standard grid members are being furnished and provide the proper type of light fixture trim. Indicate any special trims on shop drawing submittals.

B. Industrial and Striplight LED Fixtures - General Requirements

(1) Units shall have die-formed heavy gauge cold rolled steel channels and die-embossed reflectors.

(2) Finishes to be coated with a gloss powder paint or baked enamel finish with a minimum 85% reflectance.

(3) Units to have aligner clips where required for a continuous row appearance. Where continuous rows exceed twelve feet in length, provide a "unistrut" channel or similarly adequate mounting to stiffen and align row.

(4) Units to have captive latches for all covers and wire guards where specified. Wire guards shall be heavy-duty #14 wire gauge minimum with corrosion-resistant plated or vinyl finish.

(5) Units to be UL listed.

(6) Mounting brackets and hanging mechanisms shall be as specified in fixture descriptions, or as required. Allow a generous safety margin with all support systems, as recommended by the manufacturer.

C. Recessed Downlight - General Requirements

(1) Fixture to have an extruded or die-cast aluminum housing. Retaining mechanism shall provide easy access to LED array and driver box.

(2) Unit to have a corrosion-resistant steel junction box with hinged access covers and thermal protector.

(3) Mounting/plaster frame to be heavy gauge steel with finishing trim friction support springs, for the required ceiling thickness. Trim to be of color as selected by the Architect.

(4) Optical system to consist of a sealed LED module with diffuser.

(5) Provide telescoping channel bar hangers that adjust vertically and horizontally.

(6) Fixtures to be UL listed for thru-branch circuit wiring, recessed, and damp locations. Where installed in plaster or drywall or other inaccessible ceiling type, they shall be U.L. listed for bottom access.

D. Exit Lights - General Requirements

(1) Housings and canopies shall be die-cast aluminum or corrosion resistant steel. Edge-lit clear acrylic panel shall be provided where scheduled. Mountings shall be wall or ceiling, universal type, to suit the installation conditions.

(2) Provide with stencil face, lettering color red, of sizes in accord with code, or as otherwise specified.

(3) Provide single or double face as scheduled, indicated on plans or as required by the local authority having jurisdiction. Single face exit lights shall not be readable from the reverse side; acrylic blade style lights shall be furnished with an opaque barrier to block the reverse text image. Adjust installation position if required for clear visibility, in accord with applicable codes.

(4) Complete unit to be finished in color as selected by the Architect. Provide directional arrows as indicated on plans, as scheduled to suit the means of egress or as required by the local authority having jurisdiction.

(5) All exit signs shall be long life LED type.

(6) Where emergency backup battery packs are provided with exit lights, they shall have capacities for continuous operation per applicable codes. They shall have reserve battery capacity to operate remote lamps where indicated.

5. LIGHTING FIXTURE SCHEDULE

A. Refer to the contract drawings for Lighting Fixture Schedule

6. CONTROLS

A. Refer to Specification 260923-Lighting Control Devices for switching and controls.

SECTION 265113 - LIGHTING FIXTURES

7. GENERAL

A. Furnish and install all lighting fixtures, as herein specified, complete with lamps and accessories for safe and effective operation. All fixtures shall be installed and left in an operable condition with no broken, damaged or soiled parts.

B. All items furnished shall comply with the latest standards applicable such as U.L., NEMA, etc., and shall bear labels accordingly. All fixtures shall be the color specified or as selected by the Architect. Wherever fixtures have evident damage, they shall be restored to new condition or shall be replaced. Likewise, fixtures showing dirt, dust or finger prints shall be restored to new condition or shall be replaced.

C. Eight copies of light fixture factory shop drawings and cuts, showing fixture dimensions, photometric data, installation data and, if applicable, air handling data, shall be submitted to the Engineer for written approval 30 days after bid date. (Verify shop drawing quantities with the Architect.)

D. Locate pendant, surface mounted or chain-hung industrial fixtures in mechanical rooms and similar spaces to avoid ductwork and piping. Locate around and between equipment to maximize the available light. Request a layout from the Engineer if uncertain about an installation.

E. Alternate fixtures may be substituted for types specified by name or catalog number. Proposed substitutions must be submitted to the Engineer ten working days prior to bid date for written approval to bid. This written approval will only be issued in addendum form.

F. Where emergency battery packs or integral emergency transfer relays are provided with fixtures, they shall be connected to an unswitched power line and wired in accord with the manufacturer's recommendations. Test buttons and indicator lamps shall be visible and accessible with fixture door open, or shall be remotely flush mounted in the ceiling adjacent to the fixture.

G. Where remote emergency lighting transfer relays are provided, they shall be flush mounted in the ceiling adjacent to a controlled fixture. They shall be connected to an unswitched power line and installed in accord with the manufacturer's recommendations. Test buttons and indicator lamps shall be visible and accessible without removing ceiling tiles or access panels.

H. All reflecting surfaces, glass or plastic lenses, ballast housings, parabolic louvers, downlighting Alzak cones and specular reflectors shall be handled with care during installation or lamping to avoid fingerprints or dirt deposits. It is preferred that louvers be shipped and installed with clear plastic bags to protect louvers. At close of project, and after construction air filters are changed, remove bags. Any louver or cone showing dirt or fingerprints shall be cleaned with solvent recommended by the manufacturer to a like-new condition, or replaced as necessary in order to turn over to the Owner new fixtures at beneficial occupancy.

I. Where fixtures are scheduled to be provided with quartz restrike relay and lamp, for auxiliary or emergency illumination, the controlling relay shall be configured to energize the lamp on cold start or hot lamp restrike.

J. Refer to architectural details as applicable for recessed soffit fluorescent fixtures or wherever fixture installations depend upon work of other trades. Coordinate all installations with other trades. Verify dimensions of spaces for fixtures, and if necessary, adjust lengths to assure proper fit and illumination of diffuser and/or area below.

K. The use of pre-terminated lighting connectors (‘Reloc’ or similar) is prohibited.

8. VOLTAGE

A. All lighting fixtures will be rated 120, 277 or 480 volts, single phase as indicated or required.

9. BALLASTS

A. Electronic Instant-Start Fluorescent Ballast Specifications

(1) Fluorescent ballast to be instant-start high performance electronic to operate at a frequency of 20KHz or higher with less than 2% lamp flicker, at an input voltage of 108 to 132 VAC (120 volt line) or 249 to 305 VAC (277 volt line) at an input frequency of 60 Hz, minimum of .88 ballast factor, power factor of .98. Light output to remain constant for line voltage of ± 4%. Ballast to comply with EMI and RFI limits set by FCC (CFR 47 part 18) for normal electrical equipment and have less than 1.4 lamp current crest factor (or less if required by the fluorescent lamp supplier). Verify this prior to submitting shop drawings. Ballast to meet ANSI Standard 82.41 and be UL listed Class P Type I. Ballast shall be non-PCB bearing.

(2) Ballast to have less than 10% total harmonic distortion with less than 6% third harmonic distortion. Ballast to have "A" sound rating with a power factor greater than .99 and have a twenty year rated life. Ballasts used shall operate 1, 2, 3, or 4 T8 lamps as specified in the fixture specification. Use a 2, 3 or 4-lamp ballast to match number of lamps in fixture, and meet all switching requirements as shown on the drawings. Ballasts shall be unconditionally warrantied by the manufacturer for a period of three years from the date of substantial completion.

(3) Motorola, Advance, Universal or Valmont are acceptable manufacturers.

(4) Provide in-line fuse-holder(s), with fuse sized per manufacturer's recommendations for each 277 volt fixture.

NOTE: No single 2, 3, or 4 lamp ballast with 2 source input will be allowed for any fixture(s) shown supplied by both normal and emergency power.

B. Metallic vapor lamp (H.I.D.) ballast shall be rated 120 or 277 or 480 volts, 60 Hertz energy-saving high power factor, copper wound, auto regulator type for single lamp, complete with external fuse holder (Bussmann HLR) and as manufactured by Jefferson, G.E., or Advance. All vapor lamp ballasts shall be encapsulated or potted to minimize the amount of audible hum produced. No open core and coil ballasts shall be provided unless specifically indicated in the fixture description. Ballast factor for all H.I.D. ballasts shall be 1.0 ± 5% tolerance. Ballast shall deliver full wattage, to match the rating of the lamp, assuming proper input voltage, within the tolerance range noted.

C. Where lighting standards have fuses protecting ballasts, an in-line type of fuseholder shall be located at the base of the pole, readily accessible behind the handhole coverplate. Where multiple circuited luminaires are on a single pole, identify the separate fuseholders.

10. LAMPS

A. Lamps furnished and installed in indicated fixtures shall be as manufactured by G.E., Westinghouse, Phillips, Osram or Venture. Wherever possible, all lamps provided shall be manufactured in the United States of America.

B. All incandescent lamps shall be rated 130 volts with a medium screw type base (or as required) in wattages less than 300 watts and 130 volts, mogul screw type base in 300 watts and larger.

C. Fluorescent lamp to be T8 (one inch diameter), various lengths, wattages, rapid start with lamp efficacies of over 97 lumens per watt on electronic ballast, 91 lumens per watt on magnetic ballast, with a color rendering index (C.R.I.) of 65 or higher, medium bi-pin base configuration. Normal color to be 4100° Kelvin unless specified otherwise in fixture list. Normal power input to be 32 watts for 48" lamps. Lamps to have an average life of 15,000 hours at three hours per start. Lamps to operate at 265MA. Osram, Westinghouse, Philips, and General Electric are acceptable manufacturers.

D. (1) H.I.D. (low or high pressure sodium, mercury vapor, metal halide) lamps shall be suitable for the specified fixture, and as listed in the fixture schedule. All HID lamps shall be furnished with mogul base, unless otherwise noted or required. H.I.D. lamps used in outdoor fixtures shall have clear envelopes, in indoor fixtures they shall have diffuse coatings unless specifically indicated otherwise.

(2) Metal halide lamps shall be Osram "Super Metalarc" 4100° Kelvin correlated color and temperature (C.C.T.). Where used in horizontal burning positions, provide with position indicators on base. Consequently, all fixtures specified with horizontal metal halide lamps shall utilize position-oriented sockets, and lamps shall be installed per manufacturer's recommendations. No substitutions are permitted for this brand of metal halide lamp, where indicated for horizontal burning position. All metal halide lamps in any given area shall be the same color temperature rating and C.R.I. Clear lamps shall be 60 C.R.I. minimum, coated lamps shall be 70 C.R.I. minimum.

(3) Where a fixture containing an HID lamp utilizes a variable - focus or positioning socket, it shall be adjusted for the distribution pattern indicated.

E. "MR" incandescent lamps shall be 12 volt rated, with appropriate transformer for an eleven volt secondary voltage or as recommended by the lamp manufacturer, with matching dimmer where dimmers are indicated, rated specifically for the lamp/transformer combination. Where M.R. incandescent lamps are indicated to be furnished for line voltages, they shall be rated 130 volts.

F. Compact fluorescent lamps shall be amalgam type 4-pin by Phillips "PL", G.E. "Biax" or Osram. All compact fluorescent lamp/ballast combinations shall be rated for high power factor. No low power factor lamp/ballast combinations may be used.

11. LIGHT FIXTURE GENERAL REQUIREMENTS

A. Fluorescent Recessed Lighting Fixtures - General Requirements

(1) The following are minimum requirements for recessed fluorescent fixtures for lay-in grid, gypsum board, plaster and concealed spline ceilings. Surface-mounted fluorescent fixture requirements shall be similar.

(2) Housings shall be a minimum of 4" depth, premium grade, constructed of a minimum 22 gauge die embossed or stiffened cold rolled pre-treated rust-resistant steel. Troffers shall be equivalent to Hubbell "Versaline," Daybrite "Designer," Lightolier equivalent or Lithonia "2SPG" series.

(3) All parts shall be finished with polyester powder or white baked enamel (85% minimum reflectance) painted after fabrication. All wiring shall be type TFN, or THWN and shall be covered by the steel ballast cover, wiring channel, or socket track. Exposed wiring is not acceptable. Connection wiring shall be accessible thru a hinged access plate above ballast channel in top of unit.

(4) Ballasts shall be as specified. If a manufacturer and series number is listed, substitution by other manufacturers shall be of the exact same specification (sound rating, energy consumption, life expectancy, warranties, physical size, heat and temperature ratings), etc. All ballasts shall be instant-start, cool operating, of the electronic energy-saving type, UL and CBM listed.

(5) The complete light fixture unit shall be UL listed and labeled. Other agency listings may be acceptable with written approval from the Engineer.

(6) Fixture lens doors shall be reversible, hinged, painted after fabrication, with spring-loaded or other mechanically stable positive action latches.

(7) Lens shall be as specified for each fixture type. If a specific manufacturer and series number of lens is listed, the substitute shall be of the exact specification (thickness, prism configurations, transparency, efficiency, photometric distribution, hardness, vandal-resistance, etc.). Minimum average thickness of any prismatic lens shall be .125".

(8) Fixture trim and/or flanges shall conform with ceiling constructions as required. Verify all types prior to submission of shop drawings and indicate any special types on submittals. Fixtures installed in drywall or plaster ceilings to be provided with flange, screed and swing gate anchoring system.

(9) All fixtures shall be furnished with hold down clips to meet applicable seismic codes, four clips per fixture minimum or the equivalent thereof in the installation trim. Verify thickness of drywall or plaster ceilings prior to submission of shop drawings, to allow for proper trim adjustment.

(10) Support fixtures with one hanger wire at each end. Hanger wires shall be installed within 15° of plumb, maximum or additional support shall be provided. Wires shall be attached to the fixture body and to the building structure - not to the supports of other work or equipment.

(11) Each type of fluorescent (or other type) lay-in fixture shall be furnished with the proper housing flange or lip to suit the type of lay-in grid(s) being utilized on the project. The Contractor is to verify if narrow or standard grid members are being furnished and provide the proper type of light fixture trim. Indicate any special trims on shop drawing submittals.

(12) Lamps shall be as specified in lamp section of these specifications, and suitable for use in the fixture intended. If the lighting fixture manufacturer requires a specific lamp for optimum performance, that lamp shall be furnished.

(13) Do not provide pressure-lock or any other type of lampholder unless specifically indicated to the contrary or required by local codes. Fixtures may be shipped from the factory with lamps installed, at the Contractor's option.

B. Industrial and Striplight Fluorescent Fixtures - General Requirements

(1) Units shall have die-formed heavy gauge cold rolled steel channels and die-embossed reflectors.

(2) Finishes to be coated with a gloss powder paint or baked enamel finish with a minimum 85% reflectance.

(3) Units to have aligner clips where required for a continuous row appearance. Where continuous rows exceed twelve feet in length, provide a "unistrut" channel or similarly adequate mounting to stiffen and align row.

(4) Units to have captive latches for ballast covers, heavy-duty lampholders and wire guards where specified. Wire guards shall be heavy-duty #14 wire gauge) minimum with corrosion-resistant plated or vinyl finish.

(5) Ballasts to be as specified herein.

(6) Units to be UL listed.

(7) Mounting brackets and hanging mechanisms shall be as specified in fixture descriptions, or as required. Allow a generous safety margin with all support systems, as recommended by the manufacturer.

C. Recessed Ellipsoidal or Parabolic Cone Downlight - General Requirements

(1) Fixture to have an extruded or die-cast aluminum lampholder housing. Retaining mechanism shall provide easy access to lamp and ballast junction box. Lamp

holders shall be U.L. listed, compatible with the lamp type specified. All sockets shall be porcelain or high temperature plastic. No bakelite or fiber material shall be used.

(2) Unit to have a corrosion-resistant steel junction box with hinged access covers and thermal protector.

(3) Mounting/plaster frame to be heavy gauge steel with finishing trim friction support springs, for the required ceiling thickness. Trim to be of color as selected by the Architect.

(4) Optical system to consist of a specular clear Alzak upper ellipsoidal (or parabolic, as noted) reflector with specular Alzak cone or microgroove matte black baffle as noted in schedule. Units shall have a UL approved clear tempered glass protection lens where used with metal halide or quartz lamp. Where other than clear Alzak cone/reflector color is noted on the schedule, it shall be furnished as specified.

(5) Ballast to be HPF CWA 120 or 277 volt. Fixture to have a prewired, encased and potted ballast tray module. Ballast to be best sound rating available (least audible) for the class and wattage of lamp.

(6) Provide telescoping channel bar hangers that adjust vertically and horizontally.

(7) Minimum flange shall match cone finish or provide painted color as selected by the Architect on black microgroove baffle types.

(8) Lamps shall be as specified in lamp section of these specifications.

(9) Fixtures to be UL listed for thru-branch circuit wiring, recessed, and damp locations. Where installed in plaster or drywall or other inaccessible ceiling type, they shall be U.L. listed for bottom access.

(10) Refer to other sections of this specification for quartz restrike option requirements.

D. Exit Lights - General Requirements

(1) Housings and canopies shall be die-cast aluminum or corrosion resistant steel. Mountings shall be wall or ceiling, universal type, to suit the installation conditions.

(2) Provide with stencil face, lettering color red, of sizes in accord with code, or as otherwise specified.

(3) Provide single or double face as scheduled, indicated on plans or as required by the local authority having jurisdiction. Single face exit lights shall not be readable from the reverse side; acrylic blade style lights shall be furnished with an opaque barrier to block the reverse text image. Adjust installation position if required for clear visibility, in accord with applicable codes.

(4) Complete unit to be finished in color as selected by the Architect. Provide directional arrows as indicated on plans, as scheduled to suit the means of egress or as required by the local authority having jurisdiction.

(5) Lamps shall be long-life type, as specified.

(6) Where emergency backup battery packs are provided with exit lights, they shall have capacities for continuous operation per applicable codes. They shall have reserve battery capacity to operate remote lamps where indicated.

E. H.I.D. Lighting Fixtures - General Requirements

(1) For recessed indoor/outdoor fixtures, housing to be maximum of 20" high, constructed of 22 gauge die-formed, cold rolled steel finished with polyester powder (85% gloss, 89% reflectance) or baked enamel paint. Unit to be painted after fabrication.

(2) Surface-mounted indoor or outdoor fixtures shall have aluminum or steel housings as specified, finish or color as selected, wet or damp location U.L. listing as required and full gasketing to prevent insect entry. Provide charcoal or equivalent filter to allow fixture optical assembly to "breathe" for totally enclosed, gasketed fixtures.

(3) All wiring to be Type TFN or THWN; all wiring shall be enclosed by ballast covers, flexible conduits, or socket enclosure.

(4) Fixtures to have vertical lamp and extruded or die-cast aluminum heat dissipating finned socket housing. Socket shall be porcelain, with lamp shell to be nickel-plated, split type, 4 or 5 KV pulse rating, per U.L. Standards.

(5) Where fixtures are scheduled to have metal halide lamps, provide with clear tempered glass shield below lamp.

(6) Provide fixtures with high power factor constant wattage auto-transformer (CWA) 120, 277 or 480 volt (as specified or required) ballast, solidly anchored on hinged plate or power drawer that is easily accessible from below fixture. Provide ballast with single or double fusing as needed. Ballasts shall be encapsulated type, best available sound rating(least audible) for the class and wattage of lamp specified. Also see 4(D) above for additional requirements.

(7) Provide trim for lay-in, plaster, drywall, etc. applications as needed for recessed fixture.

(8) Lamps shall be as specified elsewhere in this section.

(9) Refer to other sections of this specification for quartz restrike option requirements.

12. LIGHTING FIXTURE SCHEDULE

Note: Each vendor proposing to bid the materials specified herein below is cautioned to review all requirements of the Contract Documents, as they may apply to the work involved, particularly Specifications Articles 1 thru 5 of this Section. The general materials requirements are to be met in their entirety by the contractors and vendors supplying these materials. Note: Unless otherwise noted, all 48" dimension fixtures shall be provided with 48" T8 32 watt 2900 lumen 4100°K C.C.T. lamps, quantity as specified, with companion 2, 3 or 4 lamp electronic ballasts. Where fixtures with ballasts have switches that controls lamps individually or in groups, the proper number of separate ballasts shall be provided. Refer to the drawings for specific control information.

TYPE DESCRIPTION: REFER TO THE DRAWINGS

13. PHOTOCELLS

A. Provide 120, 277 or 480 volt (rated as needed), 1000 or 2000 watt photocells as needed for control of certain circuits or fixtures as indicated on plans. They shall be as manufactured by Tork, Paragon, AMF or approved equivalent.

B. Mount photocells in locations concealed from sight lines standing on ground unless otherwise noted, in which case the final position shall be as directed by the Architect. Group together (if indicated at one location) and mount on back of parapet wall or otherwise properly support with mounting bracket. Coordinate with roofing installer to ensure that roof penetrations are properly made without violating or reducing the roof warranty in any way. Photocells may be mounted in other locations if it is not practical to install them on roofs or parapets, in which case the Contractor shall request direction for their mounting locations from the Engineer or Architect. Photocells shall always be mounted in a weatherproof, inconspicuous manner.

14. TIMECLOCKS

A. Provide synchronous motor-driven timeclock(s) to control the indicated loads. The number of poles, their ampacity and voltage withstand shall be to suit the load, but in no case less than 30 amps, 277 volts.

B. Timeclock coil and motor power shall be 120 volts AC, backed up with seven day spring winder which is automatically replenished in normal operation. Provide a 120 volt control circuit from the nearest available panelboard.

C. Provide with an astronomical dial, set up and calibrated for the week and month the timeclock is placed in operation. Order unit for the proper geographical latitude for the project site. Also provide day light savings time option and calibrate for April-October dates. Provide instruction to the Owner's representative in proper setting and operation of each type of timeclock provided.

D. Enclosures for timeclocks shall be surface type, NEMA 1 or NEMA 3R as needed. Where exposed in finished areas, provide flush-style NEMA 1 enclosures.

END OF SECTION 265113

SECTION 283100 - FIRE ALARM SYSTEM

1. GENERAL

A. SCOPE AND RELATED DOCUMENTS

(1) The work covered by and the intent of this section of the specifications includes the furnishing of all labor, equipment, materials, testing, programming and performance of all operations in connection with the installation of the Fire Alarm System as shown on the drawings, as herein specified and as required by the applicable codes.

(2) The requirements of all other applicable conditions of the Contract, Supplementary Conditions and General Requirements, apply to the work specified in this section.

(3) The complete installation shall conform to the applicable sections of NFPA-71, NFPA-72A, B, C, D, Local Code Requirements and National Electrical Code (Article 760). The requirements of any local fire department and the Authority Having Jurisdiction shall also be observed in the system installation and device layout.

(4) The work included in this section shall be coordinated with related work specified elsewhere in these specifications.

B. QUALITY ASSURANCE

(1) Every component, device, transmitter, software, etc., that are included in the work, to make up a complete Fire Alarm System shall be listed as a product by the manufacturer under the appropriate category by the Underwriters' Laboratories, Inc. (UL), and shall bear the "U.L." label.

(2) The system power, signal and controls wiring shall be UL listed for Power Limited Applications per NEC 760. All circuits shall be marked in accordance with NEC Article 760.

C. GENERAL

(1) This project involves the modification of an existing Simplex 4100 system. New devices shall be provided to meet the scope of work indicated on the drawings. All new devices must be compatible with the existing system. The system shall be fully tested at the completion of the project.

(2) All panels and peripheral devices shall be the standard product of a single manufacturer and shall display the manufacturer's name of each component. Any catalog numbers specified under this section are intended only to identify the type, quality of design, materials, and operating features desired.

(3) Equipment submissions for shop drawing review must include a minimum of the following:

a. Complete descriptive data indicating UL listing for all system components.

b. Complete sequence of operations of the system.

c. Complete system wiring diagrams for components capable of being connected to the system and interfaces to equipment supplied by others.

d. A copy of any state or local Fire Alarm System equipment approvals.

e. An Autocad (latest version) produced wiring diagram illustrating the basic floor plan of the building, showing all system wiring and equipment, as well as zoning boundaries and schedule of zone legends as intended to appear on annunciators. Provide three CD-Rom copies of as-built drawings and all system operational software at close of project, to be included in operation and maintenance manuals.

(4) No work shall be done until the drawings are approved by the Kentucky Department of Housing, Buildings and Construction.

D. OPERATION

(1) The system alarm operation subsequent to the alarm activation of any manual station, automatic detection device, or sprinkler flow switch shall be as follows:

a. 1) The appropriate initiating device circuit indicator (red color) shall flash on the control panel until the alarm has been silenced at the control panel. Once silenced, this same indicator shall latch on. A subsequent alarm received after silencing shall flash the subsequent zone alarm indicator on the control panel and resound alarms and flashing signals. These same conditions shall occur at any remote annunciator.

2) A pulsing alarm tone shall occur within the control panel until silenced.

b. All alarm indicating appliances shall sound in a temporal code pattern until silenced by an alarm silence switch at the control panel (or the remote annunciator, if any).

c. All doors normally held open by door control devices shall close. Doors shall also be released in the event of incoming normal power failure.

d. A supervised signal to notify the local fire department or an approved central station (as required by local codes) shall be activated.

e. A supervised signal shall directly activate, shut down or reconfigure the air handling systems as required by NFPA or as otherwise indicated herein. Provide necessary interlock wiring as required to control mechanical equipment..

f. The Contractor(s) shall coordinate with each other as necessary to provide all required auxiliary contacts, DDC systems interfaces, equipment, etc., as needed to shut down or otherwise control air handling systems per NFPA and all applicable codes.
g. The system shall be wired with two circuits to all Notification devices so that when an alarm is acknowledged, silencing the audibles, the visual units shall continue in operation until the main control panel has been reset. If local codes require other than this arrangement, the system shall be wired in accordance with the code that is applicable.

(2) The alarm indicating appliances shall be capable of being silenced only by authorized personnel operating the alarm silence switch at the main control panel or by use of a similar key operated switch at the remote annunciator (where remote units are provided). A subsequent alarm shall reactivate the signals. Operation of the alarm silence switch shall be indicated by trouble light and audible signal.

(3) The alarm activation of any elevator lobby shaft, pit or equipment room smoke detector shall, in addition to the operations listed above, cause the elevator cabs to be recalled according to the following sequence:

a. If the alarmed detector is in any location or on any floor other than the main level of egress, the elevator cars shall be recalled to the main level of egress.

b. If the alarmed detector is on the main egress level elevator lobby, the elevator cabs shall be recalled to the pre-determined alternate recall level.

c. Provide auxiliary contacts within the base of each elevator lobby smoke detector, with each separate landing to be wired back separately to the elevator controller. Coordinate all equipment terminations and sequence of operation with the elevator installer. The use of digital to analog controllers to accomplish this function will be acceptable, if in compliance with codes.

d. Provide heat detectors within 12" of each sprinkler head where they are installed in elevator equipment rooms, shafts or pits, in accordance with code. The temperature rating and wiring of the detectors shall be coordinated with the sprinklers, per ANSI Elevator Code and NFPA. Wire to interrupt elevator power per the applicable code.

(4) The activation of any standpipe water valve tamper switch or sprinkler zone valve tamper switch shall activate a distinctive system supervisory audible signal and illuminate a "Sprinkler Supervisory Tamper Switch" indicator at the system controls (and the remote annunciator[s]). There shall be a distinction in the audible trouble signals between valve tamper switch activation and opens or grounds on fire alarm circuit wiring.

a. Activating the trouble silence switch will silence the supervisory audible signal while maintaining the "Sprinkler Supervisory Tamper" indicator showing the tamper contact is still activated.

b. Restoring the valve to the normal position shall cause the audible signal and visual indicator to pulse at a fixed rate.

c. Activating the trouble silence switch shall silence the supervisory audible signal and restore the system to normal.

(5) Include with the control panel, as an auxiliary function, a built-in test mode that, when activated, will cause the following operation sequence:

a. The city connection circuit shall be disconnected.

b. Control relay functions shall be bypassed.

c. The control panel shall show a trouble condition.

d. The panel shall automatically reset itself.

e. Any momentary opening of an initiating or indicating appliance circuit shall cause the audible signals to sound for a minimum of two seconds to indicate the trouble condition.

(6) A manual evacuation switch shall be provided to operate the system indicating appliances and/or initiate "Drill" procedures.

(7) Activation of an auxiliary bypass switch shall override the automatic functions either selectively or throughout the system and initiate a trouble condition at the control panel.

(8) Include any and all detection equipment and interface relays as required to provide a 100% code approved and supervised pre-action Fire Suppression system. Coordinate with the Fire Protection installer as required.

E. SUPERVISION

(1) The system shall contain Class "B" (Style "B") independently supervised initiation circuits as required for the zoning indicated. Circuits shall be arranged so that a fault in any one zone shall not affect any other zone. The alarm activation of any initiation circuit shall not prevent the subsequent alarm operation of any other initiation circuit.

(2) There shall be supervisory initiation circuit(s), as required, for connection of all sprinkler valve tamper switches. Wiring methods which require any fire alarm initiation circuits to perform this function shall be deemed unacceptable; i.e.,

sprinkler and standpipe tamper switches (N/C contacts) shall NOT be connected to circuits with fire alarm initiation devices (N/O contacts). These independent initiation circuit(s) shall be each labeled "Sprinkler Supervisory Tamper Switch" and shall differentiate between tamper switch activation and wiring faults. Provide individual annunciation for the main post indicator valve and each tamper switch as indicated by the zoning schedule on the plans or as otherwise required by codes. For these circuits and all exterior underground copper circuit wiring, provide proper surge suppression and protection for circuit.

(3) There shall be independently supervised and independently fused indicating appliance circuits as required for alarm audible signals and flashing alarm lamps.

(4) All auxiliary manual controls shall be supervised so that all switches must be returned to the normal (automatic) position to clear system trouble.

(5) Each independently supervised circuit shall include a discrete (amber color) "Trouble" indicator to indicate disarrangement conditions, per each circuit.

(6) The incoming power to the system shall be supervised so that any power failure shall be audibly and visually indicated at the control panel and the annunciator. A green color "power on" indicator shall be displayed continuously while incoming power is present.

(7) The system batteries shall be lead-acid type, supervised so that disconnection or failure of a battery shall be audibly and visually indicated at the control panel (and the annunciator).

(8) Wiring to a remote annunciator (if provided for system) shall be supervised for open and ground conditions. An independent annunciator trouble indicator shall be activated and an audible trouble signal shall sound at the control panel.

F. POWER REQUIREMENTS

(1) The control panel shall receive 120 VAC power via a dedicated circuit. The incoming circuit shall have suitable overcurrent protection within the control panel, as well as at the circuit source. If additional circuits are required for this or other control units, they shall be provided by the Contractor.

(2) If the facility is equipped with an emergency standby power generator, the fire alarm equipment shall be connected to this system, per N.E.C.

(3) The system control panel and auxiliary equipment, such as power supplies shall be provided with sufficient battery capacity to operate the entire system upon loss of normal 120 VAC power in a normal supervisory mode for a period of time as required by codes for the building occupancy. There shall be reserve battery capacity to drive all alarm appliances for five minute indication at the end of this period. The system shall automatically transfer to the standby batteries upon power

failure. All battery charging and recharging operating shall be automatic. Batteries, once discharged, shall recharge at a rate that will provide a minimum of 70% capacity in 12 hours, or sooner if required by codes.

(4) All circuits requiring system operating power shall be 24 VDC and shall be individually fused at the control panel.

(5) Power supplies for Notification signals, whether in the main panel or within remote power supply cabinets, shall be designed to provide a minimum of 20% spare capacity for future signals.

G. FIRE ALARM CONTROL PANEL

(1) Where shown on the plans, provide and install the Fire Alarm Control Panel. Construction shall be modular with solid state, microprocessor based electronics. All visual indicators shall be high contrast, light-emitting diode type.

(2) The control panel shall contain the minimum following features as per plans:

- Minimum Capacity of 120 Control or Monitor Points or greater, to Suit Building Requirements, expandable to 1000 points
- Initiation Device Circuits
- Alarm Indicating Appliance Circuit
- Supervised Annunciator Circuits
- Local Energy City Connection, if required
- Form C Alarm Contacts (2.0 Amps ea., minimum of two unless otherwise required)
- Earth Ground Supervision Circuit
- Automatic Battery Charger, of proper rating
- Standby Battery, Lead/Acid Type
- Resident non-volatile programmable operating system for all operating requirements
- Supervised Manual Evacuation Switch
- Internal power supplies as required for auxiliary functions as indicated
- Auxiliary contacts or relays for auxiliary functions as indicated
- All Custom Software and Programming as required to suit the project requirements

H. SYSTEM SOFTWARE AND PROGRAMMING

(1) Provide all programming and software necessary to place annunciators and controls in full operation. System set-up shall allow for changes in annunciator legends without rewiring or addition of programming or electronics. Furnish initial programming and reprogramming as needed to accommodate changes in the system up to the time of system acceptance by the engineer without extra charge.

I. REMOTE ANNUNCIATOR

(1) Where indicated on the plans, provide and install annunciator/control panel. The panel shall be of vandal-resistant construction and shall contain a liquid crystal illuminated display for alphanumeric indication of all required functions. The panel shall also contain the following control functions, activated by a master system enable key switch on front panel:

a. Remote system reset switch, to complement main control panel reset switch.

b. Remote alarm signal silence switch.

c. Remote manual evacuation switch, to initiate fire drill functions, same as at main control panel.

d. Remote trouble silence switch to silence trouble alarms in annunciator panel and main control panel.

e. Install panel on properly sized outlet box, 54" AFF to centerline. Panel shall contain tamper-resistant LED test switch in panel, local audible alarm, system power on, trouble LED indicators and master system enable key switch, keyed alike with the main control panel.

(2) Annunciator legends shall be custom, to display both zone number and brief legend indicating the area or device associated with that zone. The legends shall be electronically generated on an alphanumeric display panel. The fire alarm system vendor shall coordinate the legends with the Engineer at shop drawing review.

(3) Wiring between main control panel and annunciator(s) shall be fully supervised, and accomplished over twisted shielded pair and/or THWN wiring as required by the manufacturer, per N.E.C. and NFPA.

J. PERIPHERAL DEVICES

Note: On fully digital multiplex systems, provide addressable devices, bases or modules for devices listed herein. Each device shall be an individual address on the system. Addressable bases or modules shall be U.L. listed for the device served.

(1) MANUAL PULL STATION

a. Manual stations shall be double action and shall be constructed of high impact, red lexan or cast metal with raised white lettering and a smooth high gloss finish. The manual pull station shall have a hinged front with key lock. Stations shall be keyed alike with the fire alarm control panel. When the station is operated, the handle shall lock open in a protruding manner. Furnish one key for each manual station to owner at close of project, during instruction period. Install within 60" of each exit, per code, whether indicated on the drawings or not.

(2) CEILING-MOUNTED SMOKE DETECTORS, PHOTOELECTRIC TYPE

a. Furnish and install where indicated on the plans or required, ceiling-mounted smoke detectors. Provide separate outlet-box mounted base with auxiliary relay, or standard base, as required.

b. Smoke Detectors shall be listed to U.L. Standard 268 and shall be compatible with their control equipment. Detectors shall be listed for this purpose by Underwriters' Laboratories, Inc. The detectors shall obtain their operating power from the fire alarm panel supervised detection loop. Loss of the operating voltage shall interrupt the supervisory circuit of the fire alarm detection loop and cause a trouble signal to be generated at the control panel. Detectors shall be capable of being reset at the main control panel.

c. No radioactive materials shall be used. Detector construction shall provide mounting base with twist-lock detector head. Contacts between the base and head shall be of the bifurcated type using spring-type, self-cleaning contacts. Removal of the detector head shall interrupt the supervisory circuit of the fire alarm detection loop and cause a trouble signal at the control panel. Detector design shall provide full solid state construction, and compatibility with other normally open fire alarm detection loop devices such as heat detectors, pull stations, etc.

d. To minimize nuisance alarms, voltage and RF transient problems, suppression techniques shall be employed as well as a smoke verification circuit and an insect screen. The detector head shall be easily disassembled to facilitate cleaning.

e. Remote LED alarm indicators shall be installed where required.

f. Smoke detectors (and all other system electronics) shall be shielded to protect circuitry from EMI problems generated by power fields, cellular phones, etc.

g. Special Note: The Contractor installing smoke detectors shall use care in the final positioning of all devices. They shall not be installed closer than 36" from an air diffuser or return grille, closer than 24" from a ceiling/wall intersection, or similar location that would diminish detector performance. Refer to and comply with NFPA 72E, "Standard On Automatic Fire Detectors".

h. Provide smoke detector at each fire alarm system control component, as required by code.

(3) AUTOMATIC HEAT DETECTORS (RATE-OF-RISE TYPE)

a. Automatic heat detectors shall be combination rate-of-rise and fixed-temperature type. When the fixed-temperature portion is activated, the units shall be non-restorable and give visual evidence of such operation. Heat detectors shall be

135, 165 or 195NF, as indicated on plan. Where not indicated, provide 165º F units. Provide as indicated or required.

(4) AUTOMATIC HEAT DETECTORS (FIXED TEMPERATURE TYPE)

a. Where indicated on the plans, provide automatic heat detectors of the non-restorable type, of the temperature rating as indicated or required. Detector heads shall be mounted to an outlet-box mounted base. Provide auxiliary contacts as needed. Provide as indicated or required.

(5) AUDIBLE AND VISUAL UNITS

a. Audible signals shall be polarized and shall be operated by 24 VDC. Each audible assembly shall include separate wire leads for in/out wiring for each leg of the associated signal circuit. T-tapping of signal device conductors to signal circuit conductors will not be accepted. The audible visual units shall be equipped with a xenon-type strobe which shall be semi-flush mounted on 4" square outlet box. Each audible device shall produce a minimum sound pressure level of 92db at 36" on axis. Provide units as manufactured by Wheelock, Inc., or approved equivalent. Locate as indicated or required. All audible tones for same function shall be identical, per NFPA. Provide sufficient audible units to comply with code for required coverage. Provide temporal coded signals.

b. The output intensity of all visual units, their locations and mountings shall be in compliance with the latest version of the Americans with Disabilities Act requirements.

c. Audible units and visual units shall be wired to separate Notification circuits, allowing for silencing of audibles with alarm acknowledgment, continuing operation of strobes until system reset. Addressable devices may be used to fulfill this requirement.

d. Provide system-wide synchronization of all visual devices, so that all strobes flash at the same rate and at the same time, complying with A.D.A.

(6) VISUAL UNITS

a. Stand-alone visual indicating units shall be xenon type strobe matching audio-visual units. These devices shall be UL listed and be or wall mounted. A high-impact clear lens shall project out from backplate. Lettering, if any, shall be oriented upright to the standing viewer. Candela output values of all visual units shall be selected for the covered spaces geometry and size, complying with A.D.A. and NFPA.

(7) DOOR HOLDERS

a. Magnetic door holders shall be 24 volt A.C., and shall have an approximate holding force of 25 lbs or greater, if required to restrain door. The door-mounted portion shall have a plated steel pivot mounted armature with shock absorbing bearing. Unit shall be capable of being either surface, flush, semi-flush or floor mounted as required. Door holders shall be UL listed for their intended purpose. Where door mounted, locate armature 6" down from top and 6" in from strike side of leaf. Where door swing prevents direct contact between armature and holder pole piece, provide non-removable plated chain to close gap as tightly as possible. Verify holder positioning with Architect prior to mounting any devices. Unless otherwise indicated, provide semi-flush mounted holders 6" below top of door leaf as noted above, with blocking in wall to support force of door impact against holder and outlet box. Provide at all needed locations as indicated or required. Coordinate with architectural hardware schedule, as applicable to project.

(8) DUCT SMOKE DETECTORS

a. Duct smoke detectors shall be of the solid state photoelectric type, operating on the light scattering photodiode principle. The detectors shall ignore invisible airborne particles or smoke densities that are below the set alarm point. No radioactive materials shall be used. The basic construction of duct smoke detectors shall be the same as that previously described for ceiling-mounted smoke detectors. Duct housing couplings shall be slotted to insure proper alignment of the sampling and exhaust tubes. Detector shall have an alarm status LED visible through a transparent cover, panel or in housing.

b. The Contractor shall furnish air duct smoke detectors with template to the sheetmetal or air handling unit installer for installation. Coordinate length of sampling probe required and furnish appropriate length. Probe tube shall be located in accord with manufacturer's recommendations, to give maximum sampling rate of airflow. Provide multiple detectors, as required, if a single device will not provide adequate sensing due to duct size or air velocity. Wire multiple detectors on a single air handling system as a single zone or address unless otherwise required by prevailing codes. Field verify quantity of detectors needed to provide NFPA-compliant coverage of the air handling unit and provide as required.

c. Detector supervised power and alarm wiring (from F.A. control panel) is to be provided by the Contractor. Interlock wiring from auxiliary contacts to stop or otherwise control air handling unit fan motor(s) is to be provided by the Contractor. Provide auxiliary contacts as required. Zone wiring and indication for air duct smoke detectors shall be maintained separate from area detection devices. Detector shall be capable of being reset at the main control panel, and at a local test/reset station.

d. Where air duct smoke detectors are located in other than Mechanical Rooms or in spaces not easily visible, a remote alarm/power indicating LED key reset

station shall be installed. These remotes shall be ganged together, if required, and labeled accurately as to which unit is reporting an alarm condition.

e. Where air duct smoke detectors are indicated to be furnished at concealed air handling units above ceilings or smoke damper locations, furnish as outlined above. Also provide remote indicating alarm LED flush in corridor wall at 7'-0" A.F.F. immediately below installation, or as close as practical to installation. The Contractor is to provide control wiring, E.P. switches, etc., as required to operate smoke dampers, as well as the required operating circuit. Coordinate all requirements with the installer of smoke dampers.

f. Ionization - type detectors shall not be utilized for air duct smoke detection.

g. All air duct smoke detector installations and materials shall be in accord with U.L., NFPA, and any other applicable codes.

(9) WEATHERPROOF DEVICES AND EXPLOSION-PROOF DEVICES

a. Where the anticipated atmosphere or installation conditions require weather-proof, explosion-proof or other specially housed devices, they shall be U.L.-listed and NFPA-compliant and provided as indicated or required. Verify installation conditions and indicate type of device on shop drawing submission.

(10) END OF LINE RESISTOR

a. End-of-line devices (if required) shall be flush-mounted, located at 7'-0" A.F.F. in corridor walls or as indicated.

(11) GUARDS FOR DEVICES

a. Where detectors, manual stations, signals, etc., require or are indicated to be furnished with a guard, utilize a U.L. listed unit, compactly covering and compatible with the device. Provide as indicated or required. Guards shall not diminish the performance of any device.

(12) DIGITAL ALARM COMMUNICATOR/TRANSMITTER

a. Provide a U.L.-listed and NFPA-compliant digital alarm communicator/transmitter (D.A.C.T.). Install at telephone terminal board or telephone service entrance and provide supervised wiring to fire alarm control panel as required. This unit may be semi-flush mounted at the F.A.C.P. location with prior approval by the Engineer. It may also be integrated within the main control panel, if U.L.-listed for the purpose.

b. The installation and connection of the D.A.C.T. shall be in compliance with all provisions of N.F.P.A. 71 and all other applicable codes. The installation and connection shall be acceptable to the Authority Having Jurisdiction, as well as

the telephone company (or companies) over whose lines the signal(s) will be transmitted. Include any costs associated with telephone company work and services required in bid. Telephone connection shall be in compliance with NFPA 71, chapter five.

c. The D.A.C.T. shall be capable of transmitting all information relative to system status changes due to alarm, trouble, water flow, and any other information as required by current codes applicable to the facility. This information shall be transmitted to a U.L. listed Central Receiving Station, that also is maintained in accord with the requirements of NFPA 71. Connect system to transmit signals as required by local codes.

d. As a part of this contract, the services of a Central Receiving Station shall be engaged for a period of one year from the date of substantial completion, this date as defined elsewhere in these documents. The Central Receiving Station facility selected shall be in full compliance with NFPA and other applicable requirements. The Contractor shall initiate this service, provided on a contract basis, and shall include any costs associated with this provision in his bid. The actual beginning date of the contract with the central receiving station may be adjusted at the discretion of the Engineer, but in no case shall be for less than one year. The contractor shall notify the owner in writing by certified mail that this service has been contracted for and explain the provisions of this service adequately. A copy of this communication and the return receipt shall be forwarded to the Architect and the Engineer.

(13) REMOTE POWER SUPPLY UNITS FOR PERIPHERAL

a. Provide remote power supply(ies) as required for proper system operation.

b. Remote power supplies shall be provided with local intelligence compatible with the digital multiplex network, so they have a unique address, providing the ability to monitor the supply for loss of power, shorts, grounds and other supervisory functions.

c. Where required by the fire alarm system manufacturer, remote power supplies shall be provided that will provide sufficient current to drive audio/visual or other required devices.

d. These units shall be located in electrical closets, mechanical rooms or similar spaces. They shall not be installed in finished areas, storage rooms, etc., without the permission of the Engineer. All locations shall be indicated on the shop drawing submissions.

e. Provide dedicated 120 volt power circuit(s) from nearby panelboards as required, whether indicated on the plans or not.

K. INSTALLATION

(1) Provide and install the system in accordance with the plans and specifications, all applicable codes and the manufacturer's recommendations. All wiring shall be in a completely separate conduit system from power wiring or other raceway systems. Minimum conduit size shall be 3/4" trade size. Maximum wire fill shall be 40%, for any raceway system.

(2) All junction boxes shall have coverplates painted red and labeled "Fire Alarm". A consistent wiring color code shall be maintained throughout the installation. The number of wiring splices shall be minimized throughout. Excessive wire splicing (as determined by the Engineer), shall be cause for rejection of the work.

(3) All circuit breakers and disconnects serving fire alarm equipment shall be marked in red and clearly labeled as Fire Alarm Circuits.

(4) Installation of equipment and devices that pertain to other work in the contract shall be closely coordinated with the appropriate tradesmen or other contractors.

(5) The Contractor shall clean all dirt and debris from the inside and the outside of the fire alarm equipment after completion of installation.

(6) The manufacturer's authorized representative shall provide on-site supervision of installation, and shall perform the initial "power-up" of the system after he has thoroughly checked the installation.

(7) Operation and maintenance manuals submitted for this project shall list names, license numbers, and telephone numbers of at least two installers that are employed full time by the supplier/manufacturer to install and test fire alarm systems in the installation location.

A floor plan drawing indicating fire alarm devices and wiring only, shall be provided by the manufacturing company for job site use. These drawings shall be approved by the State Fire Marshal's Office or Local Authority Having Jurisdiction, as appropriate and in accord with code requirements. A copy of this drawing shall be submitted to the Engineer for his review, approval and project records.

L. TESTING

(1) The completed fire alarm system shall be fully tested in accordance with NFPA-72H by the contractor in the presence of the Owner's representative and the Local Fire Marshal. Upon completion of a successful test, the Contractor shall certify the test results in writing to the Fire Marshal, Owner, General Contractor, Architect and Engineer. Provide one week's written advance notice of the test to all concerned parties.

(2) All auxiliary devices the fire alarm system is connected to, including tamper switches, flow switches, elevator controls, remote receiving stations, etc., shall be fully tested for proper operation where interfacing with the fire alarm system.

(3) The Contractor shall provide a minimum of three hours of instructional time to the Owner in the operation and maintenance of all equipment and components. A receipt shall be obtained from the Owner that this has been accomplished, and a copy forwarded to the Engineer. Provide additional training time if required by the Owner at no charge to the contract or as direct charge to the Owner.

M. WARRANTY

(1) The Contractor shall unconditionally guarantee (except for vandalism or misuse) the completed fire alarm system wiring and equipment to be free from inherent mechanical, software and electrical defects for a period of one year from the date of substantial completion.

(2) The equipment manufacturer shall make available to the Owner a maintenance contract proposal to provide a minimum of two inspections and tests per year in compliance with NFPA-72H guidelines.

END OF SECTION 283100