

CONTRACT DOCUMENTS AND SPECIFICATIONS

FOR

City of South Bend 2016 Parking Garage Improvements

Project No. 115-143

Prepared for

**CITY OF SOUTH BEND, INDIANA
BOARD OF PUBLIC WORKS**

By

Byce & Associates, Inc.

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Kalamazoo, MI 49007
Project Number 16100101

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Registered Professional Engineer
State of Indiana No. **PE19500012**

FOR BIDS DUE: April 12, 2016 at 9:30 AM



**City of South Bend, Indiana
Department of Public Works**

**2016 Parking Garage Improvements
Project No. 115-143**

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NOTICE TO BIDDERS

Notice is hereby given that the City of South Bend, Indiana, will receive sealed bids at the **Office of the Board of Public Works, 13th Floor, County-City Building, Room 1316, 227 West Jefferson, South Bend, Indiana, until the hour of 9:30 a.m., Local Time, on April 12, 2016**, for the following:
2016 Parking Garage Improvements Project No. 115-143

Work includes the removal and replacement of the existing mechanical systems in two elevator equipment rooms at the Wayne Street Parking Structure and two elevator equipment rooms in the Leighton Plaza Parking Structure in South Bend, Indiana. The project also includes the removal and replacement of the existing elevator controls, motor & signals, etc., all more particularly described in plans and specifications prepared by Byce & Associates, Inc. 487 Portage St. Kalamazoo, MI. 49007, phone 269-381-6170.

Specifications are available for download by visiting the City of South Bend's web page at www.southbendin.gov:

- X Click on "Business"
- X Click on "City Bids"
- X Click on "RFP, Vehicle, Equipment and Miscellaneous Bids"
- X Scroll down to "Specification Sets Available"
- X Select specification to download
- X Print the specification or save it to your computer
- X If interested in the bid; input company information (address/phone/fax/e-mail) where indicated on the RFP, Vehicle, Equipment and Miscellaneous Bids page
- X Click "Submit"

There is no charge for the specifications. The specifications are also available for review only during regular working hours in the Department of Public Works, 1308 County-City Building, South Bend, Indiana 46601.

Bids received after **9:30 a.m., Local Time, on April 12, 2016**, will be returned unopened.

Bids must be on the City of South Bend Bid/Proposal form provided, which includes a Contractor's Non-Collusion and Non-Debarment Affidavit, Certification regarding Investment with Iran, Employment Eligibility Verification, Non-Discrimination Commitment and Certification of Use of United States Steel Products or Foundry Products Form. Certified Check or Bid Bond in the amount of not less than 5% must be submitted with the bid. A refund of the bid security will be issued upon satisfaction of Bid Award.

The Board may reject any bid that does not conform to these requirements as non-responsive.

A **Mandatory Pre-Bid Conference** will be held on **March 23, 2016 at 10:00 a.m.**, Local Time, at the Parking Structures. We will first meet at the Southeast corner of the top level of the Wayne Street Parking Structure located at 121 E. Wayne Street, South Bend, Indiana, 46601, and follow up with a meeting on the top level of the Leighton Plaza Parking Structure located at 111 W. Jefferson Blvd., South Bend, Indiana 46601. Any questions about bidding conditions must be addressed to Richard Estes (restes@southbendin.gov), in writing no later than 5:00 pm local time, March 25, 2016.

The Board reserves the right to reject any or all bids or to accept a full or partial award of the bid or bids which, in its judgment, will be to the best interest of the City of South Bend.

BOARD OF PUBLIC WORKS
Linda M. Martin, Clerk

Publish two times:
March 11, 2016
March 18, 2016

CITY OF SOUTH BEND
STATEMENT OF POLICY

The Board of Public Works of the City of South Bend has adopted the following policy regarding the receipt of sealed bids:

All sealed bids submitted to the Board of Public Works must be received in the Board of Public Works Office, 1316 County-City Building, South Bend, Indiana, no later than the advertised time on the advertised date of the bid opening.

It shall be the responsibility of the bidder to see that his/her bid is received prior to the deadline stipulated in the bid advertisement.

Bids submitted by mail and received after the advertised time deadline will not be considered by the Board.

CITY OF SOUTH BEND
BOARD OF PUBLIC WORKS

Linda M. Martin, Clerk

NOTE: Incoming mail does not reach the Board of Public Works until after 9:30 a.m. Local Time. If you are sending your bid via Federal Express or another overnight source, please confirm that your package will arrive before the bid opening date and time.

CITY OF SOUTH BEND

EQUAL EMPLOYMENT OPPORTUNITY CONTRACTING PROVISIONS DIVERSITY UTILIZATION

It is the policy of the City of South Bend to provide equal employment and business opportunity for all persons, partnerships, companies, and corporations in accordance with the rules, regulations and guidelines of the applicable federal, state and local laws. This policy of equal employment and business opportunity shall apply to every contractor or subcontractor bidding or holding a public contract with the City of South Bend.

In furtherance of this policy, the following Equal Opportunity Clauses are hereby made a part of every construction contract entered into by the City of South Bend and all subcontractors entered into pursuant to any such contract and the bidder hereby certifies that it/he/she will abide by these provisions.

The contractor will not discriminate against any applicant or employee because of race, color, religion, sex, national origin, or handicap. The contractor will take affirmative action to ensure that all applicants or employees are treated fairly and equitably. Such action shall include but not be limited to the following: hiring, upgrading, demotion or transfer, recruitment, advertising, lay-offs or termination, rates of pay or other forms of compensation and selection for training including apprenticeship programs.

The contractor shall agree to post in conspicuous places available to employees and applicants, notices to be provided setting forth the provisions of the Non-Discrimination Clause.

The contractor will, 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, or national origin.

The contractor will send to each labor union or representative of workers with which he has a bargaining agreement or other contract or understanding, a notice to be provided, advising the labor union or worker's representatives of the contractor's commitment under this section, and shall post copies of the notices in conspicuous places available to applicants and employees.

The contractor will comply with all provisions of Executive Order 11246 (as amended by 11375) and of the rules, regulations and relevant orders of the Department of Labor.

Subpart B -- Contractors' Agreements

Sec. 202. Except in contracts exempted in accordance with Section 204 of this Order, all Government contracting agencies shall include in every Government contract hereinafter entered into the following provisions:

"During the performance of this contract, the contractor agrees as follows:"

"(1) The contractor will not discriminate against any employee or applicant for employment because of race, color, religion, sex, or national origin. The contractor will take affirmative action to ensure that applicants are employed, and that employees are treated equally during employment, without regard to their race, color, religion, sex or national origin. Such action will include, but not be limited to the following: employment, upgrading, demotion, or transfer; recruitment or

recruitment advertising; layoff or termination; rates of pay or other forms of compensation; and selection for training, including apprenticeship. The contractor agrees to post in conspicuous places, available to employees and applicants for employment, notices to be provided by the contracting officer setting forth the provisions of this nondiscrimination clause."

"(2) The contractor will, 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 or national origin."

"(3) The contractor will send to each labor union or representative of workers with which he has a collective bargaining agreement or other contract of understanding, a notice, to be provided by the agency contracting officer, advising the labor union or workers' representative of the contractor's commitments under Section 202 of Executive Order No. 11246 of September 24, 1965, and shall post copies of the notice in conspicuous places available to employees and applicants for employment."

"(4) The contractor will comply with all provisions of Executive Order No. 11246 of September 24, 1965, and of the rules and regulations, and relevant orders of the Secretary of Labor."

"(5) The contractor will furnish all information and reports required by Executive Order No. 11246 of September 24, 1965, and by the rules, regulations, and orders of the Secretary of Labor, or pursuant thereto, and will permit access to his books, records, and accounts by the contracting agency and the Secretary of Labor for purposes of investigation to ascertain compliance with such rules, regulations, and orders."

"(6) In the event of the contractor's noncompliance with the nondiscrimination clauses of this contract or with any of such rules, regulations, or orders, in this contract may be cancelled, terminated or suspended in whole or in part and the contractor may be declared ineligible for further Government contracts in accordance with procedures authorized in Executive Order No. 11246 of September 24, 1965, and such other sanctions may be imposed and remedies invoked* as provided in Executive Order No 11246 of September 24, 1965, or by rule, regulations, or order of the Secretary of Labor, or as otherwise provided by law."

"(7) The contractor will include the portion of the sentence immediately preceding paragraph (1) and the provisions of paragraphs (1) through (7) in every subcontract or purchase order unless exempted by rules, regulations, or orders of the Secretary of Labor issued pursuant to Section 204 of Executive Order 11246 of September 24, 1965, so that such provisions will be binding upon each subcontractor or vendor. The contractor will take such action with respect to any subcontract or purchase order as the administering agency may direct as a means of enforcing such provisions including sanctions for noncompliance: Provided, however, that in the event a contractor becomes involved in, or is threatened with, litigation with a subcontractor or vendor as a result of such direction by the administering agency the contractor may request the United States to enter into such litigation to protect the interests of the United States."

The applicant further agrees that it will be bound by the above equal opportunity clause with respect to its own employment practices when it participates in federally assisted construction work: Provided, that if the applicant so participating is a State or local government, the above equal opportunity clause is not applicable to any agency, instrumentality or subdivision of such government which does not participate in work on or under the contract.

The applicant agrees that it will assist and cooperate actively with the administering agency and the Secretary of Labor in obtaining the compliance of contractors and subcontractors with the equal opportunity clause and the rules, regulations, and relevant orders of the Secretary of Labor, that it will furnish the administering agency and the Secretary of Labor such information as they may require for the supervision of such compliance, and that it will otherwise assist the administering agency in the discharge of the agency's primary responsibility for securing compliance.

The applicant further agrees that it will refrain from entering into any contract or contract modification subject to Executive Order 11246 of September 24, 1965, with a contractor debarred from, or who has not demonstrated eligibility for, Government contracts and federally assisted construction contracts pursuant to the Executive Order and will carry out such sanctions and penalties for violation of the equal opportunity clause as may be imposed upon contractors and subcontractors by the administering agency or the Secretary of Labor pursuant to Part II, Subpart D of the Executive Order. In addition, the applicant agrees that if it fails or refuses to comply with these undertakings, the administering agency may take any or all of the following actions: Cancel, terminate, or suspend in whole or in part this grant (contract, loan, insurance, guarantee); refrain from extending any further assistance to the applicant under the program with respect to which the failure or refund occurred until satisfactory assurance of future compliance has been received from such applicant; and refer the case to the Department of Justice for appropriate legal proceedings.

** Corrected to read "invoked". In the original text the word "involved" was printed in error.*

MINORITY AND WOMEN BUSINESS ENTERPRISE DIVERSITY DEVELOPMENT PROGRAM

The City of South Bend, Indiana has shown its commitment to addressing Minority Business (“MBE”) and Women’s Business Enterprise (“WBE”) participation in public contracting through the adoption of the City of South Bend Ordinance No. 10081-11. Persons, partnerships, corporations, associations, or joint ventures awarded a contract by the City of South Bend through its agencies, boards, or commissions shall not discriminate against any employee or applicant for employment in the performance of a City contract with respect to hire, tenure, terms, conditions, or privileges of employment, or any matter directly or indirectly related to employment because of race, sex, religion, color, national origin, ancestry, age or disability that does not affect that person’s ability to perform work.

The goal for MBE/WBE participation for the purchase of work, labor, services, supplies, equipment, materials, or any combination in this project is 7.1% of the total bid amount, whether it be base bid or base bid plus alternate(s). Minority and Women’s Businesses are described on the Indiana Department of Administration website: <http://www.in.gov/idoa/>. It is the bidder’s sole responsibility to verify whether any listed minority or woman business meets the qualifications of a Minority or Women’s owned business. Documentation shall be provided with the bid that states the MBE/WBE that will be contracted, the dollar amount of the work that will be performed on the project and the percentage of the dollar amount as it relates to the total bid amount by using Form MWBE-1.0, Proof of MBE/WBE Participation Goal Form.

In the event the bidder cannot meet the MBE/WBE participation goal set for this project, the award of the contract under public bidding laws or other contracts in which public bids are not required by law, the City, its agencies, boards, or commissions requires the Contractor’s good faith efforts to obtain participation by those Contractors classified as a Minority Business (“MBE”) or as a Women’s Business Enterprise (“WBE”).

Failure to either meet the MBE/WBE participation goal set forth in this project or provide ALL the required evidence of good faith efforts with the bid will be grounds for rejecting a bid as non-responsive.

The requirements that bidders shall supply as good faith efforts to have active participation from MBEs and/or WBEs on this Project is written documentation evidencing the efforts by using Form MWBE-2.0, Evidence of Good Faith Efforts and Form MWBE-2.1, MBE/WBE Contacted. Such documentation shall include but is not limited to the following items:

- a. A listing of all MBE/WBEs contacted including: (1) the name and address of the MBE/WBE; (2) the date of contact; (3) the type of contact (i.e. phone call, written solicitation, etc.); (4) the nature or type services or goods requested; and (5) the result of the contact.
- b. Written evidence of outreach and copies of email exchanges inviting and receiving quotes or other responses from MBE/WBE businesses or other documentations of efforts to encourage and secure competitive quotes from MBE/WBE and local businesses to be included in the benefits of building this Project.
- c. Written documentation of letters of introduction, invitations to forging majority/minority strategic alliances for capacity building including but not limited to mentoring, extensions of assistance on payroll, insurance, bonding, line of credit, technical skills or business skills.

All bidders are actively encouraged to reach out to the MBE/WBE businesses in St. Joseph County, Indiana and other local Indiana counties to utilize a good faith effort to forge constructive and lasting business partnerships.

Notwithstanding the foregoing, the award and performance of all City contracts shall comply with applicable federal, state, and local laws.

DEPARTMENT OF PUBLIC WORKS
CITY OF SOUTH BEND, INDIANA

SPECIAL PROVISIONS

**2016 Parking Garage Improvements
Project No. 115-143**

I. PROJECT DESCRIPTION

Work to be performed shall include furnishing all labor, services, materials, insurance and equipment to provide and install **mechanical equipment, elevator equipment, electrical equipment, insulation, gypsum board, and metal joists** according to the intent of the plans and specifications at the **Wayne Street and Leighton Plaza Parking Structures**.

II. PREVAILING SPECIFICATIONS AND DESIGN & CONSTRUCTION STANDARDS

The City of South Bend's **PREVAILING SPECIFICATIONS**, most recent version, and **DESIGN & CONSTRUCTION STANDARDS**, most recent version, are to be used on this project.

Each Bid provider is specifically instructed to become completely familiar with the most recent version of the **PREVAILING SPECIFICATIONS** and the **DESIGN & CONSTRUCTION STANDARDS** prior to submitting a Bid.

Wherever the **PREVAILING SPECIFICATIONS** refer to "State Specifications," it shall mean the 2014 INDOT Standard Specifications for the letting effective after September 1, 2013.

These **SPECIAL PROVISIONS** will list only "Additions" or "Deletions" to the **PREVAILING SPECIFICATIONS** and are to be used only in conjunction with the **PREVAILING SPECIFICATIONS**.

In the event of conflict between the **SPECIAL PROVISIONS** and the **PREVAILING SPECIFICATIONS**, the **SPECIAL PROVISIONS** will govern.

III. BIDDING REQUIREMENTS

A. Prevailing Specifications: 2014, INDOT Standard Specifications Section 102

B. Additions:

1. Each Bid provider shall completely execute and submit the following documents with the Bid:
 - a. City of South Bend Contractor's Bid for Public Work Form
 - b. Bid Bond stating 5% of the total Bid or Certified Check of 5% of the bid.
 - c. Contractor's Non-Collusion and Non-Debarment Affidavit, Certification Regarding Investment with Iran, Employment Eligibility Verification, Non-Discrimination Commitment and Certification of use of United States Steel Products or Foundry Products.

IV. TERM "OR EQUAL"

A. Prevailing Specifications: None

B. Additions:

1. Where the term "or equal" is used in these specifications, the Bid provider deviating from specified item shall file with his/her Bid a letter fully explaining and justifying his/her proposed article or equal. The City of South Bend shall be the sole judge in determining if the "or equal" offered meets the specification.

V. TAX EXEMPT

A. Prevailing Specifications: None

B. Additions:

1. Materials and properties purchased under contract with the Owner that becomes a permanent part of the structure or facilities constructed are not subject to the Indiana Gross Retail Tax (Sales Tax). The exemption number will be furnished to the Contractor upon award.

VI. INDEMNIFICATION

A. Prevailing Specifications: None

B. Additions:

1. Contractor agrees to indemnify, defend and hold harmless the City of South Bend, its agents, officers and employees, from all costs, losses, claims and suits, including court costs, attorney fees, and other expenses, arising from or out of the negligent performance of this Contract by Contractor, or because of arising out of any defect in the goods, materials or equipment supplied by the Bid provider.

VII. INSURANCE

A. Prevailing Specifications: 2014, INDOT Standard Specifications Section 103

B. Additions:

1. All Contractors and subcontractors doing business with the City of South Bend shall present a Certificate of Insurance showing coverage in the following minimum amount:
 - a. General Liability: Premises-Completed Operations or Products, Bodily Injury and Property Damage Combined Single Limit - \$5,000,000.
 - b. There shall be no exclusion for explosion, collapse or underground hazard.
 - c. Workmen's Compensation: Statutory State of Indiana Employer's Liability - \$100,000.
 - d. Auto Liability: Bodily Injury and Property Damage Combined Single limit - \$1,000,000
 - e. City of South Bend shall be named as additional insured on the Certificate of Insurance.

VIII. AWARD OF CONTRACT

A. Prevailing Specifications: 2014, INDOT Standard Specifications Section 103

B. Additions:

1. All Bids will remain subject to acceptance for sixty (60) calendar days after the day of the Bid opening, but the City of South Bend may, in its sole discretion, release any Bid and return the Bid security prior to that date.
2. Successful bidder from award notice will have fourteen (14) calendar days to submit a fully executed contract, Certificated of Insurance, and other require documents from either the awarded contactor and/or the subcontractors. Failure to comply within the award period may be cause for the Board of Public Works to rescind the award.

IX. BONDING REQUIREMENTS

A. Prevailing Specifications: 2014, INDOT Standard Specifications Section 103

1. Additions:

a. The successful Bid provider shall supply the following bonds:

- (i) Payment Bond within seven (7) days of Notification of Award for an amount equal to one hundred percent (100%) of the contract amount.
- (ii) Performance Bond within seven (7) days of Notification of Award for an amount equal to one hundred twenty-five percent (125%) of the contract amount.
- (iii) Maintenance bond within ten (10) days of acceptance of the project by the City of South Bend, for an amount equal to ten percent (10%) of the final contract price, guaranteeing for a period of three (3) years after the date of acceptance of the project by the City of South Bend.

X. CONTROL OF WORK

A. Prevailing Specifications: 2014, INDOT Standard Specifications Section 105

B. Additions:

1. The complete responsibility for this project lies with the Director of Public Works of the City of South Bend, Indiana acting through his authorized representatives.
2. Construction Engineering - The Contractor shall provide all the necessary, qualified personnel, equipment and supplies to perform all work required under this item. There will be no direct payment for this item.
3. The contractor is responsible to maintain the site which includes but is not limited to; dust control, site security, erosion control, and protecting adjacent properties.
4. Work hours for the Project shall be from 7:00 a.m. through 6:00 p.m., Monday through Friday. No work shall be permitted on weekends, Holidays, or after hours unless approved by the City of South Bend Department of Public Works.
5. All work must be coordinated with the current property managers, Downtown South Bend.

6. Work is to be coordinated with events that will occur in the area. These events include, but are not limited to, First Friday events held each month, the Sunburst Marathon on June 4, and the two-way conversion project.

XI. LEGAL RELATIONS

- A. Prevailing Specifications: 2014, INDOT Standard Specifications Section 107w
- B. Additions:
 1. The Owner, where mentioned in these documents, is the City of South Bend. The Engineer, where mentioned in these documents, is Byce & Associates, Inc..
 2. The Contractor shall apply for and obtain any and all required permits for the work from local, state, and federal agencies and shall comply with permit requirements, including the St. Joseph County / City of South Bend Building Department.
 3. If the Contractor awarded this contract is not a resident of Indiana, within thirty days, the Contractor shall provide the Engineer with proof that the Contractor is duly licensed, qualified and registered with the Secretary of State of Indiana to engage in business within the State of Indiana.

XII. SUBMITTALS

- A. Prevailing Specifications: 2014, INDOT Standard Specifications Section 106
- B. Additions:
 1. Submit four (4) copies or an electronic version of the submittals for all equipment or materials used in this project to the South Bend Department of Public Works for approval. All submittals must be delivered within 7 calendar days from the notice to proceed.
 2. The Department of Public Works will review and return two (2) copies or an electronic version of the submittals within five (5) working days.
 3. The review of the submittal information by the Department of Public Works is to facilitate the satisfactory acceptance of the equipment. This review shall neither relieve the contractor from the responsibility for deviations from the Specifications, nor from errors and omissions in the shop drawings or literature. Parts found not meeting the requirements of these Specifications shall be removed, repaired or replaced at no cost to the OWNER.
 4. Submittals shall include complete manufacturer's descriptive information and shop drawings for all the parts furnished under this contract.
 5. Upon completion of project, the Contractor will supply one (1) conformed set of all submittals to the City of South Bend.

XIII. PROSECUTION AND PROGRESS

- A. Prevailing Specifications: 2014, INDOT Standard Specifications Sec. 108
- B. Additions:

1. The project will have a completion date of (168) calendar days after the date of the Notice to Proceed for all work. The contract time will start when the Notice to Proceed is delivered and signed.
2. The City, Engineer, and Contractor will hold a pre-construction meeting following award of the contract. The date of the Notice to Proceed will be agreed at that meeting.
3. Contractor shall provide a schedule to the Owner prior to beginning any work on the site.

XIV. CHANGE OF CONTRACT TIME

A. Prevailing Specifications: 2014, INDOT Standard Specifications Section 108

B. Additions:

1. The Contract Time may only be changed by Change Order. Any Claim for an extension in the Contract Time shall be based on written notice delivered to the Department of Public Works within seven (7) calendar days of the occurrence of the event giving rise to the claim. Notice of the extent of the claim with supporting data shall be delivered within fourteen (14) calendar days after such occurrence unless an official of the Public Works Department allows an additional period of time to ascertain more accurate data. The Contract Time will be extended in an amount equal to time lost to delays beyond the control of the Contractor if a claim is made in accordance with this provision. Such delays shall include acts of neglect by the Public Works employees, or to fires, flood, labor disputes, epidemics, abnormal weather conditions, governmental procedures, or acts of God.
2. Unless otherwise provided, the Contract time is based upon normal weather conditions. An extension is granted for weather conditions significantly more severe than normal if the Contractor demonstrates to the satisfaction of the City that the delay in the progress of the work was due to such weather. The basis to define normal weather will be the data compiled by the United States Department of Commerce, National Oceanic and Atmospheric Administration (NOAA).
3. No extension of time will be granted if the Contractor, by his/her/its own action or inaction, including fault or negligence of Contractor's subcontractors, caused the delay, or for which any remedies are provided under any other provision of this agreement.
4. The grant of an extension of time under this Section in no way constitutes a waiver by the City of any rights or remedies existing under this contract at law or in equity.

XV. DEFAULT AND TERMINATION

A. Prevailing Specifications: 2014, INDOT Standard Specifications Section 108

B. Additions:

1. Events of Default shall include Contractor's failure to perform any of its obligations under this contract including failure to commence work at the time specified, failure to perform the work in accordance with these specifications, unauthorized discontinuation of the work, failure to carry out the work in a manner acceptable to the City, failure to observe Federal, State, or local laws or regulations, and failure to comply with any other term of this contract.
2. If an Event of Default occurs, the City shall provide Contractor written notice and may permit Contractor ten (10) calendar days after the date of the notice to cure the default. If the default is not cured within the ten (10) day cure period, the City may at any time

thereafter terminate this contract in which case the termination shall be final and effective.

3. Upon an Event of Default, the City may invoke the following remedies in addition to those remedies provided under separate provisions of this contract, the right of set-off against any payments due or to become due to the Contractor against the retainage, the right to take over and complete the Work. If the City notifies Contractor that City is invoking its right to complete the Work, all rights that the Contractor has in order under Contractor's subcontracts are assigned to the City, subject to the City's right to take assignment of all or only selected subcontracts at the City's discretion. The sole obligation accepted by the City under such subcontracts is to pay for Work satisfactorily performed after the date of the assignment. In the event a conditional assignment has not been executed, the Contractor shall execute or cause to be executed any assignment, agreement, or other document that may be necessary in the sole opinion of legal counsel to the City's Board of Public Works to evidence compliance with this provision. The Contractor shall promptly deliver such documents upon the City's request. In the case of such assignment, unless otherwise agreed in writing, The Contractor remains liability to subcontractors for any payment already involved, and for any claim, suit or cause of action based upon or resulting from any error, omission, negligence or other breach of contract by the Contractor, its officers, employees, or agents arising prior to the date of assignment to the City.

XVI. LIQUIDATED DAMAGES

A. Prevailing Specifications: 2014, INDOT Standard Specifications Section 108

B. Additions:

1. The contractor shall proceed with the work at such rate of progress to insure full completion within the Contract Time. It is expressly understood and agreed, by and between the Contractor and the Owner, that the Contract Time for completion of the work described herein is a reasonable time, taking into consideration the average climatic and economic conditions and other factors prevailing in the locality of the work, and excludes the time for unavoidable delays which were beyond the control and without the fault of the Contractor.
2. If the Contractor shall fail to complete the work within the Contract Time, or extension of time granted by the Owner, then the Contractor will pay to the Owner the amount for liquidated damages a sum of five hundred dollars (\$500.00) for each calendar day that the Contractor shall remain in default after the time of completion stipulated in the Contract Documents.
3. The Contractor shall not be charged with liquidated damages or any excess cost when the delay in completion of the work is due to the following and the Contractor has promptly given written notice of such delay to the Owner and Engineer/Architect.
 - a. To any preference, priority, or allocation order duly issued by the Owner.
 - b. To unforeseeable causes beyond the control and without the fault or negligence of the Contractor, including but not restricted to acts of God, acts of public enemy, acts of the Owner, acts of another Contractor in the performance of a Contract with the Owner, fires, floods, epidemics, quarantine restrictions, strikes, freight embargoes, and abnormal and unforeseeable weather.

XVII. RETAINAGE AND FINAL PAYMENT

A. Prevailing Specifications: 2014, INDOT Standard Specifications Section 109

B. Additions:

1. Payments will be made every thirty (30) calendar days.
2. Consistent with provisions of IC 36-1-12-14, the Board of Public Works shall retain a percentage of payments throughout the duration of the project.
3. Before final payment and retainage are released the Contractor must satisfy the following:
 - a. All parts and labor meet requirements stated in the specifications.
 - b. Provide copies of test reports or cut sheets on all materials supplied.
 - c. Provide As-Built drawings in accordance with the City of South Bend Prevailing Specifications for Public Works.
 - d. One (1) copy of the City of South Bend Completion Affidavit and one (1) copy of a Final Waiver of Lien.

XVIII. WARRANTY

A. Prevailing Specifications: None

B. Additions:

1. All parts shall include the following:
 - (i) Performance specifications;
 - (ii) Bill of materials
 - (iii) Warranties on all parts; and
 - (iv) Installation and safety requirements.

XIX. OTHER UTILITIES

A. Prevailing Specifications: None

B. Additions:

1. The Contractor shall verify the locations of all utilities by contacting Holey Moley at 1-800-382-5544 at least two (2) working days, not counting Saturdays, Sundays or federal and state holidays before proceeding with construction. It shall also be the Contractors responsibility to contact any other utility that is not contacted by Holey Moley and verify the utility locations.
2. The Contractor shall be responsible for working with the other utilities, i.e., gas electric, telephone, etc. in order to assure that all utilities that need to be replaced or relocated can be done with a minimum disturbance to service. The Contractor shall also be responsible for coordinating schedules with the various utilities such that they can proceed with their relocation work as efficiently as possible.
3. If the odor of natural gas is detected in a work area at any time during the course of work, the Contractor shall immediately notify NIPSCO at 1-800-634-3524. The Contractor shall

also immediately notify the residents of adjacent properties. The Contractor shall advise the residents to evacuate their homes immediately if the odor is present within the dwelling.

4. Unless an allowance is specified in the bid tab, the restoration of sprinkler systems damaged by the Contractor's operations shall be repaired at no cost to the City and Owner of the system. If an allowance is provided in the bid tab, the City will reimburse the Contractor up to the allowance amount for sprinkler repairs. Restoration of sprinkler systems damaged by the Contractor's operations exceeding the allowance will be considered incidental to the contract.

XX. MAINTENANCE OF TRAFFIC

- A. Prevailing Specifications: 2014, INDOT Standard Specifications Sections 105 & 801
- B. Additions:
 1. Maintenance of traffic during construction shall conform to the "Indiana Manual on Uniform Traffic Control Devices" and the City of South Bend Design and Construction Standards.
 2. The attached "Traffic Closure Request" form is to be used for any lane restrictions or closures and required to be filled out and sent to the Department of Public Works.
 3. The Contractor shall arrange and prosecute the work specified for this contract in such a manner that traffic on existing streets is unrestricted throughout the Project. The Engineer shall approve the method of traffic control. No construction equipment, vehicles, materials, supplies or temporary facilities shall be left unattended in the right-of-way of any street or left parked overnight without proper marking and lighting.
 4. After the award of the contract and before beginning the work, the Contractor shall submit his proposed schedule of operations for the review of the Engineer. The schedule of operations as reviewed by the Engineer shall be maintained at all times.
 5. There will be no direct payment for this work.

XXI. DESCRIPTION OF WORK

- A. Prevailing Specifications: None
- B. Additions:
 1. Work to be performed shall include furnishing all labor, services, materials, insurance and equipment to the removal and replacement of the existing mechanical systems in two elevator equipment rooms at the Wayne Street Parking Structure and two elevator equipment rooms in the Leighton Plaza Parking Structure South Bend The project also includes the removal and replacement of the existing elevator controls, motor & signals, etc.
 2. The **Base Bid** covers the providing and installing of improvements according to the intent of the Plans and Specifications.
 3. The Contractor shall preserve and protect all surrounding property, structures, tenants, visitors and their property from damage caused by the Contractor's operations.

XXII. MUNICIPAL OPERATIONS

A. Prevailing Specifications: None

B. Additions:

1. The Contractor shall be responsible for trash, yard waste, and recycling collection within the project limits. The Contractor shall coordinate with the City of South Bend Solid Waste, Waste Management, and other pickup services as requested to ensure collection services are maintained. The Contractor shall be required to collect bins, place them in a common point for easy access by automated truck services, and redistribution after pickup as requested.
2. The Contractor shall be responsible for snow removal within the project limits and shall coordinate with City of South Bend Public Works. The Contractor is responsible for protecting his project site from excessive wear and tear during snow removal.

XXIII. PLANS

A. Prevailing Specifications: City of South Bend Design and Construction Standards

B. Additions:

1. The plans consist of **five (5)** Sheets.
2. The work shall conform to the plans.
3. The drawings are schematic in nature.
4. The CONTRACTOR is responsible for estimating dimensions and quantities of materials.
5. In the event that the Special Provisions and the Plans conflict, the Special Provisions shall govern.

227 W. JEFFERSON BOULEVARD
 SUITE 1316 COUNTY-CITY BUILDING
 SOUTH BEND, INDIANA 46601



PHONE 574/ 235-9251
 FAX 574/ 235-9171
 TDD 574/ 235-5567

CITY OF SOUTH BEND

**DEPARTMENT OF PUBLIC WORKS
 CLOSURE REQUEST FORM**

***FAX OR MAIL FORM 3 WORKING DAYS (EXCLUDES WEEKENDS) BEFORE REQUIRED 48 HR PUBLIC NOTICE
 48 HR PUBLIC NOTICE ANNOUNCED UPON APPROVED FORM

Partial/One Lane Full Road Closure Right-of-Way Sidewalk Closure

Submission Date:		<input type="checkbox"/> Original		<input type="checkbox"/> Revision		#	
Applicant			Phone #			Fax #	
Permit/Project #							
Street							
Location(s)		From:			To:		
Date(s)		From:			To:		
Time(s)		From:			To:		
Contractor Performing Work							
On-Site Contact			Phone #				
Work to be Performed:							
Reason for Closure:							
Affected Customers:							
Attach the following items:							
<input type="checkbox"/> Traffic Control Plan		<input type="checkbox"/> Detour Plan		<input type="checkbox"/> Barricades, Signs, Flashers or Other Signage Details			

OFFICE USE ONLY:

Approved Approved as Noted Revise Revise as Noted

Authorized Signature: _____ Date: _____



**CITY OF SOUTH BEND, INDIANA
CONTRACTOR'S BID FOR PUBLIC WORK
CHECKLIST FOR BIDDERS**

Project Name 2016 Parking Garage Improvements
Project No. 115-143
For Bids Due 9:30am April 12, 2016

From time to time the South Bend Board of Public Works finds it necessary to reject a bid because it does not comply with statutory requirements. In preparing your bid, please use the following checklist in order to make sure that your bid is done in the proper manner.

___ Proper bid security included. The bidder has the option of providing either a Certified Check or Bid Bond.

___ Bid prepared on the City of South Bend Contractor's Bid for Public Work Form, completely executed.

___ Contractor's Non-Collusion and Non-Debarment Affidavit, Certification Regarding Investments with Iran, Employment Eligibility Verification, Non-Discrimination Commitment, and Certification of use of United States Steel Products or Foundry Products.

___ Proof of MBE/WBE Participation Goal Form [MWBE-1.0]. If minimum participation goal is not met, also provide Evidence of Good Faith Efforts Form [MWBE-2.0] and MBE/WBE Contacted Form [MWBE-2.1].

___ Acknowledge Receipt of ___ Addendum(s) included with the bid.

___ All required additional information is included with the bid.

___ Proposal statements and other affidavits all signed by the proper party with name either printed or typed underneath signature.

___ This checklist submitted with the Bid.

This checklist is provided for bidder's use in assuring compliance with required documentation; however, it does not include all specifications requirements and does not relieve the bidder of the need to read and comply with the specifications.

Bidder: _____ Date: _____

By Authorized Representative:

Signature: _____

Print Name & Title: _____



CITY OF SOUTH BEND, INDIANA CONTRACTOR'S BID FOR PUBLIC WORK

Project Name 2016 Parking Garage Improvements

Project No. 115-143

For Bids Due 9:30am April 12, 2016

PART I

(Must be completed for all bids. Please type or print)

Date: _____ Bidder (Firm): _____

Address: _____

City/State/Zip: _____ Telephone Number: () _____

Agent of Bidder (if Applicable): _____

Pursuant to notices given, the undersigned offers to furnish labor and/or material necessary to complete the public works project of:

_____ the City of South Bend, Indiana, in accordance with plans and specifications prepared by:

_____ and dated _____ for the sum of (enter the Total Bid as shown on the Proposal)

_____ (\$ _____)
(Enter sum of Total Base Bid plus Alternates shown on Proposal) (Numerical)

The undersigned further agrees to furnish a bond or certified check with this bid for an amount specified in the notice of the letting. If alternative bids apply, the undersigned submits a proposal for each in accordance with the notice. Any addendums attached will be specifically referenced at the applicable page.

If additional units of material included in the contract are needed, the cost of units must be the same as that shown in the original contract if accepted by the City of South Bend. If the bid is to be awarded on a unit basis, the itemization of the units shall be shown on a separate attachment.

By _____
(Signature)

(Printed Name of Person Signing)

ACCEPTANCE

The above bid is accepted this _____ day of _____ 20 _____

Subject to the following conditions: _____

BOARD OF PUBLIC WORKS

Gary A. Gilot, President

David P. Relos, Member

Elizabeth A. Maradik, Member

Therese J. Dorau, Member

James A. Mueller, Member

Attest: Linda M. Martin, Clerk

PART II

(For projects of \$100,000 or more – IC 36-1-12-4)

These statements to be submitted under oath by each bidder with and as part of his bid.

Attach additional pages for each section as needed.

SECTION I EXPERIENCE QUESTIONNAIRE

1. Attach information regarding projects your organization has completed for the period of one (1) year prior to the date of the current bid.
2. Attach a listing of public works projects currently in process of construction by your organization.
3. Attach information regarding any failure to complete any work awarded to you and the location thereof.
4. Attach references from private firms for which you have performed work.

SECTION II PLAN AND EQUIPMENT QUESTIONNAIRE

1. Attach an explanation of your plan or layout for performing proposed work. (Examples could include a narrative of when you could begin work, complete the project, number of workers, etc. and any other information which you believe would enable the City of South Bend to consider your bid.)
2. Attach a listing of the names and addresses of all subcontractors (i.e. persons or firms outside your own firm who have performed part of the work) that you have used on public works projects during the past five (5) years along with a brief description of the work done by each subcontractor.
3. If you intend to sublet any portion of the work, attach the name and address of each subcontractor, equipment to be used by the subcontractor, and whether you will require a bond. However, if you are unable to currently provide a listing, please understand a listing must be provided prior to contract approval. Until the completion of the proposed project, you are under a continuing obligation to immediately notify the City of South Bend in the event that you subsequently determine that you will use a subcontractor on the proposed project.
4. Attach a listing of equipment you have available to use for the proposed project.
5. Have you entered into contracts or received offers for all materials which substantiate the prices used in preparing your proposal? If not, attach an explanation for the rationale used which would corroborate the prices listed.

SECTION III CONTRACTOR'S FINANCIAL STATEMENT

Attachment of bidder's financial statement is mandatory. Any bid submitted without said financial statement as required by statute shall thereby be rendered invalid. The financial statement provided hereunder to the City of South Bend awarding the contract must be specific enough in detail so that said City of South Bend can make a proper determination of the bidder's capability for completing the project if awarded.

eligibility status of all of Contractor's newly hired employees through the E-Verify Program as defined by I.C. 22-5-1.7-3. Contractor's documentation of enrollment and participation in the E-Verify Program is included and attached as part of this bid/quote; and

5. Contractor shall require his/her/its subcontractors performing work under this public contract to certify that the subcontractors do not knowingly employ or contract with an unauthorized alien, nor retain any employee or contract with a person that the subcontractor subsequently learns is an unauthorized alien, and that the subcontractor has enrolled in and is participating in the E-Verify Program. The Contractor agrees to maintain this certification throughout the term of the contract with the City of South Bend, and understands that the City may terminate the contract for default if the Contractor fails to cure a breach of this provision no later than thirty (30) days after being notified by the City.
6. Persons, partnerships, corporations, associations, or joint venturers awarded a contract by the City of South Bend through its agencies, boards, or commissions shall not discriminate against any employee or applicant for employment in the performance of a City contract with respect to hire, tenure, terms, conditions, or privileges of employment, or any matter directly or indirectly related to employment because of race, sex, religion, color, national origin, ancestry, age, gender expression, gender identity, sexual orientation or disability that does not affect that person's ability to perform the work.

In awarding contracts for the purchase of work, labor, services, supplies, equipment, materials, or any combination of the foregoing including, but not limited to, public works contracts awarded under public bidding laws or other contracts in which public bids are not required by law, the City, its agencies, boards, or commissions may consider the Contractor's good faith efforts to obtain participation by those Contractors certified by the State of Indiana as a Minority Business ("MBE") or as a Women's Business Enterprise ("WBE") as a factor in determining the lowest, responsible, responsive bidder.

In no event shall persons or entities seeking the award of a City contract be required to award a subcontract to an MBE/WBE; however, it may not unlawfully discriminate against said WBE/MBE. A finding of a discriminatory practice by the City's MBE/WBE Utilization Board shall prohibit that person or entity from being awarded a City contract for a period of one (1) year from the date of such determination, and such determination may also be grounds for terminating the contract for which the discriminatory practice or noncompliance pertains.

7. The undersigned contractor agrees that the following nondiscrimination commitment shall be made a part of any contract which it may henceforth enter into with the City of South Bend, Indiana or any of its agencies, boards or commissions.

Contractor agrees not to discriminate against or intimidate any employee or applicant for employment in the performance of this contract with privileges of employment, or any matter directly or indirectly related to employment, because of race, religion, color, sex, gender expression, gender identity, sexual orientation, handicap, national origin or ancestry. Breach of this provision may be regarded as material breach of contract.

I, the undersigned bidder or agent as contractor on a public works project, understand my statutory obligations to the use of steel products or foundry products made in the United States (I.C. 5-16-8-1). I hereby certify that I and all subcontractors employed by me for this project will use steel products or foundry products on this project if awarded. I understand that violations hereunder may result in forfeiture of contractual payments.

I hereby affirm under the penalties of perjury that the facts and information contained in the foregoing bid for public works are true and correct.

Dated this _____ day of _____, 20__

Contractor/Bidder (Firm)

Signature of Contractor/Bidder or Its Agent

Printed Name and Title

Subscribed and sworn to before me this _____ day of _____, 20__

My Commission Expires _____

Notary Public

County of Residence _____

**BID/PROPOSAL
CITY OF SOUTH BEND**



Project Name 2016 Parking Garage Improvements

Project No. 115-143

For Bids Due 9:30am April 12, 2016

BASE BID: Wayne Street: Southeast Tower Improvements

Item No.	Description	Quantity	Unit	Unit Price	Total Amount
1	Elevator Equipment				
2	Mechanical				
3	Electrical				
4	General Trades				
5	General Conditions				

BASE BID TOTAL _____

BASE BID: Wayne Street: Northwest Tower Improvements

Item No.	Description	Quantity	Unit	Unit Price	Total Amount
6	Elevator Equipment				
7	Mechanical				
8	Electrical				
9	General Trades				
10	General Conditions				

BASE BID TOTAL _____

BASE BID: Leighton Plaza: Stair Tower 1 Improvements

Item No.	Description	Quantity	Unit	Unit Price	Total Amount
11	Elevator Equipment				
12	Mechanical				
13	Electrical				
14	General Trades				
15	General Conditions				

BASE BID TOTAL _____

BASE BID: Leighton Plaza: Stair Tower 2 Improvements

Item No.	Description	Quantity	Unit	Unit Price	Total Amount
16	Elevator Equipment				
17	Mechanical				

18	Electrical				
19	General Trades				
20	General Conditions				

BASE BID TOTAL _____

ALTERNATE #1

Item No.	Description	Quantity	Unit	Unit Price	Total Amount
21	Remove & replace roof of Leighton Plaza Stair Tower 1 as necessary to replace elevator machine.				

ALTERNATE #1 TOTAL _____

ALTERNATE #2

Item No.	Description	Quantity	Unit	Unit Price	Total Amount
22	Remove & replace roof of Leighton Plaza Stair Tower 2 as necessary to replace elevator machine.				

ALTERNATE #2 TOTAL _____

ALTERNATE #3

Item No.	Description	Quantity	Unit	Unit Price	Total Amount
23	NEMA 1 elevator and electrical fixtures in Wayne Street Southeast Tower				

ALTERNATE #3 TOTAL _____

ALTERNATE #4

Item No.	Description	Quantity	Unit	Unit Price	Total Amount
24	NEMA 1 elevator and electrical fixtures in Wayne Street Northwest Tower				

ALTERNATE #4 TOTAL _____

ALTERNATE #5

Item No.	Description	Quantity	Unit	Unit Price	Total Amount
25	NEMA 1 elevator and electrical fixtures in Leighton Plaza Stair Tower 1				

ALTERNATE #5 TOTAL _____

ALTERNATE #6

Item No.	Description	Quantity	Unit	Unit Price	Total Amount
26	NEMA 1 elevator and electrical fixtures in Leighton Plaza Stair Tower 2				

ALTERNATE #6 TOTAL _____

Bidder (Firm): _____

Address: _____

City/State/Zip: _____ Telephone Number: () _____

By _____

(Signature)

(Printed Name of Person Signing)

**CITY OF SOUTH BEND
MINORITY AND WOMEN BUSINESS ENTERPRISE DIVERSITY
DEVELOPMENT PROGRAM**



**FORM MWBE-1.0
PROOF OF MBE/WBE PARTICIPATION GOAL**

This completed form should be supplied with Bids that pertain to City of South Bend Public Works Projects requiring proof of MBE/MBE participation goal. It is the bidder's sole responsibility to verify whether any listed minority or woman business meets the qualifications of a Minority or Women's owned business.

Project Number: 115-143 Project Name: 2016 Parking Garage Improvements
 Bidder: _____ Total Bid Amount: _____ MBE/WBE Goal: _____
 Page _____ of _____

Name & Address of MBE/WBE	Primary Contact Person (Name/Telephone)	Scope of Work to be Performed (Attach scope/schedule if you need additional space)	Dollar Amount of MBE/WBE Component	Percentage of Total Bid/Proposal

Submitted by: _____
 Print Name Signature Date

**CITY OF SOUTH BEND
MINORITY AND WOMEN BUSINESS ENTERPRISE DIVERSITY
DEVELOPMENT PROGRAM**



**FORM MWBE-2.0
EVIDENCE OF GOOD FAITH EFFORTS**

This completed form should be included as part of the Bids documents related to City of South Bend Public Works Projects requiring Good Faith Efforts to obtain MBE/WBE participation. It is the bidder's sole responsibility to verify whether any listed minority or woman business meets the qualifications of a Minority or Women's owned business as defined by the Indiana Department of Administration ("IDOA").

Project Number: 115-143 Date: _____

Project Name: 2016 Parking Garage Improvements

Bidder: _____

Contact Person: _____ Telephone: _____

Address: _____

City: _____ State: _____ Zip: _____

Email: _____

To determine whether a bidder has demonstrated good faith efforts to reach the MBE/WBE utilization goals set forth in the City of South Bend Public Works Project Specifications, the City and its agencies, boards, or commissions, **REQUIRE ALL** of the following Good Faith Efforts as listed in the table below*:

	EVIDENCE OF GOOD FAITH EFFORTS
	MBE/WBE LIST(S): The bidder reviewed the City of South Bend's Minority and Women Business Enterprise Diversity Development Program, which uses the IDOA approved list of Minority and Women Owned Business as found on their website (http://www.in.gov/idoa).
	ACTION (ADVERTISE/CONTACT): In order for your bid to be deemed responsive, the City of South Bend requires that all perspective bidders complete no less than 2 of the following: <ol style="list-style-type: none"> 1. Attend all pre-bid meetings scheduled by the City to inform MBE/WBEs of contracting and subcontracting opportunities. 2. Advertise in general circulation and/or trade association publications concerning subcontracting opportunities, and allow MBE/WBEs reasonable time to respond. 3. Perform any and all necessary steps to provide written notice in a manner reasonably calculated to inform MBE/WBEs of subcontracting opportunities and allowed sufficient time for them to participate effectively. 4. Utilize pre-existing services of available community organizations, small and/or disadvantaged business assistance offices and other organizations that provided assistance in the recruitment and placement of MBE/WBE firms. <p>**Bidder must circle or otherwise notate which of the two (2) required actions were performed.</p>
	GOOD FAITH NEGOTIATIONS: The bidder negotiated in good faith with interested MBE/WBEs, including providing such MBE/WBE's with adequate information about the plans, specifications and other requirements of the subcontract and did not reject MBE/WBEs as unqualified without sound business reasons based on a thorough investigation of their capabilities.
	SMALL CONTRACT(S): The bidder selected specific portions of the work to be performed by MBE/WBEs in order to increase the likelihood of meeting the MBE/WBE goals (including breaking down contracts into smaller units to facilitate MBE/WBE participation)
	CONTRACT RECORDS: The bidder has maintained the following records for each MBE/WBE that has bid on the subcontracting opportunity: <ol style="list-style-type: none"> 1. Name, address, and telephone number; 2. A description of information provided by the bidder or subcontractor; and 3. A statement of whether an agreement was reached, and if not, why not, including any reasons for concluding that the MBE/WBE was unqualified to perform the job.

***Proper demonstration of Good Faith Effort requires your initials next to all of the above boxes. Any omissions shall be considered grounds for rejection of the bid by the Board of Public Works. The City of South Bend reserves the right to request additional information.**

CITY OF SOUTH BEND
MINORITY AND WOMEN BUSINESS ENTERPRISE DIVERSITY
DEVELOPMENT PROGRAM



FORM MWBE-2.1
MBE/WBE CONTACTED

This completed form should be supplied with Bids that pertain to City of South Bend Public Works Projects requiring contacted MBE/WBE to obtain Good Faith Efforts. It is the bidder's sole responsibility to verify whether any listed minority or woman business meets the qualifications of a Minority or Women's owned business.

PAGE _____ OF _____

Project Number: 115-143 MBE/WBE Participation Goal _____

Project Name: 2016 Parking Garage Improvements

Bidder: _____

By: _____
(Signature) (Title) (Date)

MBE/WBE Firm _____

Owner or Contact at MBE/WBE Firm _____

Telephone: _____ Fax: _____ Email: _____

TYPE OF WORK SOLICITED FOR THIS PROJECT:

RESULTS OF CONTACT WITH THE MBE/WBE FIRM:

MBE/WBE Firm _____

Owner or Contact at MBE/WBE Firm _____

Telephone: _____ Fax: _____ Email: _____

TYPE OF WORK SOLICITED FOR THIS PROJECT:

RESULTS OF CONTACT WITH THE MBE/WBE FIRM:

Division 02 – Existing Conditions

SECTION 02 41 19 - SELECTIVE DEMOLITION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section Includes:
 1. Demolition and removal of selected portions of building or structure.
 2. Salvage of existing items to be reused or recycled.

1.3 DEFINITIONS

- A. Remove: Detach items from existing construction and legally dispose of them off-site unless indicated to be removed and salvaged or removed and reinstalled.
- B. Remove and Reinstall: Detach items from existing construction, prepare for reuse, and reinstall where indicated.
- C. Existing to Remain: Existing items of construction that are not to be permanently removed and that are not otherwise indicated to be removed, removed and salvaged, or removed and reinstalled.

1.4 MATERIALS OWNERSHIP

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

1.5 INFORMATIONAL SUBMITTALS

- A. Schedule of Selective Demolition Activities: Indicate the following:
 1. Detailed sequence of selective demolition and removal work, with starting and ending dates for each activity.
 2. Interruption of utility services. Indicate how long utility services will be interrupted.
 3. Coordination for shutoff, capping, and continuation of utility services.
 4. Use of elevator and stairs.
 5. Coordination of Owner's continuing occupancy of portions of existing building and of Owner's partial occupancy of completed Work.
- B. Safety Plan: Provide a copy of the Contractor's company safety plan and policies, including a Maintenance of Traffic Plan that describes the method of protecting the vehicles and pedestrians in the public right-of-way.

1.6 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 not expected that hazardous materials will be encountered in the Work.
 - 1. If suspected hazardous materials are encountered, do not disturb; immediately notify Architect and Owner. Hazardous materials will be removed by Owner under a separate contract.
- E. Storage or sale of removed items or materials on-site is not permitted.
- F. Utility Service: Maintain existing utilities indicated to remain in service and protect them against damage during selective demolition operations.
 - 1. Maintain fire-protection facilities in service during selective demolition operations.

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.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Review record documents of existing construction provided by Owner. Owner does not guarantee that existing conditions are same as those indicated in record documents.
- B. Survey existing conditions and correlate with requirements indicated to determine extent of selective demolition required.
- C. When unanticipated mechanical, electrical, or structural elements that conflict with intended function or design are encountered, investigate and measure the nature and extent of conflict. Promptly submit a written report to Architect.

3.2 UTILITY SERVICES AND MECHANICAL/ELECTRICAL SYSTEMS

- A. Existing Services/Systems to Remain: Maintain services/systems indicated to remain and protect them against damage.
- B. Existing Services/Systems to Be Removed, Relocated, or Abandoned: Locate, identify, disconnect, and seal or cap off indicated 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.

3.3 PREPARATION

- A. 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.
- B. Temporary Facilities: Provide temporary barricades and other protection required to prevent injury to people and damage to adjacent buildings and facilities to remain.
 - 1. Provide protection to ensure safe passage of people around selective demolition area and to and from occupied portions of building.
 - 2. Provide temporary weather protection, during interval between selective demolition of existing construction on exterior surfaces and new construction, to prevent water leakage and damage to structure and interior areas.
 - 3. Protect walls, ceilings, floors, and other existing finish work that are to remain or that are exposed during selective demolition operations.
 - 4. Cover and protect furniture, furnishings, and equipment that have not been removed.

3.4 SELECTIVE DEMOLITION, GENERAL

- 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, to minimize disturbance of adjacent surfaces. 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 fire watch and portable fire-suppression devices during flame-cutting operations.
 - 4. Maintain adequate ventilation when using cutting torches.
 - 5. Remove decayed, vermin-infested, or otherwise dangerous or unsuitable materials and promptly dispose of off-site.
 - 6. Locate selective demolition equipment and remove debris and materials so as not to impose excessive loads on supporting walls, floors, or framing.

7. Dispose of demolished items and materials promptly.
8. In all cases where it is necessary to work on the public right of way, including the sidewalks and alleys, the Contractor shall submit a traffic control plan to the Engineering Department using the attached form for approval a minimum of five (5) working days prior to beginning the work at that structure. The Contractor will provide all barricades, warning signs and lights, flaggers, or other methods in compliance with the Indiana Manual for Uniform Traffic Control Devices to control traffic. Alleys shall be used wherever possible for truck and equipment access to the structures. No tracked vehicles shall be operated on public streets or public sidewalks. Loading of debris into trucks located within the right of way will not be approved without proof that there is no other way to accomplish the work without damage to private property.

B. Removed and Reinstalled Items:

1. Clean and repair items to functional condition adequate for intended reuse.
2. Pack or crate items after cleaning and repairing. Identify contents of containers.
3. Protect items from damage during transport and storage.
4. Reinstall items in locations indicated. Comply with installation requirements for new materials and equipment. Provide connections, supports, and miscellaneous materials necessary to make item functional for use indicated.

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.

3.5 DISPOSAL OF DEMOLISHED MATERIALS

A. General: Except for items or materials indicated to be reused, salvaged, reinstalled, or otherwise indicated to remain Owner's property, remove demolished materials from Project site and legally dispose of them in an EPA-approved landfill.

1. Do not allow demolished materials to accumulate on-site.
2. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.
3. Remove debris from elevated portions of building by chute, hoist, or other device that will convey debris to grade level in a controlled descent.

B. Disposal: Transport demolished materials off Owner's property and legally dispose of them.

1. All demolition debris, rubbish, and all other material removed from the site as part of the work shall be transported in a lawful manner to landfill(s) or other disposal facilities licensed to receive such material. The Contractor shall inform the City in writing of the identity of those facilities, the nature of materials disposed there, and a statement from the facility that it is licensed to receive such material prior to any work starting on site. Trucks leaving the work area shall be adequately covered, protected and secured to prevent debris from spilling or blowing from the trucks during transport.

3.6 CLEANING

- A. 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.
- B. All existing concrete sidewalks, drive approaches, curbing, and curb ramps in the public right of way are to remain in place and be preserved in existing condition. If damaged during demolition, it shall be the responsibility of the Contractor to repair the damaged item to a condition as good as found. There will be no direct payment for replacement of damaged concrete.

END OF SECTION 02 41 19

Division 05 – Metals

SECTION 05 31 00 - STEEL DECKING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section Includes:
 - 1. Roof deck.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of deck, accessory, and product indicated.

1.4 QUALITY ASSURANCE

- A. Ensure that steel meets the statutory obligations concerning steel products or foundry products made in the United States (I.C.5-16-8-1).

1.5 WARRANTY

- A. Special Warranty: Manufacturer agrees to replace steel decking that fails in materials or workmanship within specified warranty period.
 - 1. Warranty Period: Manufacturer's standard, but not less than one year from date of Substantial Completion, including components and labor.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Protect steel deck from corrosion, deformation, and other damage during delivery, storage, and handling.
- B. Stack steel deck on platforms or pallets and slope to provide drainage. Protect with a waterproof covering and ventilate to avoid condensation.
 - 1. Protect and ventilate acoustical cellular roof deck with factory-installed insulation to maintain insulation free of moisture.

PART 2 - PRODUCTS

2.1 ROOF DECK

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Canam Steel Corporation; Canam Group, Inc.
 - 2. Epic Metals Corporation.

3. Nucor Corp.
4. Verco Decking, Inc., a Nucor company.

B. Roof Deck: Fabricate panels, without top-flange stiffening grooves, to comply with "SDI Specifications and Commentary for Steel Roof Deck," in SDI Publication No. 31, and with the following:

1. Prime-Painted Steel Sheet: ASTM A 1008/A 1008M, Structural Steel (SS), Grade 33 minimum, shop primed with manufacturer's standard baked-on, rust-inhibitive primer.
 - a. Color: Gray.
2. Deck Profile: Match existing, believed to be Type 3DR, deep rib.
3. Profile Depth: Match existing, believed to be 3 inches .
4. Design Uncoated-Steel Thickness: Match existing, believed to be 0.0295 inch .
5. Span Condition: Simple span.

2.2 ACCESSORIES

- A. General: Provide manufacturer's standard accessory materials for deck that comply with requirements indicated.
- B. Mechanical Fasteners: Corrosion-resistant, low-velocity, power-actuated or pneumatically driven carbon-steel fasteners; or self-drilling, self-threading screws.
- C. Repair Paint: Manufacturer's standard rust-inhibitive primer of same color as primer.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine supporting frame and field conditions for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION, GENERAL

- A. Install deck panels and accessories according to applicable specifications and commentary in SDI Publication No. 31, manufacturer's written instructions, and requirements in this Section.
- B. Place deck panels on supporting frame and adjust to final position with ends accurately aligned and bearing on supporting frame before being permanently fastened. Do not stretch or contract side-lap interlocks.
- C. Place deck panels flat and square and fasten to supporting frame without warp or deflection.
- D. Cut and neatly fit deck panels and accessories around openings and other work projecting through or adjacent to deck.
- E. Provide additional reinforcement and closure pieces at openings as required for strength, continuity of deck, and support of other work.

- F. Comply with AWS requirements and procedures for manual shielded metal arc welding, appearance and quality of welds, and methods used for correcting welding work.
- G. Mechanical fasteners may be used in lieu of welding to fasten deck. Locate mechanical fasteners and install according to deck manufacturer's written instructions.

3.3 ROOF-DECK INSTALLATION

- A. Fasten roof-deck panels to steel supporting members by arc spot (puddle) welds of the surface diameter indicated or arc seam welds with an equal perimeter that is not less than 1-1/2 inches long, and as follows:
 - 1. Weld Diameter: 5/8 inch , nominal.
 - 2. Weld Spacing: Weld edge and interior ribs of deck units with a minimum of two welds per deck unit at each support. Space welds 12 inches apart in the field of roof and 6 inches apart in roof corners and perimeter, based on roof-area definitions in FMG Loss Prevention Data Sheet 1-28.
 - 3. Weld Washers: Install weld washers at each weld location.
- B. Side-Lap and Perimeter Edge Fastening: Fasten side laps and perimeter edges of panels between supports, at intervals not exceeding the lesser of one-half of the span or 18 inches , and as follows:
 - 1. Mechanically fasten with self-drilling, No. 10 diameter or larger, carbon-steel screws.
 - 2. Mechanically clinch or button punch.
 - 3. Fasten with a minimum of 1-1/2-inch- long welds.
- C. End Bearing: Install deck ends over supporting frame with a minimum end bearing of 1-1/2 inches , with end joints as follows:
 - 1. End Joints: Lapped 2 inches minimum.

3.4 PROTECTION

- A. Galvanizing Repairs: Prepare and repair damaged galvanized coatings on both surfaces of deck with galvanized repair paint according to ASTM A 780/A 780M and manufacturer's written instructions.
- B. Repair Painting: Wire brush and clean rust spots, welds, and abraded areas on both surfaces of prime-painted deck immediately after installation, and apply repair paint.
 - 1. Apply repair paint, of same color as adjacent shop-primed deck, to bottom surfaces of deck exposed to view.

END OF SECTION 05 31 00

SECTION 05 40 00 - COLD-FORMED METAL FRAMING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section Includes:
 - 1. Ceiling joist framing.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of cold-formed steel framing product and accessory.

1.4 QUALITY ASSURANCE

- A. Ensure that steel meets the statutory obligations concerning steel products or foundry products made in the United States (I.C.5-16-8-1).

1.5 WARRANTY

- A. Special Warranty: Manufacturer agrees to replace metal framing that fails in materials or workmanship within specified warranty period.
 - 1. Warranty Period: Manufacturer's standard, but not less than one year from date of Substantial Completion, including components and labor.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Protect cold-formed steel framing from corrosion, moisture staining, deformation, and other damage during delivery, storage, and handling.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. ClarkWestern Building Systems, Inc.
 - 2. Craco Mfg., Inc.
 - 3. Dietrich Metal Framing; a Worthington Industries Company.
 - 4. Formetal Co. Inc. (The).
 - 5. Nuconsteel; a Nucor Company.
 - 6. United Metal Products, Inc.

2.2 PERFORMANCE REQUIREMENTS

- A. AISI Specifications and Standards: Unless more stringent requirements are indicated, comply with AISI S100 and AISI S200.

2.3 COLD-FORMED STEEL FRAMING, GENERAL

- A. Steel Sheet: ASTM A 1003/A 1003M, Structural Grade, Type H, metallic coated, of grade and coating weight as follows:
 1. Grade: ST33H.
 2. Coating: G60, A60, AZ50, or GF30.

2.4 CEILING JOIST FRAMING

- A. Steel Ceiling Joists: Manufacturer's standard C-shaped steel sections, of web depths indicated, punched with standard holes, with stiffened flanges, and as follows:
 1. Minimum Base-Metal Thickness: 0.0428 inch.
 2. Flange Width: 1-5/8 inches, minimum.

2.5 FRAMING ACCESSORIES

- A. Fabricate steel-framing accessories from steel sheet, ASTM A 1003/A 1003M, Structural Grade, Type H, metallic coated, of same grade and coating weight used for framing members.

2.6 ANCHORS, CLIPS, AND FASTENERS

- A. Steel Shapes and Clips: ASTM A 36/A 36M, zinc coated by hot-dip process according to ASTM A 123/A 123M.
- B. Mechanical Fasteners: ASTM C 1513, corrosion-resistant-coated, self-drilling, self-tapping, steel drill screws.
 1. Head Type: Low-profile head beneath sheathing, manufacturer's standard elsewhere.

2.7 MISCELLANEOUS MATERIALS

- A. Galvanizing Repair Paint: SSPC-Paint 20 or MIL-P-21035B.
- B. Shims: Load bearing, high-density multimonomer plastic, and nonleaching; or of cold-formed steel of same grade and coating as framing members supported by shims.

2.8 FABRICATION

- A. Fabricate cold-formed steel framing and accessories plumb, square, and true to line, and with connections securely fastened, according to referenced AISI's specifications and standards, manufacturer's written instructions, and requirements in this Section.
 1. Fabricate framing assemblies using jigs or templates.
 2. Cut framing members by sawing or shearing; do not torch cut.

3. Fasten cold-formed steel framing members by welding, screw fastening, clinch fastening, pneumatic pin fastening, or riveting as standard with fabricator. Wire tying of framing members is not permitted.
 - a. Comply with AWS D1.3/D1.3M requirements and procedures for welding, appearance and quality of welds, and methods used in correcting welding work.
 - b. Locate mechanical fasteners and install according to Shop Drawings, with screw penetrating joined members by no fewer than three exposed screw threads.
 4. Fasten other materials to cold-formed steel framing by welding, bolting, pneumatic pin fastening, or screw fastening, according to Shop Drawings.
- B. Reinforce, stiffen, and brace framing assemblies to withstand handling, delivery, and erection stresses. Lift fabricated assemblies to prevent damage or permanent distortion.
- C. Fabrication Tolerances: Fabricate assemblies level, plumb, and true to line to a maximum allowable tolerance variation of 1/8 inch in 10 feet and as follows:
1. Spacing: Space individual framing members no more than plus or minus 1/8 inch from plan location. Cumulative error shall not exceed minimum fastening requirements of sheathing or other finishing materials.
 2. Squareness: Fabricate each cold-formed steel framing assembly to a maximum out-of-square tolerance of 1/8 inch.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine supporting substrates and abutting structural framing for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION, GENERAL

- A. Cold-formed steel framing may be shop or field fabricated for installation, or it may be field assembled.
- B. Install cold-formed steel framing according to AISI S200 and to manufacturer's written instructions unless more stringent requirements are indicated.
- C. Install shop- or field-fabricated, cold-formed framing and securely anchor to supporting structure.
 1. Screw, bolt, or weld wall panels at horizontal and vertical junctures to produce flush, even, true-to-line joints with maximum variation in plane and true position between fabricated panels not exceeding 1/16 inch.
- D. Install cold-formed steel framing and accessories plumb, square, and true to line, and with connections securely fastened.
 1. Cut framing members by sawing or shearing; do not torch cut.

2. Fasten cold-formed steel framing members by welding, screw fastening, clinch fastening, or riveting. Wire tying of framing members is not permitted.
 - a. Comply with AWS D1.3/D1.3M requirements and procedures for welding, appearance and quality of welds, and methods used in correcting welding work.
 - b. Locate mechanical fasteners and install according to Shop Drawings, and complying with requirements for spacing, edge distances, and screw penetration.
- E. Install framing members in one-piece lengths unless splice connections are indicated for track or tension members.
- F. Install temporary bracing and supports to secure framing and support loads comparable in intensity to those for which structure was designed. Maintain braces and supports in place, undisturbed, until entire integrated supporting structure has been completed and permanent connections to framing are secured.
- G. Erection Tolerances: Install cold-formed steel framing level, plumb, and true to line to a maximum allowable tolerance variation of 1/8 inch in 10 feet and as follows:
 1. Space individual framing members no more than plus or minus 1/8 inch from plan location. Cumulative error shall not exceed minimum fastening requirements of sheathing or other finishing materials.

3.3 JOIST INSTALLATION

- A. Install perimeter joist track sized to match joists. Align and securely anchor or fasten track to supporting structure at corners, ends, and spacings indicated on Shop Drawings.
- B. Space joists not more than 2 inches from abutting walls, and as follows:
 1. Joist Spacing: 16 inches.
- C. Frame openings with built-up joist headers consisting of joist and joist track, or another combination of connected joists if indicated.
- D. Install miscellaneous joist framing and connections, including web stiffeners, closure pieces, clip angles, continuous angles, hold-down angles, anchors, and fasteners, to provide a complete and stable joist-framing assembly.

3.4 REPAIRS AND PROTECTION

- A. Galvanizing Repairs: Prepare and repair damaged galvanized coatings on fabricated and installed cold-formed steel framing with galvanized repair paint according to ASTM A 780 and manufacturer's written instructions.
- B. Provide final protection and maintain conditions, in a manner acceptable to manufacturer and Installer, that ensure that cold-formed steel framing is without damage or deterioration at time of Substantial Completion.

END OF SECTION 05 40 00

SECTION 05 50 00 - METAL FABRICATIONS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section Includes:
 - 1. Steel framing and supports for applications where framing and supports are not specified in other Sections.

1.3 COORDINATION

- A. Coordinate selection of shop primers with topcoats to be applied over them. Comply with paint and coating manufacturers' written recommendations to ensure that shop primers and topcoats are compatible with one another.

1.4 QUALITY ASSURANCE

- A. Ensure that steel meets the statutory obligations concerning steel products or foundry products made in the United States (I.C.5-16-8-1).

1.5 WARRANTY

- A. Special Warranty: Manufacturer agrees to replace metal fabrications that fail in materials or workmanship within specified warranty period.
 - 1. Warranty Period: Manufacturer's standard, but not less than one year from date of Substantial Completion, including components and labor.

1.6 FIELD CONDITIONS

- A. Field Measurements: Verify actual locations of walls and other construction contiguous with metal fabrications by field measurements before fabrication.

PART 2 - PRODUCTS

2.1 METALS

- A. Metal Surfaces, General: Provide materials with smooth, flat surfaces unless otherwise indicated. For metal fabrications exposed to view in the completed Work, provide materials without seam marks, roller marks, rolled trade names, or blemishes.
- B. Steel Plates, Shapes, and Bars: ASTM A 36/A 36M.

2.2 FASTENERS

- A. Steel Bolts and Nuts: Regular hexagon-head bolts, ASTM A 325, Type 3; with hex nuts, ASTM A 563, Grade C3; and, where indicated, flat washers.
- B. Post-Installed Anchors: Torque-controlled expansion anchors or chemical anchors.
 - 1. Material for Interior Locations: Carbon-steel components zinc plated to comply with ASTM B 633 or ASTM F 1941, Class Fe/Zn 5, unless otherwise indicated.

2.3 MISCELLANEOUS MATERIALS

- A. Shop Primers: Provide primers that comply with Section 09 91 23 Interior Painting."

2.4 FABRICATION, GENERAL

- A. Shop Assembly: Preassemble items in the shop to greatest extent possible. Disassemble units only as necessary for shipping and handling limitations. Use connections that maintain structural value of joined pieces. Clearly mark units for reassembly and coordinated installation.
- B. Cut, drill, and punch metals cleanly and accurately. Remove burrs and ease edges to a radius of approximately 1/32 inch unless otherwise indicated. Remove sharp or rough areas on exposed surfaces.
- C. Form bent-metal corners to smallest radius possible without causing grain separation or otherwise impairing work.
- D. Form exposed work with accurate angles and surfaces and straight edges.
- E. Weld corners and seams continuously to comply with the following:
 - 1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
 - 2. Obtain fusion without undercut or overlap.
 - 3. Remove welding flux immediately.
 - 4. At exposed connections, finish exposed welds and surfaces smooth and blended so no roughness shows after finishing and contour of welded surface matches that of adjacent surface.
- F. Form exposed connections with hairline joints, flush and smooth, using concealed fasteners or welds where possible. Where exposed fasteners are required, use Phillips flat-head (countersunk) fasteners unless otherwise indicated. Locate joints where least conspicuous.
- G. Fabricate seams and other connections that are exposed to weather in a manner to exclude water. Provide weep holes where water may accumulate.
- H. Cut, reinforce, drill, and tap metal fabrications as indicated to receive finish hardware, screws, and similar items.

- I. Provide for anchorage of type indicated; coordinate with supporting structure. Space anchoring devices to secure metal fabrications rigidly in place and to support indicated loads.

2.5 MISCELLANEOUS FRAMING AND SUPPORTS

- A. General: Provide steel framing and supports not specified in other Sections as needed to complete the Work.
- B. Fabricate units from steel shapes, plates, and bars of welded construction unless otherwise indicated. Fabricate to sizes, shapes, and profiles indicated and as necessary to receive adjacent construction.
- C. Prime miscellaneous framing and supports.

2.6 FINISHES, GENERAL

- A. Finish metal fabrications after assembly.
- B. Finish exposed surfaces to remove tool and die marks and stretch lines, and to blend into surrounding surface.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

- A. Cutting, Fitting, and Placement: Perform cutting, drilling, and fitting required for installing metal fabrications. Set metal fabrications accurately in location, alignment, and elevation; with edges and surfaces level, plumb, true, and free of rack; and measured from established lines and levels.
- B. Fit exposed connections accurately together to form hairline joints. Weld connections that are not to be left as exposed joints but cannot be shop welded because of shipping size limitations. Do not weld, cut, or abrade surfaces of exterior units that have been hot-dip galvanized after fabrication and are for bolted or screwed field connections.
- C. Field Welding: Comply with the following requirements:
 - 1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
 - 2. Obtain fusion without undercut or overlap.
 - 3. Remove welding flux immediately.
 - 4. At exposed connections, finish exposed welds and surfaces smooth and blended so no roughness shows after finishing and contour of welded surface matches that of adjacent surface.
- D. Fastening to In-Place Construction: Provide anchorage devices and fasteners where metal fabrications are required to be fastened to in-place construction. Provide threaded fasteners for use with concrete and masonry inserts, toggle bolts, through bolts, lag screws, wood screws, and other connectors.

3.2 INSTALLING MISCELLANEOUS FRAMING AND SUPPORTS

- A. General: Install framing and supports to comply with requirements of items being supported, including manufacturers' written instructions and requirements indicated on Shop Drawings.

END OF SECTION 05 50 00

Division 07 – Thermal and Moisture Protection

SECTION 07 21 00

THERMAL INSULATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section Includes:
 1. Foam-plastic board insulation.
 2. Glass-fiber blanket insulation.

1.3 ACTION SUBMITTALS

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

1.4 QUALITY ASSURANCE

- A. Surface-Burning Characteristics: As determined by testing identical products according to ASTM E 84 by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.

1.5 WARRANTY

- A. Special Warranty: Manufacturer agrees to replace thermal insulation that fails in materials or workmanship within specified warranty period.
 1. Warranty Period: Manufacturer's standard, but not less than one year from date of Substantial Completion, including components and labor.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Protect insulation materials from physical damage and from deterioration due to moisture, soiling, and other sources. Store inside and in a dry location. Comply with manufacturer's written instructions for handling, storing, and protecting during installation.
- B. Protect foam-plastic board insulation as follows:
 1. Do not expose to sunlight except to necessary extent for period of installation and concealment.
 2. Protect against ignition at all times. Do not deliver foam-plastic board materials to Project site before installation time.
 3. Quickly complete installation and concealment of foam-plastic board insulation in each area of construction.

PART 2 - PRODUCTS

2.1 FOAM-PLASTIC BOARD INSULATION

- A. Extruded-Polystyrene Board Insulation: ASTM C 578, of type and minimum compressive strength indicated below, with maximum flame-spread and smoke-developed indexes of 75 and 450, respectively, per ASTM E 84.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. DiversiFoam Products.
 - b. Dow Chemical Company (The).
 - c. Owens Corning.
 - d. Pactiv Building Products.
 - 2. Type X, 15 psi.
- B. Adhesive for Bonding Insulation: Product with demonstrated capability to bond insulation securely to substrates without damaging insulation and substrates.

2.2 GLASS-FIBER BLANKET INSULATION

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. CertainTeed Corporation.
 - 2. Guardian Building Products, Inc.
 - 3. Johns Manville.
 - 4. Knauf Insulation.
 - 5. Owens Corning.
- B. Kraft-Faced, Glass-Fiber Blanket Insulation: ASTM C 665, Type II (non-reflective faced), Class C (faced surface not rated for flame propagation); Category 1 (membrane is a vapor barrier).

PART 3 - EXECUTION

3.1 PREPARATION

- A. Clean substrates of substances that are harmful to insulation or that interfere with insulation attachment.

3.2 INSTALLATION, GENERAL

- A. Comply with insulation manufacturer's written instructions applicable to products and applications indicated.
- B. Install insulation that is undamaged, dry, and unsoiled and that has not been left exposed to ice, rain, or snow at any time.

- C. Extend insulation to envelop entire area to be insulated. Cut and fit tightly around obstructions and fill voids with insulation. Remove projections that interfere with placement.
- D. Provide sizes to fit applications indicated and selected from manufacturer's standard thicknesses, widths, and lengths. Apply single layer of insulation units to produce thickness indicated unless multiple layers are otherwise shown or required to make up total thickness.

3.3 INSTALLATION OF INSULATION

- A. Apply insulation units to substrates by method indicated, complying with manufacturer's written instructions. If no specific method is indicated, bond units to substrate with adhesive or use mechanical anchorage to provide permanent placement and support of units.
- B. Foam-Plastic Board Insulation: Seal joints between units by applying adhesive, mastic, or sealant to edges of each unit to form a tight seal as units are shoved into place. Fill voids in completed installation with adhesive, mastic, or sealant as recommended by insulation manufacturer.
- C. Glass-Fiber or Mineral-Wool Blanket Insulation: Install in cavities formed by framing members according to the following requirements:
 - 1. Use insulation widths and lengths that fill the cavities formed by framing members. If more than one length is required to fill the cavities, provide lengths that will produce a snug fit between ends.
 - 2. Place insulation in cavities formed by framing members to produce a friction fit between edges of insulation and adjoining framing members.

3.4 PROTECTION

- A. Protect installed insulation from damage due to harmful weather exposures, physical abuse, and other causes. Provide temporary coverings or enclosures where insulation is subject to abuse and cannot be concealed and protected by permanent construction immediately after installation.

END OF SECTION 07 21 00

SECTION 07 72 00 - ROOF ACCESSORIES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section Includes:
 - 1. Attic vents.

1.3 COORDINATION

- A. Coordinate layout and installation of roof accessories with roofing and base flashing and interfacing and adjoining construction to provide a leakproof, weathertight, secure, and noncorrosive installation.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of roof accessory.
 - 1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes.

1.5 WARRANTY

- A. Special Warranty: Manufacturer agrees to replace roof accessories that fail in materials or workmanship within specified warranty period.
 - 1. Warranty Period: Manufacturer's standard, but not less than one year from date of Substantial Completion, including components and labor.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. General Performance: Roof accessories shall withstand exposure to weather and resist thermally induced movement without failure, rattling, leaking, or fastener disengagement due to defective manufacture, fabrication, installation, or other defects in construction.

2.2 ROOF CURBS

- A. Construction:
 - 1. Fabricate curbs to minimum height of 18 inches above roofing surface unless otherwise indicated.

2.3 ATTIC VENTS

- A. J-Vent: Manufacturer's standard, fabricated as indicated, with manufacturer's standard welded or sealed mechanical joints.
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Active Ventilation Products, Inc.
 - b. Air Vent, Inc.; a Gibraltar Industries company.
 - c. Dur-Red Products.
 - d. Greenheck Fan Corporation.
 - e. Loren Cook Company.
 - f. Metallic Products Corp.
 - g. Moffitt Corporation.
 - h. PennBarry.
 - i. Romlair Ventilator Co.
 - j. Safe Air of Illinois.
 - k. Thaler Metal Industries Ltd.
 - l. Vent Products Co., Inc.
 2. Construction: Integral base flange, vent cylinder, cylinder bird screen, and rain cap.
 3. Dimensions: As indicated on Drawings.
 4. Bird Screens: Manufacturer's standard mesh with rewirable frame.
 5. Insect Screens: Manufacturer's standard mesh with rewirable frame.
 6. Vent Cylinder, Base Flange, and Rain-Cap Material: Zinc-coated (galvanized) steel sheet, of manufacturer's standard thickness.
 7. Finish: As selected by Architect from manufacturer's full range.

2.4 METAL MATERIALS

- A. Zinc-Coated (Galvanized) Steel Sheet: ASTM A 653/A 653M, G90 coating designation.

2.5 MISCELLANEOUS MATERIALS

- A. Underlayment:
1. Felt: ASTM D 226/D 226M, Type II (No. 30), asphalt-saturated organic felt, nonperforated.
 2. Fasteners: Roof accessory manufacturer's recommended fasteners suitable for application and metals being fastened. Match finish of exposed fasteners with finish of material being fastened. Provide nonremovable fastener heads to exterior exposed fasteners. Furnish the following unless otherwise indicated:
- B. Gaskets: Manufacturer's standard tubular or fingered design of neoprene, EPDM, PVC, or silicone or a flat design of foam rubber, sponge neoprene, or cork.
- C. Elastomeric Sealant: ASTM C 920, elastomeric silicone polymer sealant as recommended by roof accessory manufacturer for installation indicated; low modulus; of type, grade, class, and use classifications required to seal joints and remain watertight.

2.6 GENERAL FINISH REQUIREMENTS

- A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.
- B. Appearance of Finished Work: Noticeable variations in same piece are not acceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, to verify actual locations, dimensions, and other conditions affecting performance of the Work.
- B. Verify that substrate is sound, dry, smooth, clean, sloped for drainage, and securely anchored.
- C. Verify dimensions of roof openings for roof accessories.
- D. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. General: Install roof accessories according to manufacturer's written instructions.
 - 1. Install roof accessories level; plumb; true to line and elevation; and without warping, jogs in alignment, buckling, or tool marks.
 - 2. Anchor roof accessories securely in place so they are capable of resisting indicated loads.
 - 3. Use fasteners, separators, sealants, and other miscellaneous items as required to complete installation of roof accessories and fit them to substrates.
 - 4. Install roof accessories to resist exposure to weather without failing, rattling, leaking, or loosening of fasteners and seals.
- B. Metal Protection: Protect metals against galvanic action by separating dissimilar metals from contact with each other or with corrosive substrates by painting contact surfaces with bituminous coating or by other permanent separation as recommended by manufacturer.
 - 1. Underlayment: Where installing roof accessories directly on cementitious or wood substrates, install a course of underlayment and cover with manufacturer's recommended slip sheet.
 - 2. Bed flanges in thick coat of asphalt roofing cement where required by manufacturers of roof accessories for waterproof performance.

3.3 REPAIR AND CLEANING

- A. Galvanized Surfaces: Clean field welds, bolted connections, and abraded areas and repair galvanizing according to ASTM A 780/A 780M.

- B. Touch up factory-primed surfaces with compatible primer ready for field painting according to Section 09 91 13 "Exterior Painting."
- C. Clean exposed surfaces according to manufacturer's written instructions.
- D. Clean off excess sealants.
- E. Replace roof accessories that have been damaged or that cannot be successfully repaired by finish touchup or similar minor repair procedures.

END OF SECTION 07 72 00

SECTION 07 92 00 - 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. Section Includes:
 1. Nonstaining silicone joint sealants.
 2. Urethane joint sealants.
 3. Mildew-resistant joint sealants.
 4. Butyl joint sealants.

1.3 ACTION SUBMITTALS

- A. Product Data: For each joint-sealant product.

1.4 FIELD 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.
 2. When joint substrates are wet.
 3. Where joint widths are less than those allowed by joint-sealant manufacturer for applications indicated.
 4. Where contaminants capable of interfering with adhesion have not yet been removed from joint substrates.

1.5 WARRANTY

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

PART 2 - PRODUCTS

2.1 JOINT SEALANTS, 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 joint-sealant manufacturer, based on testing and field experience.
- B. Colors of Exposed Joint Sealants: As selected by Architect from manufacturer's full range.

2.2 URETHANE JOINT SEALANTS

- A. Urethane, S, NS, 25, NT: Single-component, nonsag, nontraffic-use, plus 25 percent and minus 25 percent movement capability, urethane joint sealant; ASTM C 920, Type S, Grade NS, Class 25, Use NT.
 - 1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
 - a. BASF Construction Chemicals, LLC, Building Systems; Sonalastic TX1.
 - b. Bostik, Inc.; Chem-Calk GPS1.
 - c. Pecora Corporation; Dynatrol I-XL.
 - d. Sherwin-Williams Company (The); [Stampede-1] [Stampede-TX].
 - e. Sika Corporation U.S.; Sikaflex Textured Sealant.
 - f. Tremco Incorporated; Dymonic.

2.3 JOINT-SEALANT BACKING

- A. Sealant Backing Material, General: Nonstaining; compatible with joint substrates, sealants, primers, and other joint fillers; and approved for applications indicated by sealant manufacturer based on field experience and laboratory testing.
 - 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. BASF Construction Chemicals, LLC, Building Systems.
 - b. Construction Foam Products, a division of Nomaco, Inc.
- B. Cylindrical Sealant Backings: ASTM C 1330, Type C (closed-cell material with a surface skin), and of size and density to control sealant depth and otherwise contribute to producing optimum sealant performance.
- 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. 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 performance of the Work.
- 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, 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.
 - 3. Remove laitance and form-release agents from concrete.
- B. Joint Priming: Prime joint substrates where recommended by joint-sealant manufacturer or as indicated by preconstruction joint-sealant-substrate tests or prior experience. Apply primer to comply with joint-sealant manufacturer's written instructions. Confine primers to areas of joint-sealant bond; do not allow spillage or migration onto adjoining surfaces.
- C. Masking Tape: Use masking tape where required to prevent contact of sealant or primer with adjoining surfaces that otherwise would be permanently stained or damaged by such contact or by cleaning methods required to remove sealant smears. Remove tape immediately after tooling without disturbing joint seal.

3.3 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 kind indicated to support sealants during application and at position required to produce cross-sectional shapes and depths of installed sealants relative to joint widths that allow optimum sealant movement capability.
 - 1. Do not leave gaps between ends of sealant backings.

2. Do not stretch, twist, puncture, or tear sealant backings.
 3. Remove absorbent sealant backings that have become wet before sealant application, and replace them with dry materials.
- 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 in subparagraphs below to form smooth, uniform beads of configuration indicated; to eliminate air pockets; and to ensure contact and adhesion of sealant with sides of joint.
1. Remove excess sealant from surfaces adjacent to joints.
 2. Use tooling agents that are approved in writing by sealant manufacturer and that do not discolor sealants or adjacent surfaces.
 3. Provide concave joint profile per Figure 8A in ASTM C 1193 unless otherwise indicated.

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, remove, and repair damaged or deteriorated joint sealants immediately so installations with repaired areas are indistinguishable from original work.

3.6 JOINT-SEALANT SCHEDULE

- A. Joint-Sealant Application: Interior joints in vertical surfaces and horizontal nontraffic surfaces.
1. Joint Locations:
 - a. Joint between bottom of gypsum board and concrete slab..
 2. Joint Sealant: Urethane, S, NS, 25, NT.
 3. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors.

END OF SECTION 07 92 00

Division 09 – Finishes

SECTION 09 29 00 - GYPSUM BOARD

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section Includes:
 - 1. Interior gypsum board.

1.3 ACTION SUBMITTALS

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

1.4 DELIVERY, STORAGE AND HANDLING

- A. Store materials inside under cover and keep them dry and protected against weather, condensation, direct sunlight, construction traffic, and other potential causes of damage. Stack panels flat and supported on risers on a flat platform to prevent sagging.

1.5 WARRANTY

- A. Special Warranty: Manufacturer agrees to repair or replace panels that fail in materials or workmanship within specified warranty period.
 - 1. Warranty Period: Manufacturer's standard, but not less than one year from date of Substantial Completion, including components and labor.

1.6 FIELD CONDITIONS

- A. Environmental Limitations: Comply with ASTM C 840 requirements or gypsum board manufacturer's written recommendations, whichever are more stringent.
- B. Do not install panels that are wet, those that are moisture damaged, and those that are mold damaged.
 - 1. Indications that panels are wet or moisture damaged include, but are not limited to, discoloration, sagging, or irregular shape.
 - 2. Indications that panels are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.

PART 2 - PRODUCTS

2.1 GYPSUM BOARD, GENERAL

- A. Size: Provide maximum lengths and widths available that will minimize joints in each area and that correspond with support system indicated.

2.2 GYPSUM BOARD

- A. Glass-Mat Gypsum Sheathing Board: ASTM C 1177/C 1177M, with fiberglass mat laminated to both sides and with manufacturer's standard edges.
 - 1. Products: Subject to compliance with requirements, provide one of the following:
 - a. CertainTeed Corp.; GlasRoc Sheathing.
 - b. Georgia-Pacific Gypsum LLC; Dens-Glass Gold.
 - c. National Gypsum Company; Gold Bond, e(2)XP.
 - d. USG Corporation; Securock Glass Mat Sheathing.
 - 2. Core: 5/8 inch, Type X.

2.3 TRIM ACCESSORIES

- A. Interior Trim: ASTM C 1047.
 - 1. Material: Galvanized or aluminum-coated steel sheet, rolled zinc, plastic, or paper-faced galvanized steel sheet .
 - 2. Shapes:
 - a. Cornerbead.
 - b. Bullnose bead.
 - c. LC-Bead: J-shaped; exposed long flange receives joint compound.
 - d. L-Bead: L-shaped; exposed long flange receives joint compound.
 - e. U-Bead: J-shaped; exposed short flange does not receive joint compound.
 - f. Expansion (control) joint.

2.4 JOINT TREATMENT MATERIALS

- A. General: Comply with ASTM C 475/C 475M.
- B. Joint Tape:
 - 1. Glass-Mat Gypsum Sheathing Board: 10-by-10 glass mesh.
- C. Joint Compound for Other Applications:
 - 1. Glass-Mat Gypsum Sheathing Board: As recommended by sheathing board manufacturer.

2.5 AUXILIARY MATERIALS

- A. General: Provide auxiliary materials that comply with referenced installation standards and manufacturer's written recommendations.
- B. 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 thick.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine areas and substrates including welded hollow-metal frames and framing, with Installer present, for compliance with requirements and other conditions affecting performance.
- B. Examine panels before installation. Reject panels that are wet, moisture damaged, and mold damaged.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 APPLYING AND FINISHING PANELS, GENERAL

- A. Comply with ASTM C 840.
- B. Install ceiling panels across framing to minimize the number of abutting end joints and to avoid abutting end joints in central area of each ceiling. Stagger abutting end joints of adjacent panels not less than one framing member.
- C. Install panels with face side out. Butt panels together for a light contact at edges and ends with not more than 1/16 inch of open space between panels. Do not force into place.
- D. 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.
- E. Form control and expansion joints with space between edges of adjoining gypsum panels.
- F. Cover both faces of support framing with gypsum panels in concealed spaces (above ceilings, etc.), except in chases braced internally.
 1. Unless concealed application is indicated or required for sound, fire, air, or smoke ratings, coverage may be accomplished with scraps of not less than 8 sq. ft. in area.
 2. Fit gypsum panels around ducts, pipes, and conduits.
 3. Where partitions intersect structural members projecting below underside of floor/roof slabs and decks, cut gypsum panels to fit profile formed by structural members; allow 1/4- to 3/8-inch- wide joints to install sealant.
- G. Isolate perimeter of gypsum board applied to non-load-bearing partitions at structural abutments, except floors. Provide 1/4- to 1/2-inch- wide spaces at these locations and trim edges with edge trim where edges of panels are exposed. Seal joints between edges and abutting structural surfaces with acoustical sealant.
- H. Attachment to Steel Framing: Attach panels so leading edge or end of each panel is attached to open (unsupported) edges of stud flanges first.

3.3 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.
- B. Control Joints: Install control joints according to ASTM C 840 and in specific locations approved by Architect for visual effect.

3.4 FINISHING GYPSUM BOARD

- 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 for trim products specifically indicated as not intended to receive tape.
- D. Glass-Mat Faced Panels: Finish according to manufacturer's written instructions.

3.5 PROTECTION

- A. Protect adjacent surfaces from drywall compound and promptly remove from floors and other non-drywall surfaces. Repair surfaces stained, marred, or otherwise damaged during drywall application.
- B. Protect installed products from damage from weather, condensation, direct sunlight, construction, and other causes during remainder of the construction period.
- C. Remove and replace panels that are wet, moisture damaged, and mold damaged.
 - 1. Indications that panels are wet or moisture damaged include, but are not limited to, discoloration, sagging, or irregular shape.
 - 2. Indications that panels are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.

END OF SECTION 09 29 00

SECTION 09 91 23 - INTERIOR PAINTING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section includes surface preparation and the application of paint systems on the following interior substrates:
 - 1. Steel and iron.
 - 2. Gypsum board.
- B. Related Requirements:
 - 1. Section 05 50 00 "Metal Fabrications" for shop priming metal fabrications.

1.3 DEFINITIONS

- A. MPI Gloss Level 1: Not more than five units at 60 degrees and 10 units at 85 degrees, according to ASTM D 523.
- B. MPI Gloss Level 2: Not more than 10 units at 60 degrees and 10 to 35 units at 85 degrees, according to ASTM D523.
- C. MPI Gloss Level 3: 10 to 25 units at 60 degrees and 10 to 35 units at 85 degrees, according to ASTM D 523.
- D. MPI Gloss Level 4: 20 to 35 units at 60 degrees and not less than 35 units at 85 degrees, according to ASTM D 523.
- E. MPI Gloss Level 5: 35 to 70 units at 60 degrees, according to ASTM D 523.
- F. MPI Gloss Level 6: 70 to 85 units at 60 degrees, according to ASTM D 523.
- G. MPI Gloss Level 7: More than 85 units at 60 degrees, according to ASTM D523.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product. Include preparation requirements and application instructions.
- B. Samples for Initial Selection: For each type of topcoat product.
- C. Product List: Cross-reference to paint system and locations of application areas. Use same designations indicated on Drawings and in schedules. Include color designations.

1.5 WARRANTY

- A. Special Warranty: Manufacturer agrees to replace paint that fails in materials or workmanship within specified warranty period.
 - 1. Warranty Period: Manufacturer's standard, but not less than one year from date of Substantial Completion, including components and labor.

1.6 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish extra materials, from the same product run, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
 - 1. Paint: 5 percent, but not less than 1 gal. of each material and color applied.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Store materials not in use in tightly covered containers in well-ventilated areas with ambient temperatures continuously maintained at not less than 45 deg F.
 - 1. Maintain containers in clean condition, free of foreign materials and residue.
 - 2. Remove rags and waste from storage areas daily.

1.8 FIELD CONDITIONS

- A. Apply paints only when temperature of surfaces to be painted and ambient air temperatures are between 50 and 95 deg F.
- B. Do not apply paints when relative humidity exceeds 85 percent; at temperatures less than 5 deg F above the dew point; or to damp or wet surfaces.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Basis-of-Design Product: Subject to compliance with requirements, provide product indicated on Drawings or comparable product by one of the following:
 - 1. Benjamin Moore & Co.
 - 2. Coronado Paint; Benjamin Moore Company.
 - 3. PPG Architectural Finishes, Inc.
 - 4. Pratt & Lambert.
 - 5. Sherwin-Williams Company (The).
 - 6. O'Leary Paint.

2.2 PAINT, GENERAL

- A. MPI Standards: Products shall comply with MPI standards indicated and shall be listed in its "MPI Approved Products Lists."
- B. Material Compatibility:

1. Materials for use within each paint system shall be compatible with one another and substrates indicated, under conditions of service and application as demonstrated by manufacturer, based on testing and field experience.
 2. For each coat in a paint system, products shall be recommended in writing by topcoat manufacturers for use in paint system and on substrate indicated.
- C. VOC Content: For field applications that are inside the weatherproofing system, paints and coatings shall comply with VOC content limits of authorities having jurisdiction and the following VOC content limits:
1. Flat Paints and Coatings: 50 g/L.
 2. Nonflat Paints and Coatings: 50 g/L.
 3. Dry-Fog Coatings: 150 g/L.
 4. Primers, Sealers, and Undercoaters: 100 g/L.
 5. Rust-Preventive Coatings: 100 g/L.
 6. Zinc-Rich Industrial Maintenance Primers: 100 g/L.
 7. Pretreatment Wash Primers: 420 g/L.

2.3 SOURCE QUALITY CONTROL

- A. Testing of Paint Materials: Owner reserves the right to invoke the following procedure:
1. Owner may direct Contractor to stop applying paints if test results show materials being used do not comply with product requirements. Contractor shall remove noncomplying paint materials from Project site, pay for testing, and repaint surfaces painted with rejected materials. Contractor will be required to remove rejected materials from previously painted surfaces if, on repainting with complying materials, the two paints are incompatible.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates and conditions, with Applicator present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.
- B. Maximum Moisture Content of Substrates: When measured with an electronic moisture meter as follows:
1. Gypsum Board: 12 percent.
- C. Gypsum Board Substrates: Verify that finishing compound is sanded smooth.
- D. Verify suitability of substrates, including surface conditions and compatibility, with existing finishes and primers.
- E. Proceed with coating application only after unsatisfactory conditions have been corrected.
1. Application of coating indicates acceptance of surfaces and conditions.

3.2 PREPARATION

- A. Comply with manufacturer's written instructions and recommendations in "MPI Architectural Painting Specification Manual" applicable to substrates and paint systems indicated.
- B. Remove hardware, covers, plates, and similar items already in place that are removable and are not to be painted. If removal is impractical or impossible because of size or weight of item, provide surface-applied protection before surface preparation and painting.
 - 1. After completing painting operations, use workers skilled in the trades involved to reinstall items that were removed. Remove surface-applied protection if any.
- C. Clean substrates of substances that could impair bond of paints, including dust, dirt, oil, grease, and incompatible paints and encapsulants.
 - 1. Remove incompatible primers and reprime substrate with compatible primers or apply tie coat as required to produce paint systems indicated.
- D. Steel Substrates: Remove rust, loose mill scale, and shop primer, if any. Clean using methods recommended in writing by paint manufacturer.
- E. Shop-Primed Steel Substrates: Clean field welds, bolted connections, and areas where shop paint is abraded. Paint exposed areas with the same material as used for shop priming to comply with SSPC-PA 1 for touching up shop-primed surfaces.

3.3 APPLICATION

- A. Apply paints according to manufacturer's written instructions and to recommendations in "MPI Manual."
 - 1. Use applicators and techniques suited for paint and substrate indicated.
 - 2. Paint surfaces behind movable equipment and furniture same as similar exposed surfaces. Before final installation, paint surfaces behind permanently fixed equipment or furniture with prime coat only.
 - 3. Paint front and backsides of access panels, removable or hinged covers, and similar hinged items to match exposed surfaces.
 - 4. Do not paint over labels of independent testing agencies or equipment name, identification, performance rating, or nomenclature plates.
 - 5. Primers specified in painting schedules may be omitted on items that are factory primed or factory finished if acceptable to topcoat manufacturers.
- B. Tint each undercoat a lighter shade to facilitate identification of each coat if multiple coats of same material are to be applied. Tint undercoats to match color of topcoat, but provide sufficient difference in shade of undercoats to distinguish each separate coat.
- C. If undercoats or other conditions show through topcoat, apply additional coats until cured film has a uniform paint finish, color, and appearance.
- D. Apply paints to produce surface films without cloudiness, spotting, holidays, laps, brush marks, roller tracking, runs, sags, ropiness, or other surface imperfections. Cut in sharp lines and color breaks.

3.4 FIELD QUALITY CONTROL

- A. Dry Film Thickness Testing: Owner may engage the services of a qualified testing and inspecting agency to inspect and test paint for dry film thickness.
 - 1. Contractor shall touch up and restore painted surfaces damaged by testing.
 - 2. If test results show that dry film thickness of applied paint does not comply with paint manufacturer's written recommendations, Contractor shall pay for testing and apply additional coats as needed to provide dry film thickness that complies with paint manufacturer's written recommendations.

3.5 CLEANING AND PROTECTION

- A. At end of each workday, remove rubbish, empty cans, rags, and other discarded materials from Project site.
- B. After completing paint application, clean spattered surfaces. Remove spattered paints by washing, scraping, or other methods. Do not scratch or damage adjacent finished surfaces.
- C. Protect work of other trades against damage from paint application. Correct damage to work of other trades by cleaning, repairing, replacing, and refinishing, as approved by Architect, and leave in an undamaged condition.
- D. At completion of construction activities of other trades, touch up and restore damaged or defaced painted surfaces.

3.6 INTERIOR PAINTING SCHEDULE

- A. Gypsum Board:
 - 1. Walls:
 - a. Prime Coat: Primer sealer, latex, interior, SW ProMar 200 Interior Latex Primer.
 - b. Intermediate Coat: Latex, interior , matching topcoat..
 - c. Top Coat: Latex, interior SW ProMar 200 Zero VOC Interior Latex - Eggshell Finish, B20-2600 Series, .
 - 2. Ceilings:
 - a. Prime Coat: Primer sealer, latex, interior, SW ProMar 200 Zero VOC Primer B28W2600.
 - b. Intermediate Coat: Latex, interior - matching topcoat.
 - c. Top Coat: Latex, interior, SW ProMar 200 Zero VOC Interior Flat, B30-2650 Series..
- B. Exposed Ceilings:
 - 1. Devco HP Coatings Uni-Grip 4380 Modified Epoxy Flat Dryfog Primer & Finish.

END OF SECTION 09 91 23

Division 14 – Conveying Equipment

SECTION 14 21 00 – Electric Traction Elevators

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 specifies electric traction elevators.
- B. Work Required:
 - 1. The work required under this section consists of all labor, materials and services required for the alteration of four (4) existing elevators; two (2) at the Leighton Plaza Parking Structure and two (2) at the Wayne Street Parking Structure.
 - 2. All work shall be performed in a first class, safe and workmanlike manner.
 - 3. In all cases where a device or part of the equipment is herein referred to in the singular, it is intended that such reference shall apply to as many of such devices or parts as are required to make complete installation/alteration.
- C. Related work not specified herein: The following sections contain requirements that relate to this section and are performed by trades other than the elevator contractor.
 - 1. The elevator contractor shall be a sub-contractor to the General Contractor selected by the owner.
 - 2. Division 02, Section “Selective Demolition” for demolition of selected portions of the building for alteration.
- D. Applicable Codes: Comply with applicable building codes and elevator codes at the project site, including but not limited to the following:
 - 1. ANSI A117.1, Buildings and Facilities, Providing Accessibility and Usability for Physically Handicapped People.
 - 2. ADAAG, Americans with Disabilities Act Accessibility Guidelines.
 - 3. ANSI/NFPA 70, National Electrical Code.
 - 4. ASME/ANSI A17.1, Safety Code for Elevators and Escalators, 2007 Edition.
 - 5. All other applicable local codes.

1.3 DEFINITIONS

- A. Definitions in ASME A17.1 apply to work of this Section.

- B. Defective Elevator Work: Operation or control system failures; performance below specified ratings; excessive wear; unusual deterioration or aging of materials or finishes; unsafe conditions; the need for excessive maintenance; abnormal noise or vibration; and similar unusual, unexpected, and unsatisfactory conditions.

1.4 SUBMITTALS

- A. Product Data: Submit manufacturer's product data for each system proposed for use. Include the following:
 - 1. Signal and operating fixtures, operating panels and indicators.
 - 2. Electrical characteristics and connection requirements.
 - 3. Expected heat dissipation of elevator equipment in control room space and machine space (BTU).
- B. Maintenance Manuals: Provide manufacturer's standard operations and maintenance manual.
- C. Inspection and Acceptance Certificates and Operating Permits: As required by authorities having jurisdiction for normal, unrestricted elevator use.

1.5 QUALITY ASSURANCE

- A. Elevator Manufacturer: Obtain elevator through one source from a single manufacturer. Elevator manufacturer shall be ISO 9001 certified.
- B. Elevator Installer: Elevator(s) shall be installed by the manufacturer. Manufacturer shall have completed elevator installations similar in material, design and extent to that indicated for this Project and with a record of successful in-service performance.
- C. Regulatory Requirements: In addition to local governing regulations, comply with applicable provisions in ASME A17.1, Safety Code for Elevators and Escalators.
- D. Permits, Inspections and Certificates: The Elevator Contractor shall obtain and pay for necessary Municipal or State Inspection and permit as required by the elevator inspection authority, and make such tests as are called for by the regulations or such authorities. These tests shall be made in the presence of such authorities or their authorized representatives.

1.6 DELIVERY, STORAGE AND HANDLING

- A. Deliver, store and handle materials, components and equipment in manufacturer's protective packaging.
- B. Store materials, components and equipment off of ground, under cover and in a dry location. Handle according to manufacturer's written recommendations to prevent damage, deterioration and/or soiling. On-site storage to be made available to elevator contractor within close proximity of existing elevator hoistways.

1.7 COORDINATION

- A. Coordinate locations and dimensions of other work related to electric traction elevators including pit ladder; sumps and floor drains in pits; electrical service; and electrical outlets, lights, wiring, and switches in hoistway(s), pit(s) and machine room(s).
- B. Coordinate the hoisting of any and all elevator equipment.
- C. Coordinate any and all elevator related demolition.
- D. Coordinate sequence of elevator work with other trades to avoid delaying overall project schedule.

1.8 DEMOLITION

- A. The elevator contractor shall be responsible for the entire demolition of all existing elevator equipment except where noted herein or on the drawings as being retained and/or reused. All demolished materials/equipment shall become the property of the elevator contractor. All demolished materials/equipment shall be removed in a safe manner. All demolished materials/equipment shall be disposed of legally and, where possible, recycle any and all metal products.
- B. The elevator contractor shall not be responsible for the identification, detection, abatement, encapsulation or removal of asbestos, polychlorinated biphenyl (PCB), and/or any existing products and/or materials containing asbestos, PCB's or other hazardous substances. In the event any such existing products and/or materials are encountered during the course of performing the work, all on-going work shall be immediately discontinued until such time that it is determined that the identified hazard no longer exists.

1.9 WARRANTY

- A. Manufacturer's Special Warranty: Manufacturer agrees to repair, restore or replace elevator equipment that fails in materials or workmanship within the specified warranty period.
 - 1. Warranty Period: One (1) year from the date of completion or acceptance for beneficial use.
 - 2. Failures due to ordinary wear and tear, improper use, vandalism, abuse, misuse, neglect or any other cause(s) beyond the control of the elevator contractor shall be excluded from the manufacturerTMs warranty.

1.10 MAINTENANCE SERVICE

- A. Beginning at completion or acceptance for beneficial use, provide twelve (12) months of full maintenance service. Full Maintenance Service shall consist of regular examinations and adjustments of the elevator equipment by skilled, licensed employees of the elevator contractor. This service shall not be subcontracted but shall be performed by the elevator contractor. All work shall be performed by competent employees during regular working hours of regular working days and shall include emergency 24-hour callback service. This service shall not cover adjustments, repairs or replacement of parts due to negligence, misuse, abuse or accidents caused by persons other than the elevator contractor. Only genuine parts and supplies as used in the manufacture and installation of the original equipment shall be provided.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products as specified by one of the following:
1. Otis Elevator Company
 2. Approved Equal.

2.2 ELEVATORS - GENERAL

- A. General: Provide manufacturer's standard overhead traction elevator system and/or products unless otherwise specified.

B. Elevator Description:

1. Wayne Street Elevators: Northwest Elevator, Southeast Elevator
 - a. Type: Geared Overhead Traction - *retain existing*
 - b. Rated Load: 2500 lbs. - *retain existing*
 - c. Rated Speed: 350 fpm - *retain existing*
 - d. Landings:
 - 1) North Elevator – Seven (7) - *retain existing*
 - 2) South Elevator - Seven (7) - *retain existing*
 - e. Openings:
 - 1) North Elevator
 - a) Front: Seven (7) - *retain existing*
 - b) Rear: N/A
 - 2) South Elevator
 - a) Front: Six (6) - *retain existing*
 - b) Rear: One (1) - *retain existing*
 - f. Floors Served:
 - 1) North Elevator – 1, 2, 3, 4, 5, 6, 7 - *retain existing*
 - 2) South Elevator – S, 1, 2, 3, 4, 5, 6 - *retain existing*
 - g. Travel: 60'-0" ± field verify - *retain existing*
 - h. Operation System:
 - 1) Simplex Operation - *provide new*
 - i. Auxiliary Operations: - *provide new*

- 1) Full Collective Operation
 - 2) Anti-nuisance Operation
 - 3) Fan and Light Protection
 - 4) Load Weighing By-Pass Operation
 - 5) Independent Service Operation
 - 6) Firefighters' Service Phase I and Phase II Operation
 - 7) Hoistway Access Operation
 - 8) Relative System Response Dispatching Operation
 - j. Car Enclosure:
 - 1) Inside Width: **retain existing**
 - 2) Inside Depth: **retain existing**
 - 3) Inside Height: **retain existing**
 - 4) Interior Finish: **retain existing**
 - 5) Flooring: **retain existing**
 - k. Hoistway Entrances:
 - 1) Width: **retain existing**
 - 2) Height: **retain existing**
 - 3) Type: **retain existing**
 - 4) Frames: **retain existing**
 - 5) Door Panels: **provide new**
 - 6) Sills: **retain existing**
 - l. Signal Fixtures: As detailed on drawings - *provide new*
 - m. Additional Requirements:
 - 1) Provide provisions for remote monitoring capabilities.
2. Leighton Plaza Elevators: Elevator1, Elevator 2
- a. Type: Geared Overhead Traction - *provide new*
 - b. Rated Load: 3500 lbs. - *retain existing*
 - c. Rated Speed: 350 fpm - *retain existing*
 - d. Landings: Seven (7) - *retain existing*
 - e. Openings: Seven (7) - *retain existing*
 - f. Floors Served: 1, 2, 3, 4, 5, 6, 7 - *retain existing*
 - g. Travel: 60'-0" ± field verify - *retain existing*
 - h. Operation System:
 - 1) Simplex Operation - *provide new*
 - i. Auxiliary Operations: - *provide new*
 - 1) Full Collective Operation
 - 2) Anti-nuisance Operation
 - 3) Fan and Light Protection
 - 4) Load Weighing By-Pass Operation
 - 5) Independent Service Operation
 - 6) Firefighters' Service Phase I and Phase II Operation
 - 7) Hoistway Access Operation
 - 8) Relative System Response Dispatching Operation
 - j. Car Enclosure:
 - 1) Inside Width: **retain existing**
 - 2) Inside Depth: **retain existing**
 - 3) Inside Height: **retain existing**

- 4) Interior Finish: **retain existing**
- 5) Flooring: **retain existing**
- k. Hoistway Entrances:
 - 1) Width: **retain existing**
 - 2) Height: **retain existing**
 - 3) Type: **retain existing**
 - 4) Frames: **retain existing**
 - 5) Door Panels: **provide new**
 - 6) Sills: **retain existing**
- l. Signal Fixtures: As detailed on drawings - *provide new*
- m. Additional Requirements:
 - 1) Provide provisions for remote monitoring capabilities.

2.3 MATERIALS AND COMPONENTS

- A. The following specifications shall apply to both Leighton Plaza and Wayne Street unless noted otherwise.
- B. Elevator Machine:
 - 1. Leighton Plaza: Provide new.
 - 2. Wayne Street: Retain Existing.
- C. Elevator Motor: Furnish and install a new 500 volt Alternating Current Variable Frequency 3 phase low slip motor designed for the existing duty characteristics.
- D. Hoist Ropes: Furnish and install new hoist ropes. The new hoist shall be traction steel of size, construction and number to ensure proper operation of the elevator and give satisfactory wearing qualities. All ropes shall consist of at least eight strands wound around a hemp core.
- E. Machine Beams: Existing machine beams and support system shall, as appropriate, be retained and reused in place.
- F. Over Speed Governor: New
 - 1. Provide an overspeed switch on each governor.
 - 2. Test governor in both directions of travel.
 - 3. Seal all adjustments following testing.
- G. Car Safety: Retain and reuse existing. Clean, refurbish and test as necessary.
- H. Unintended Movement Device:
 - 1. Leighton Plaza: A new Unintended Movement Device shall be furnished and installed.
 - 2. Wayne Street: Retain and reuse existing. Clean, refurbish and test as necessary.
- I. Car Guides: Retain and reuse existing. Clean and refurbish as necessary.
- J. Guide Rails: Reuse existing. Check all car and counterweight guides for plumbness. Align and file all rail joints as needed in order to provide a smooth and quiet ride.

- K. Hoistway Equipment: Provide all new hoistway limit switches, vanes, cams, optics, brackets, struts, hardware and necessary wiring. Provide:
1. Terminal stopping switches.
 2. New Positioning System which consists of car top encoder, reader box and door zone vanes.
 3. New car top junction box.
- L. Car Frame and Platform: Reuse existing.
1. Provide new toe guard as required.
- M. Counterweight: Reuse existing counterweight and frames.
1. Verify each elevator is properly counterweighted. Add or remove weight if found to be improperly counterbalanced.
 2. Verify each existing counterweight brace rod is tight, has double locking nuts and rods are properly pinned.
- N. Pit Equipment:
1. Pit Stop Switch: Provide code compliant pit stop switch.
 2. Car and Counter Weight Buffers: Reuse existing buffers. Clean and, as needed, test all buffers. Paint all buffers and support steel with one (1) coat of rust inhibiting paint.
 3. Pit Ladder: Provide code compliant pit ladder. Reuse existing pit ladder if contractor determines ladder to be code compliant.
 4. Pit Light: Provide code compliant NEMA 4 rated pit lighting. Reuse existing pit lighting if contractor determines existing lighting to be code compliant and NEMA 4 rated.
 5. Pit Light Switch: Provide code compliant NEMA 4 rated pit light switch. Reuse existing pit light switch if contractor determines existing switch to be code compliant and NEMA 4 rated.
 6. Counterweight Guard: Provide new as needed.
- O. Wiring: Provide all new machine room, hoistway and car wiring necessary for all elevators. If the base bid of NEMA 4 fixtures is accepted, install all new conduit and duct to match the rating of the fixtures. If the alternate of NEMA 1 fixtures is accepted, where appropriate, existing conduit and duct may be reused provided the existing conduit and duct meet or exceed current code standards. No existing wiring is to be reused.
- P. Hoistway Fascia: Provide new where required

2.4 OPERATION SYSTEMS

- A. Controller: Provide a microprocessor based elevator control system designed for the appropriate operation. The elevator control system will be designed as a digital closed-loop microprocessor-based control system specifically designed to meet the particular needs of this project. The system shall include a distributed network of modular microprocessor control units and solid-state performance measurement devices which use serial-link communication and measurement transducers to constantly monitor the performance of every elevator function controlled by the microprocessor. The software shall be designed to maintain optimum elevator system performance by evaluating changes in elevator demand or performance. Elevator controller layout shall be as follows:
1. All high voltage (110V or above) contact points inside the controller cabinet shall be protected from accidental contact in a situation where the controller doors are open.
 2. Controller shall be separated into two distinct halves; Motor Drive side and Control side. High voltage motor power conductors shall be routed so as to be physically segregated from the rest of the controller.
 3. Field conductor terminations points shall be segregated; high voltage (>30 volts DC and 110 VAC,) and low voltage (< 30 volts DC)
 4. Controllers shall be designed and tested for Electromagnetic Interference (EMI) immunity according to the EN 12016 (May 1998): "EMC Product Family Standards for lifts, escalators, and passenger conveyors Part 2 – immunity".
 5. Controllers shall be enclosed in a NEMA 4 rated cabinet.
- B. Operation: Selective Collective Operation: Using a microprocessor-based controller, operation shall be automatic by means of the car and hall buttons. If all calls in the system have been answered, the car shall park at the last landing served.
- C. Drive: A Variable Voltage Variable Frequency AC drive system shall be provided. The drive shall be set up for regeneration of AC power back to the building grid.
- D. Auxiliary Operations: In addition to the primary operation system features, provide the following operational features for each elevator where indicated:
1. Independent Service Operation: Provide a key switch in the car control station that shall remove the elevator car from service and allow it to respond only to car calls. When on Independent Service, doors close only in response to the door close button.
 2. Hoistway Access Operation: Hoistway Access Operation shall be provided. A key switch shall be located at each terminal landing allowing up and down movement of an elevator with the hoistway and car doors in the open position. Movement shall be restricted by switches and cams located on the elevator and in the hoistway.
 - a. Each switch shall have an up, down and neutral position. The key shall be removable in the neutral position only.
 - b. An activation switch shall be located within a service cabinet located in the Car Operating Panel.
 3. Anti-nuisance Operation: When car calls exceed a preset number while car load is less than a pre-determined weight, all car calls shall be canceled.
 4. Load Weighing By-Pass Operation: When car load exceeds 80 percent of rated capacity, car responds only to car calls, not hall calls.

5. Zoned Car Parking Operation: When cars are not required for response to calls, they shall be parked with doors closed at a programmable zone throughout the building.

2.5 DOOR EQUIPMENT

- A. Door Operator: A new Closed Loop Door Operator shall be furnished and installed.
 - ?.
 1. Doors on the car and at the hoistway entrances shall be power operated by means of a closed loop door operator mounted on top of the car. The door operator is a fully closed loop system designed to give consistent door performance with changes in temperature, wind or minor debris in the door track. The system continually monitors door speed and position and adjusts it accordingly to match the pre-determined profile.
 2. Door operation shall be automatic at each landing with door opening being initiated as the car arrives at the landing and closing taking place after expiration of an adjustable time interval. An electric car door contact shall prevent the elevator from operating unless the car door is in the closed position.
 3. Door close shall be arranged to start after a minimum time, consistent with Handicap Requirements.
 4. Doors shall be arranged to remain open for an adjustable time period sufficient to meet ADA requirements.
 5. The time interval for which the elevator doors remain open when a car stops at a landing shall be independently adjustable for response to car calls and response to all calls.
- B. Car Gate Switch: A new car gate switch shall be furnished and installed.
- C. Clutch Assembly: A new clutch assembly shall be furnished and installed.
- D. Car Door Hangers/Track: New car door hangers and track shall be furnished and installed at all landings.
- E. Door ReOpening Device: A new solid state infrared passenger protection device shall be installed on the car door.
 1. This device shall provide a minimum of 56 infrared light beams that create an invisible safety net across the elevator entrance. If the receivers detect enough light, a reversal signal is generated to open the doors. The maximum projection of these 12 additional beams at any time is one-third of the door opening width.
 2. If any beam is interrupted, the door-reversal signal will cause the elevator doors to reopen instantly without touching the passenger. After a car stop is made, the door shall remain open for a predetermined interval before closing. If, while the door is closing, the matrix of invisible light beams is interrupted by a passenger entering or leaving the car, the door shall stop and reopen, after which the door shall again start to close.
- F. Hoistway Door Interlocks: New hoistway door interlocks shall be furnished and installed at all landings.
- G. Hoistway Door Hangers/Track: New hoistway door hangers and track shall be furnished and installed at all landings.

- H. Hoistway Door Closing Assembly: New hoistway door closing assembly shall be furnished and installed at all landings.

2.6 HOISTWAY ENTRANCES

- A. Hoistway Frames: The existing hoistway entrances shall be retained and reused in place.
- B. Door Panels: New #4 Brushed Stainless Steel hoistway door panels shall be furnished and installed.
- C. Entrance Sills: The existing hoistway entrance sills shall be retained and reused in place.
- D. Entrance Marking Plates: Furnish and install new. Entrance jambs shall be marked with 4" x 4" plates having raised floor markings with Braille located underneath the floor marking. Marking plates shall be provided on both sides of the entrance jamb.
- E. Sight Guards: New to match the new hoistway door panels.

2.7 CAB ENCLOSURE

- A. Cab Enclosure: Reuse existing.
- B. Cab Interior: Reuse existing
- C. Car Doors: New #4 Brushed Stainless Steel car door panels shall be furnished and installed.\
- D. Emergency Pulsating Siren: Siren mounted on top of the car that is activated when the Alarm button in the car operating panel is engaged. Siren shall have a rated sound pressure level of 80 dB(A) at a distance of 3.0 m from the device. Siren shall respond with a delay of not more than 1 second after the switch or push button has been pressed.
- E. Ventilation Fan: A NEMA 4 rated cab ventilation fan will be mounted to the structural ceiling to facilitate in-car air circulation, meeting A17.1 code requirements. This fan produces airflow rates of 855CFM. The fan shall be rubber mounted to prevent the transmission of structural vibration and will include a baffle to diffuse audible noise. A switch shall be provided in the car-operating panel to control the fan.
- F. Emergency Exit Contact: An electrical contact shall be furnished and installed on the car-top exit.
- G. Certificate Frame: Provide a Certificate frame with a satin stainless steel finish.

2.8 SIGNAL FIXTURES

- A. Car Operating Panel (COP): Furnish and install a new car operating panel which contains all push buttons, key switches, and message indicators for elevator operation. The car operating panel shall have a #4 brush stainless steel finish and a NEMA 4 rating.

1. An applied car operating panel shall be furnished. It shall contain a bank of round metal vandal resistant illuminated buttons. Flush mounted to the panel and marked to correspond to the landings served, an emergency call button, door open and door close buttons, and switches for lights, inspection and the exhaust fan. The emergency call button shall be connected to a bell that serves as an emergency signal. All buttons to have raised numerals and Braille markings. Red LED halo illumination with flat flush targets. Target finishes shall be satin stainless steel.
 2. The COP shall have the elevator number and capacity engraved in the cover.
 3. All controls shall be mounted at heights complying with the Americans with Disabilities Accessibility Guidelines (ADAAG).
 4. Provide an appropriate three position switch for Fire Service. Locate all Fire Service operations behind a locked panel as required by ASME A17.1 Code. Include audible and visual signals. Provide firefighters service instructions on the inside of each compartment cover.
 5. Provide an audible voice announcement system. Equipment shall be furnished to allow an audible announcement in each car of the name of the next selected landing at which the elevator will stop and the committed direction of travel. Several advisory messages shall also be available to indicate the need for elevator on special service or passenger delay of elevator.
 6. Provide an Access Enable key switch.
 7. Provide a battery operated emergency light in each elevator.
 8. The COP shall have a service cabinet located within the panel. The following functions shall be secured within the cabinet:
 - a. Light toggle switch.
 - b. Fan toggle switch.
 - c. Independent Service toggle switch.
 - d. GFCI Outlet.
 - e. Emergency Light Test switch.
- B. Car Position Indicator: A new segmented LED car position indicator shall be furnished and installed and shall be integral to the car operating panel.
- C. Emergency Communications: Furnish and install a NEMA 4X surface mount ADA telephone. The phone is a telephone which enables communication between persons in the elevator and a 24-hour answering service. The phone will be surface mounted in the elevator car operating panel. It will automatically dial a preprogrammed number and will inform the answering service of the elevator location via prerecorded digital voice communication. After disclosing the elevator location, the phone will allow two-way voice communication. The phone contains a light-emitting diode that indicates the call has been acknowledged. After receiving acknowledgment of the call from the answering service, a deaf/mute person can signal the answering service by reactivating the call button. The phone can be easily programmed and allows incoming calls to be received. The telephone will be furnished and installed in accordance with the ASME A17.1 Safety Code for Elevators and Escalators, and is registered with the FCC.
- D. Hall Push Button Stations: New hall pushbutton stations shall be furnished and installed at each landing.
1. Slim-line *surface* mounted NEMA 4 rated fixtures shall be provided.

2. An up button and a down button at each intermediate landing and a single button at each terminal landing shall be installed. A call shall be registered by momentary pressure of a landing button. The button shall become illuminated and remain illuminated until the call is answered.
 3. All buttons to be vandal resistant and have long life LED illumination.
 4. Locate an engraved or etched Appendix O sign in all lobby pushbutton fixture covers.
 5. Provide an indicator light in main lobby egress fixture that illuminates each time the elevator system goes on Fire Service operation.
 6. Provide, at the top floor and at the lowest landing, a Hoistway Access key switch.
- E. Hall Position Indicator: Hall position indicators with stainless steel faceplates and NEMA 4 ratings shall be installed at the First Landing. The position of the car in the hoistway shall be shown by the illumination of the indicator corresponding to the landing that the car is stopped or passing.
- F. Hall Lanterns: New surface mounted NEMA 4 rated Hall Lanterns shall be furnished and installed. New interior components (i.e. LED lights, chime/gongs, etc.) shall be installed so that when a car is stopping at a landing, the lantern indicates the direction that the car is set to travel. A chime shall sound once for the "UP" direction and twice for the "DOWN" direction.
- G. Hoistway Access: A hoistway access key-switch shall be located at the top floor and at the lowest landing. Key switch to be mounted in the new hall push button stations.
- H. Emergency Key Box: Reuse existing.
- 2.9 PASSENGER ELEVATORS
- A. Equipment Description: Geared Traction elevator with overhead machine room application.
- B. Equipment Control: Elevonic®RH Control System.
- C. Drive: Regenerative VVVF
- D. Quantity of Elevators: 2
- E. Elevator Stop Designations: see Part 2.2.B.1 & 2.2.B.2
- F. Stops : see Part 2.2.B.1 & 2.2.B.2
- G. Openings: see Part 2.2.B.1 & 2.2.B.2
- H. Travel: see Part 2.2.B.1 & 2.2.B.2
- I. Rated Capacity:
 1. Leighton Plaza: 3500 lbs.
 2. Wayne Street: 2500 lbs.
- J. Rated Speed: 350 fpm

- K. Main Power Supply: 208 VAC, 3Ø, 60 Hz
- L. Car Lighting Power Supply: 120 VAC, Single-phase, 15 Amp, 60 Hz.
- M. Performance:
 - 1. Car Speed: $\pm 3\%$ of contract speed under any loading condition or direction of travel.
 - 2. Car Capacity: Safely lower, stop and hold up to 125% of rated load.
- N. Ride Quality:
 - 1. Vertical Vibration (maximum): 12 – 17 milli-g
 - 2. Horizontal Vibration (maximum): 10 – 15 milli-g
 - 3. Vertical Jerk (maximum): 4.6 ± 1.0 ft./ sec³
 - 4. Acceleration/Deceleration (maximum): $1.98 \pm .33$ ft./ sec²
 - 5. In Car Noise: 55 – 60 dB(A)
 - 6. Stopping Accuracy: ± 0.2 in. (± 5 mm)
 - 7. Re-leveling Distance: ± 0.4 in. (± 10 mm)

PART 3 - EXECUTION

3.1 PREPARATION

- A. Take field dimensions and examine conditions of substrates, supports, and other conditions under which this work is to be performed. Do not proceed with work until unsatisfactory conditions are corrected.

3.2 INSTALLATION

- A. Installation of all elevator components except as specifically provided for elsewhere by others.

3.3 DEMONSTRATION

- A. The elevator contractor shall make a final check of each elevator operation with the Owner or Owner's representative present prior to turning each elevator over for use. The elevator contractor shall determine that control systems and operating devices are functioning properly.

END OF SECTION 14 21 00

**Division 23 – Heating, Ventilating and Air-
Conditioning (HVAC)**

SECTION 23 81 13.11 - PACKAGED TERMINAL AIR-CONDITIONERS, THROUGH-WALL UNITS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section includes packaged, terminal, through-the-wall air conditioners.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product. Include rated capacities, operating characteristics, electrical characteristics, and furnished specialties and accessories.

1.4 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data: For packaged, terminal air conditioners to include in emergency, operation, and maintenance manuals.

1.5 WARRANTY

- A. Special Warranty: Manufacturer agrees to repair or replace components of packaged, terminal air conditioners that fail in materials or workmanship within specified warranty period.
 - 1. Warranty Period for Sealed Refrigeration System: Manufacturer's standard, but not less than one year from date of Substantial Completion, including components and labor.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - 1. Carrier Corporation; a unit of United Technologies Corp.
 - 2. ClimateMaster, Inc.
 - 3. Daikin Applied.
 - 4. Friedrich Air Conditioning Company.
 - 5. General Electric Company; GE Energy Management - Electrical Distribution.
 - 6. LG Electronics.

2.2 MANUFACTURED UNITS

- A. Description: Factory-assembled and -tested, self-contained, packaged, terminal air conditioner with room cabinet, electric refrigeration system, and temperature controls; fully charged with refrigerant and filled with oil; with cord-connected chassis.
- B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- C. UL listed and ETL performance certified.

2.3 CHASSIS

- A. Cabinet: 0.052-inch- thick galvanized steel with removable front panel with concealed latches.
 - 1. Mounting: Wall with wall sleeve.
 - 2. Discharge Grille: Reversible-polycarbonate discharge grille allowing upward and horizontal airflow, tamperproof, and carrying a flame test rating in accordance with UL standard 494.
 - 3. Finish: Baked enamel.
- B. Refrigeration System: Direct-expansion indoor coil with capillary restrictor and hermetically sealed scroll compressor with vibration isolation and overload protection.
 - 1. Indoor and Outdoor Coils: Seamless copper tubes mechanically expanded into aluminum fins.
 - 2. Accumulator.
 - 3. Constant-pressure expansion valve.
 - 4. Reversing valve.
 - 5. Charge: R-410A.
- C. Filters: Washable polyurethane in molded plastic frame.
- D. Condensate Drain: Drain pan to direct condensate to outdoor coil for re-evaporation.

2.4 CONTROLS

- A. Control Module: Unit-mounted digital panel with touchpad temperature control and with touchpad for cooling, and fan operation. Include the following features:

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install units level and plumb, maintaining manufacturer's recommended clearances and tolerances.
- B. Install wall sleeves in finished wall assembly; seal and weatherproof. Joint-sealant materials and applications are specified in Section 07 92 00 "Joint Sealants."

- C. Install and anchor wall sleeves to withstand, without damage to equipment and structure, seismic forces required by building code.

3.2 ADJUSTING

- A. Adjust initial temperature set points.
- B. Set field-adjustable switches and circuit-breaker trip ranges as indicated.

3.3 DEMONSTRATION

- A. Train Owner's maintenance personnel to adjust, operate, and maintain packaged, terminal air conditioners.

END OF SECTION 23 81 13.11

SECTION 23 81 26 - SPLIT-SYSTEM AIR-CONDITIONERS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section includes split-system air-conditioning and heat-pump units consisting of separate evaporator-fan and compressor-condenser components.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated. Include rated capacities, operating characteristics, and furnished specialties and accessories. Include performance data in terms of capacities, outlet velocities, static pressures, sound power characteristics, motor requirements, and electrical characteristics.

1.4 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data: For split-system air-conditioning units to include in emergency, operation, and maintenance manuals.

1.5 COORDINATION

- A. Coordinate sizes and locations of roof curbs, equipment supports, and roof penetrations with actual equipment provided.

1.6 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of split-system air-conditioning units that fail in materials or workmanship within specified warranty period.
 - 1. Warranty Period:
 - a. For Compressor: One year(s) from date of Substantial Completion.
 - b. For Parts: One year(s) from date of Substantial Completion.
 - c. For Labor: One year(s) from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - 1. Carrier Corporation; a unit of United Technologies Corp.

2. Daikin.
3. Mitsubishi Electric & Electronics USA, Inc.
4. SANYO North America Corporation.
5. Trane.
6. Samsung.

2.2 INDOOR UNITS (5 TONS OR LESS)

- A. Wall-Mounted, Evaporator-Fan Components:
1. Refrigerant Coil: Copper tube, with mechanically bonded aluminum fins and thermal-expansion valve. Comply with ARI 206/110.
 2. Fan Motors:
 - a. Multitapped, multispeed with internal thermal protection and permanent lubrication.
 - b. NEMA Premium (TM) efficient motors as defined in NEMA MG 1.
 - c. Controllers, Electrical Devices, and Wiring: Comply with requirements for electrical devices and connections specified in electrical Sections.
 3. Air Filtration Section: Washable type

2.3 OUTDOOR UNITS (5 TONS OR LESS)

- A. Air-Cooled, Compressor-Condenser Components:
1. Compressor: Hermetically sealed with crankcase heater and mounted on vibration isolation device. Compressor motor shall have thermal- and current-sensitive overload devices, start capacitor, relay, and contactor.
 - a. Compressor Type: Scroll.
 - b. Refrigerant Charge: R-410A.
 - c. Refrigerant Coil: Copper tube, with mechanically bonded aluminum fins and liquid subcooler. Comply with ARI 206/110.

2.4 ACCESSORIES

- A. Thermostat: Low voltage with subbase to control compressor and evaporator fan.
- B. Automatic-reset timer to prevent rapid cycling of compressor.
- C. Refrigerant Line Kits: Soft-annealed copper suction and liquid lines factory cleaned, dried, pressurized, and sealed; factory-insulated suction line with flared fittings at both ends.
- D. Drain Hose: For condensate.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install units level and plumb.
- B. Install evaporator-fan components using manufacturer's standard mounting devices securely fastened to building structure.

3.2 CONNECTIONS

- A. Where piping is installed adjacent to unit, allow space for service and maintenance of unit.

3.3 STARTUP SERVICE

- A. Perform startup service.
 - 1. Complete installation and startup checks according to manufacturer's written instructions.

3.4 DEMONSTRATION

- A. Train Owner's maintenance personnel to adjust, operate, and maintain units.

END OF SECTION 23 81 26

SECTION 23 82 39.16 - PROPELLER UNIT HEATERS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section includes propeller unit heaters with electric-resistance heating coils.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
 - 1. Include rated capacities, operating characteristics, furnished specialties, and accessories.

1.4 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data: For propeller unit heaters to include in emergency, operation, and maintenance manuals.

1.5 WARRANTY

- A. Special Warranty: Manufacturer agrees to repair or replace components of unit heaters that fail in materials or workmanship within specified warranty period.
 - 1. Warranty Period for Electric Unit Heaters: Manufacturer's standard, but not less than one year from date of Substantial Completion, including components and labor.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

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

2.2 DESCRIPTION

- A. Assembly including casing, coil, fan, and motor in horizontal discharge configuration with adjustable discharge louvers.
- B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- C. Comply with UL 2021.

2.3 HOUSINGS

- A. Finish: Manufacturer's standard baked enamel applied to factory-assembled and -tested propeller unit heaters before shipping.
- B. Discharge Louver: Adjustable fin diffuser for horizontal units and conical diffuser for vertical units.

2.4 COILS

- A. Electric-Resistance Heating Coil: Nickel-chromium heating wire, free from expansion noise and 60-Hz hum, embedded in magnesium oxide refractory and sealed in steel or corrosion-resistant metallic sheath with fins no closer than 0.16 inch . Element ends shall be enclosed in terminal box. Fin surface temperature shall not exceed 550 deg F at any point during normal operation.

2.5 CONTROLS

- A. Control Devices:
 - 1. Wall-mounted thermostat.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine areas to receive propeller unit heaters for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
- B. Examine roughing-in for electrical connections to verify actual locations before unit-heater installation.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Install propeller unit heaters to comply with NFPA 90A.
- B. Install propeller unit heaters level and plumb.
- C. Suspend propeller unit heaters from structure with all-thread hanger rods and elastomeric hangers.
- D. Install wall-mounted thermostats and switch controls in electrical outlet boxes at heights to match lighting controls. Verify location of thermostats and other exposed control sensors with Drawings and room details before installation.

3.3 ADJUSTING

- A. Adjust initial temperature set points.

END OF SECTION 23 82 39.16

Division 26 – Electrical

SECTION 26 05 19 - LOW-VOLTAGE ELECTRICAL POWER CONDUCTORS AND CABLES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section Includes:
 - 1. Building wires and cables rated 600 V and less.
 - 2. Connectors, splices, and terminations rated 600 V and less.

1.3 WARRANTY

- A. Special Warranty: Manufacturer agrees to repair or replace building wires, cables connectors, splices and terminations that fail in materials or workmanship within specified warranty period.
 - 1. Warranty Period: Manufacturer's standard, but not less than one year from date of Substantial Completion, including components and labor.

PART 2 - PRODUCTS

2.1 CONDUCTORS AND CABLES

- A. Basis-of-Design Product: Subject to compliance with requirements, provide product by one of the following:
 - 1. Alpha Wire.
 - 2. Belden Inc.
 - 3. Southwire Incorporated.
 - 4. Essex Group, Inc
 - 5. Diamond Wire & Cable Co.
- B. Conductors: Comply with NEMA WC 70/ICEA S-95-658.
- C. Conductor Insulation: Comply with NEMA WC 70/ICEA S-95-658 for .
- D. Multiconductor Cable: Comply with NEMA WC 70/ICEA S-95-658 for with ground wire.

2.2 CONNECTORS AND SPLICES

- A. Description: Factory-fabricated connectors and splices of size, ampacity rating, material, type, and class for application and service indicated.

2.3 SYSTEM DESCRIPTION

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

PART 3 - EXECUTION

3.1 CONDUCTOR MATERIAL APPLICATIONS

- A. Feeders: Copper. Solid for No. 10 AWG and smaller; stranded for No. 8 AWG and larger.
- B. Branch Circuits: Copper. Solid for No. 10 AWG and smaller; stranded for No. 8 AWG and larger. Minimum 12 AWG.
- C. Control Circuits: Stranded conductors, minimum 16 AWG.
- D. Utilize 10 AWG conductors for 20 ampere, branch circuits as follows. Voltage drop not to exceed 5% of system voltage at any device.
 - 1. 120 volt circuits with conductors longer than 75 feet.
 - 2. 277 volt circuits with conductors longer than 200 feet.

3.2 CONDUCTOR INSULATION AND MULTICONDUCTOR CABLE APPLICATIONS AND WIRING METHODS

- A. Service Entrance: Type THHN-2-THWN-2, single conductors in raceway.
- B. Exposed Feeders: Type THHN-2-THWN-2, single conductors in raceway .
- C. Feeders Concealed in Ceilings, Walls, Partitions, and Crawlspace: Type THHN-2-THWN-2, single conductors in raceway .
- D. Feeders Concealed in Concrete, below Slabs-on-Grade, and Underground: Type THHN-2-THWN-2, single conductors in raceway .
- E. Exposed Branch Circuits, Including in Crawlspace: Type THHN-2-THWN-2, single conductors in raceway.
- F. Branch Circuits Concealed in Ceilings, Walls, and Partitions: Type THHN-2-THWN-2, single conductors in raceway .
- G. Branch Circuits Concealed in Concrete, below Slabs-on-Grade, and Underground: Type THHN-2-THWN-2, single conductors in raceway.
- H. Cord Drops and Portable Appliance Connections: Type SO, hard service cord with stainless-steel, wire-mesh, strain relief device at terminations to suit application.

3.3 INSTALLATION OF CONDUCTORS AND CABLES

- A. Conceal cables in finished walls, ceilings, and floors unless otherwise indicated.
- B. Complete raceway installation between conductor and cable termination points according to Section 26 05 33 "Raceways and Boxes for Electrical Systems" prior to pulling conductors and cables.
- C. Use manufacturer-approved pulling compound or lubricant where necessary; compound used must not deteriorate conductor or insulation. Do not exceed manufacturer's recommended maximum pulling tensions and sidewall pressure values.
- D. Use pulling means, including fish tape, cable, rope, and basket-weave wire/cable grips, that will not damage cables or raceway.
- E. Install exposed cables parallel and perpendicular to surfaces of exposed structural members, and follow surface contours where possible.
- F. Support cables according to Section 26 05 29 "Hangers and Supports for Electrical Systems."

3.4 CONNECTIONS

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

3.5 IDENTIFICATION

- A. Identify and color-code conductors and cables according to Section 26 05 53 "Identification for Electrical Systems."
- B. Identify each spare conductor at each end with identity number and location of other end of conductor, and identify as spare conductor.

3.6 SLEEVE AND SLEEVE-SEAL INSTALLATION FOR ELECTRICAL PENETRATIONS

- A. Install sleeves and sleeve seals at penetrations of exterior floor and wall assemblies. Comply with requirements in Section 26 05 44 "Sleeves and Sleeve Seals for Electrical Raceways and Cabling."

3.7 FIRESTOPPING

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

END OF SECTION 26 05 19

SECTION 26 05 26 - GROUNDING AND BONDING 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. Section includes grounding and bonding systems and equipment.

1.3 QUALITY ASSURANCE

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

1.4 WARRANTY

- A. Special Warranty: Manufacturer agrees to repair or replace components of grounding and bonding system that fail in materials or workmanship within specified warranty period.
 - 1. Warranty Period: Manufacturer's standard, but not less than one year from date of Substantial Completion, including components and labor.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Basis-of-Design Product: Subject to compliance with requirements, provide products by one of the following:
 - 1. Burndy; Part of Hubbell Electrical Systems.
 - 2. ERICO International Corporation.
 - 3. O-Z/Gedney; A Brand of the EGS Electrical Group.

2.2 SYSTEM DESCRIPTION

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

2.3 CONDUCTORS

- A. Insulated Conductors: Copper wire or cable insulated for 600 V unless otherwise required by applicable Code or authorities having jurisdiction.

- B. Bare Copper Conductors:
 - 1. Solid Conductors: ASTM B 3.
 - 2. Stranded Conductors: ASTM B 8.
 - 3. Bonding Cable: 28 kcmil, 14 strands of No. 17 AWG conductor, 1/4 inch diameter.
 - 4. Bonding Conductor: No. 4 or No. 6 AWG, stranded conductor.
 - 5. Bonding Jumper: Copper tape, braided conductors terminated with copper ferrules; 1-5/8 inches wide and 1/16 inch thick.
 - 6. Tinned Bonding Jumper: Tinned-copper tape, braided conductors terminated with copper ferrules; 1-5/8 inches wide and 1/16 inch thick.

2.4 CONNECTORS

- A. Listed and labeled by an NRTL acceptable to authorities having jurisdiction for applications in which used and for specific types, sizes, and combinations of conductors and other items connected.
- B. Bolted Connectors for Conductors and Pipes: Copper or copper alloy.
- C. Welded Connectors: Exothermic-welding kits of types recommended by kit manufacturer for materials being joined and installation conditions.

PART 3 - EXECUTION

3.1 APPLICATIONS

- A. Conductors: Install solid conductor for No. 10 AWG and smaller, and stranded conductors for No. 8 AWG and larger unless otherwise indicated.
- B. Underground Grounding Conductors: Install bare copper conductor, No. 4/0 AWG minimum.
 - 1. Bury at least 24 inches below grade.
- C. Conductor Terminations and Connections:
 - 1. Pipe and Equipment Grounding Conductor Terminations: Bolted connectors.
 - 2. Underground Connections: Welded connectors except as otherwise indicated.
 - 3. Connections to Structural Steel: Welded connectors.

3.2 EQUIPMENT GROUNDING

- A. Install insulated equipment grounding conductors with the following items, in addition to those required by NFPA 70:
 - 1. Flexible raceway runs.
 - 2. Armored and metal-clad cable runs.

3.3 INSTALLATION

- A. Grounding Conductors: Route along shortest and straightest paths possible unless otherwise indicated or required by Code. Avoid obstructing access or placing conductors where they may be subjected to strain, impact, or damage.

- B. Bonding Straps and Jumpers: Install in locations accessible for inspection and maintenance except where routed through short lengths of conduit.
1. Bonding to Structure: Bond straps directly to basic structure, taking care not to penetrate any adjacent parts.
 2. Bonding to Equipment Mounted on Vibration Isolation Hangers and Supports: Install bonding so vibration is not transmitted to rigidly mounted equipment.
 3. Use exothermic-welded connectors for outdoor locations; if a disconnect-type connection is required, use a bolted clamp.
- C. Bonding Interior Metal Ducts: Bond metal air ducts to equipment grounding conductors of associated fans, blowers, electric heaters, and air cleaners. Install bonding jumper to bond across flexible duct connections to achieve continuity.

END OF SECTION 26 05 26

SECTION 26 05 29 - 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.

1.3 DEFINITIONS

- A. EMT: Electrical metallic tubing.
- B. RMC: Rigid metal conduit.

1.4 QUALITY ASSURANCE

- A. Comply with NFPA 70.

1.5 WARRANTY

- A. Special Warranty: Manufacturer agrees to repair or replace hangers and supports for electrical equipment and systems that fail in materials or workmanship within specified warranty period.
 - 1. Warranty Period: Manufacturer's standard, but not less than one year from date of Substantial Completion, including components and labor.

PART 2 - PRODUCTS

2.1 SUPPORT, ANCHORAGE, AND ATTACHMENT COMPONENTS

- A. Raceway and Cable Supports: As described in NECA 1 and NECA 101.
- B. Conduit and Cable Support Devices: Steel hangers, clamps, and associated fittings, designed for types and sizes of raceway or cable to be supported.
- C. 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.
- D. Structural Steel for Fabricated Supports and Restraints: ASTM A 36/A 36M, steel plates, shapes, and bars; black and galvanized.

- E. Mounting, Anchoring, and Attachment Components: Items for fastening electrical items or their supports to building surfaces include the following:
1. Mechanical-Expansion Anchors: Insert-wedge-type, zinc-coated steel, for use in hardened portland cement concrete with tension, shear, and pullout capacities appropriate for supported loads and building materials in which used.
 - a. 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.
 2. Concrete Inserts: Steel or malleable-iron, slotted support system units similar to MSS Type 18; complying with MFMA-4 or MSS SP-58.
 3. Clamps for Attachment to Steel Structural Elements: MSS SP-58, type suitable for attached structural element.
 4. Through Bolts: Structural type, hex head, and high strength. Comply with ASTM A 325.
 5. Toggle Bolts: All-steel springhead type.
 6. Hanger Rods: Threaded steel.

2.2 FABRICATED METAL EQUIPMENT SUPPORT ASSEMBLIES

- A. Description: Welded or bolted, structural-steel shapes, shop or field fabricated to fit dimensions of supported equipment.
- B. Materials: Comply with requirements in Section 05 50 00 "Metal Fabrications" for steel shapes and plates.

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 and RMC as NFPA 70. Minimum rod size shall be 1/4 inch in diameter.
- C. Spring-steel clamps designed for supporting single conduits without bolts may be used for 1-1/2-inch 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. 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.
- C. 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: Beam clamps (MSS Type 19, 21, 23, 25, or 27) complying with MSS SP-69 or 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.
- D. Drill holes for expansion anchors in concrete at locations and to depths that avoid reinforcing bars.

3.3 INSTALLATION OF FABRICATED METAL SUPPORTS

- A. Comply with installation requirements in Section 05 50 00 "Metal Fabrications" for site-fabricated metal supports.
- B. Cut, fit, and place miscellaneous metal supports accurately in location, alignment, and elevation to support and anchor electrical materials and equipment.
- C. Field Welding: Comply with AWS D1.1/D1.1M.

3.4 PAINTING

- A. Touchup: Clean field welds and abraded areas of shop paint. Paint exposed areas immediately after erecting hangers and supports. Use same materials as used for shop painting. Comply with SSPC-PA 1 requirements for touching up field-painted surfaces.
 - 1. Apply paint by brush or spray to provide minimum dry film thickness of 2.0 mils.
- B. Galvanized Surfaces: Clean welds, bolted connections, and abraded areas and apply galvanizing-repair paint to comply with ASTM A 780.

END OF SECTION 26 05 29

SECTION 26 05 33 - RACEWAYS AND BOXES 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. Section Includes:
 1. Metal conduits, tubing, and fittings.
 2. Nonmetal conduits, tubing, and fittings.
 3. Metal wireways and auxiliary gutters.
 4. Surface raceways.
 5. Boxes, enclosures, and cabinets.

1.3 DEFINITIONS

- A. GRC: Galvanized rigid steel conduit.
- B. EMT: Electrical Metallic Tubing.

1.4 WARRANTY

- A. Special Warranty: Manufacturer agrees to repair or replace raceways or boxes that fail in materials or workmanship within specified warranty period.
 1. Warranty Period: Manufacturer's standard, but not less than one year from date of Substantial Completion, including components and labor.

PART 2 - PRODUCTS

2.1 METAL CONDUITS, TUBING, AND FITTINGS

- A. Manufacturers: Subject to compliance with requirements, provide products by the following:
 1. Allied Tube & Conduit; a Tyco International Ltd. Co.
 2. O-Z/Gedney; a brand of EGS Electrical Group.
 3. Southwire Company.
 4. Thomas & Betts Corporation.
 5. Western Tube and Conduit Corporation.
 6. Wheatland Tube Company; a division of John Maneely Company.
- B. Listing and Labeling: Metal conduits, tubing, and fittings shall be listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- C. GRC: Comply with ANSI C80.1 and UL 6.

- D. PVC-Coated Steel Conduit: PVC-coated rigid steel conduit.
 - 1. Comply with NEMA RN 1.
 - 2. Coating Thickness: 0.040 inch, minimum.
- E. EMT: Comply with ANSI C80.3 and UL 797.
- F. FMC: Comply with UL 1; zinc-coated steel.
- G. LFMC: Flexible steel conduit with PVC jacket and complying with UL 360.
- H. Fittings for Metal Conduit: Comply with NEMA FB 1 and UL 514B.
 - 1. Conduit Fittings for Hazardous (Classified) Locations: Comply with UL 886 and NFPA 70.
 - 2. Fittings for EMT:
 - a. Material: Steel.
 - b. Type: Setscrew.
 - 3. Expansion Fittings: PVC or steel to match conduit type, complying with UL 651, rated for environmental conditions where installed, and including flexible external bonding jumper.
 - 4. Coating for Fittings for PVC-Coated Conduit: Minimum thickness of 0.040 inch, with overlapping sleeves protecting threaded joints.

2.2 NONMETALLIC CONDUITS, TUBING, AND FITTINGS

- A. Manufacturers: Subject to compliance with requirements, provide products by the following:
 - 1. CANTEX Inc.
 - 2. RACO; a Hubbell company.
 - 3. Thomas & Betts Corporation.
- B. RNC: Type EPC-40-PVC, complying with NEMA TC 2 and UL 651 unless otherwise indicated.
- C. LFNC: Comply with UL 1660.
- D. Fittings for RNC: Comply with NEMA TC 3; match to conduit or tubing type and material.
- E. Fittings for LFNC: Comply with UL 514B.

2.3 METAL WIREWAYS AND AUXILIARY GUTTERS

- A. Manufacturers: Subject to compliance with requirements, provide products by the following:
 - 1. Cooper B-Line, Inc.
 - 2. Hoffman; a Pentair company.
 - 3. Mono-Systems, Inc.
 - 4. Square D; a brand of Schneider Electric.

- B. Fittings and Accessories: Include covers, couplings, offsets, elbows, expansion joints, adapters, hold-down straps, end caps, and other fittings to match and mate with wireways as required for complete system.
- C. Wireway Covers: Hinged type unless otherwise indicated.

2.4 SURFACE RACEWAYS

- A. Listing and Labeling: Surface raceways shall be listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- B. Surface Metal Raceways: Galvanized steel with snap-on covers complying with UL 5. Manufacturer's standard enamel finish in color selected by Architect.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by the following:
 - a. Mono-Systems, Inc.
 - b. Panduit Corp.
 - c. Wiremold / Legrand.
- C. Surface Nonmetallic Raceways: Two- or three-piece construction, complying with UL 5A, and manufactured of rigid PVC with texture and color selected by Architect from manufacturer's standard colors. Product shall comply with UL 94 V-0 requirements for self-extinguishing characteristics.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by the following:
 - a. Hubbell Incorporated; Wiring Device-Kellems Division.
 - b. Mono-Systems, Inc.
 - c. Panduit Corp.
 - d. Wiremold / Legrand.

2.5 BOXES, ENCLOSURES, AND CABINETS

- A. Manufacturers: Subject to compliance with requirements, provide products by the following:
 - 1. Adalet.
 - 2. Cooper Technologies Company; Cooper Crouse-Hinds.
 - 3. EGS/Appleton Electric.
 - 4. Erickson Electrical Equipment Company.
 - 5. FSR Inc.
 - 6. Hoffman; a Pentair company.
 - 7. Hubbell Incorporated; Killark Division.
 - 8. Kraloy.
 - 9. Milbank Manufacturing Co.
 - 10. Mono-Systems, Inc.
 - 11. O-Z/Gedney; a brand of EGS Electrical Group.
 - 12. RACO; a Hubbell Company.
 - 13. Robroy Industries.
 - 14. Spring City Electrical Manufacturing Company.
 - 15. Stahlin Non-Metallic Enclosures; a division of Robroy Industries.

16. Thomas & Betts Corporation.
 17. Wiremold / Legrand.
- B. General Requirements for Boxes, Enclosures, and Cabinets: Boxes, enclosures, and cabinets installed in wet locations shall be listed for use in wet locations.
- C. Sheet Metal Outlet and Device Boxes: Comply with NEMA OS 1 and UL 514A.
- D. Cast-Metal Outlet and Device Boxes: Comply with NEMA FB 1, aluminum, Type FD, with gasketed cover.
- E. Luminaire Outlet Boxes: Nonadjustable, designed for attachment of luminaire weighing 50 lb. Outlet boxes designed for attachment of luminaires weighing more than 50 lb shall be listed and marked for the maximum allowable weight.
- F. Small Sheet Metal Pull and Junction Boxes: NEMA OS 1.
- G. Cast-Metal Access, Pull, and Junction Boxes: Comply with NEMA FB 1 and UL 1773, cast aluminum with gasketed cover.
- H. Box extensions used to accommodate new building finishes shall be of same material as recessed box.
- I. Device Box Dimensions: 4 inches square by 2-1/8 inches deep.
- J. Gangable boxes are allowed.
- K. Cabinets:
1. NEMA 250, Type 1 galvanized-steel box with removable interior panel and removable front, finished inside and out with manufacturer's standard enamel.
 2. Hinged door in front cover with flush latch and concealed hinge.
 3. Key latch to match panelboards.
 4. Metal barriers to separate wiring of different systems and voltage.
 5. Accessory feet where required for freestanding equipment.
 6. Nonmetallic cabinets shall be listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

PART 3 - EXECUTION

3.1 RACEWAY APPLICATION

- A. Outdoors: Apply raceway products as specified below unless otherwise indicated:
1. Exposed Conduit: GRC.
 2. Concealed Conduit, Aboveground: GRC.
 3. Underground Conduit: RNC, Type EPC-40-PVC, direct buried.
 4. Connection to Vibrating Equipment (Including Transformers and Hydraulic, Pneumatic, Electric Solenoid, or Motor-Driven Equipment): LFMC.
 5. Boxes and Enclosures, Aboveground: NEMA 250, Type 3R.

- B. Indoors: Apply raceway products as specified below unless otherwise indicated:
 - 1. Exposed, Not Subject to Physical Damage: EMT.
 - 2. Exposed, Not Subject to Severe Physical Damage: EMT identified for such use.
 - 3. Exposed and Subject to Severe Physical Damage: GRC.
 - 4. Concealed in Ceilings and Interior Walls and Partitions: EMT.
 - 5. Connection to Vibrating Equipment (Including Transformers and Hydraulic, Pneumatic, Electric Solenoid, or Motor-Driven Equipment): FMC, except use LFMC in damp or wet locations.
 - 6. Damp or Wet Locations: GRC.
 - 7. Boxes and Enclosures: NEMA 250, Type 1, except use NEMA 250, Type 4 nonmetallic in damp or wet locations.
 - 8. MC Cable is not acceptable.
- C. Minimum Raceway Size: 1/2-inch trade size. 3/4-inch trade size for outdoors.
- D. Install surface raceways only where indicated on Drawings.
- E. Do not install nonmetallic conduit where ambient temperature exceeds 120 deg F.

3.2 INSTALLATION

- A. Comply with NECA 1 and NECA 101 for installation requirements except where requirements on Drawings or in this article are stricter. Comply with NFPA 70 limitations for types of raceways allowed in specific occupancies and number of floors.
- B. Route exposed raceway parallel and perpendicular to walls.
- C. Route raceway installed above accessible ceilings parallel and perpendicular to walls.
- ?. Route conduit in and under slab from point-to-point.
- D. Keep raceways at least 6 inches away from parallel runs of flues and steam or hot-water pipes. Install horizontal raceway runs above water and steam piping.
- E. Complete raceway installation before starting conductor installation.
- F. Comply with requirements in Section 26 05 29 "Hangers and Supports for Electrical Systems" for hangers and supports.
- G. Install no more than the equivalent of three 90-degree bends in any conduit run except for control wiring conduits, for which fewer bends are allowed. Support within 12 inches of changes in direction.
- H. Conceal conduit and EMT within finished walls, ceilings, and floors unless otherwise indicated. Install conduits parallel or perpendicular to building lines.
- I. Support conduit within 12 inches of enclosures to which attached.

- J. Stub-ups to Above Recessed Ceilings:
 - 1. Use EMT or RMC for raceways.
 - 2. Use a conduit bushing or insulated fitting to terminate stub-ups not terminated in hubs or in an enclosure.
- K. Threaded Conduit Joints, Exposed to Wet, Damp, Corrosive, or Outdoor Conditions: Apply listed compound to threads of raceway and fittings before making up joints. Follow compound manufacturer's written instructions.
- L. Coat field-cut threads on PVC-coated raceway with a corrosion-preventing conductive compound prior to assembly.
- M. Raceway Terminations at Locations Subject to Moisture or Vibration: Use insulating bushings to protect conductors including conductors smaller than No. 4 AWG. Terminate raceway into back or bottom of boxes.
- N. Terminate threaded conduits into threaded hubs or with locknuts on inside and outside of boxes or cabinets. Install bushings on conduits up to 1-1/4-inch trade size and insulated throat metal bushings on 1-1/2-inch trade size and larger conduits terminated with locknuts. Install insulated throat metal grounding bushings on service conduits.
- O. Install raceways square to the enclosure and terminate at enclosures with locknuts. Install locknuts hand tight plus 1/4 turn more.
- P. Do not rely on locknuts to penetrate nonconductive coatings on enclosures. Remove coatings in the locknut area prior to assembling conduit to enclosure to assure a continuous ground path.
- Q. Cut conduit perpendicular to the length. For conduits 2-inch trade size and larger, use roll cutter or a guide to make cut straight and perpendicular to the length.
- R. Install pull wires in empty raceways. Use polypropylene or monofilament plastic line with not less than 200-lb tensile strength. Leave at least 12 inches of slack at each end of pull wire. Cap underground raceways designated as spare above grade alongside raceways in use.
- S. Surface Raceways:
 - 1. Install surface raceway with a minimum 2-inch radius control at bend points.
 - 2. Secure surface raceway with screws or other anchor-type devices at intervals not exceeding 48 inches and with no less than two supports per straight raceway section. Support surface raceway according to manufacturer's written instructions. Tape and glue are not acceptable support methods.
- T. Install raceway sealing fittings at accessible locations according to NFPA 70 and fill them with listed sealing compound. For concealed raceways, install each fitting in a flush steel box with a blank cover plate having a finish similar to that of adjacent plates or surfaces. Install raceway sealing fittings according to NFPA 70.

- U. Install devices to seal raceway interiors at accessible locations. Locate seals so no fittings or boxes are between the seal and the following changes of environments. Seal the interior of all raceways at the following points:
 - 1. Where conduits pass from warm to cold locations, such as boundaries of refrigerated spaces.
 - 2. Where an underground service raceway enters a building or structure.
 - 3. Where otherwise required by NFPA 70.
 - V. Flexible Conduit Connections: Comply with NEMA RV 3. Use a maximum of 72 inches of flexible conduit for recessed and semirecessed luminaires, equipment subject to vibration, noise transmission, or movement; and for transformers and motors.
 - 1. Use LFMC in damp or wet locations subject to severe physical damage.
 - 2. Use LFMC in damp or wet locations not subject to severe physical damage.
 - W. Mount boxes at heights indicated on Drawings. If mounting heights of boxes are not individually indicated, give priority to ADA requirements. Install boxes with height measured to center of box unless otherwise indicated.
 - X. Recessed Boxes in Masonry Walls: Saw-cut opening for box in center of cell of masonry block, and install box flush with surface of wall. Prepare block surfaces to provide a flat surface for a raintight connection between box and cover plate or supported equipment and box.
 - Y. Horizontally separate boxes mounted on opposite sides of walls so they are not in the same vertical channel.
 - Z. Locate boxes so that cover or plate will not span different building finishes.
 - AA. Support boxes of three gangs or more from more than one side by spanning two framing members or mounting on brackets specifically designed for the purpose.
 - BB. Fasten junction and pull boxes to or support from building structure. Do not support boxes by conduits.
- 3.3 SLEEVE AND SLEEVE-SEAL INSTALLATION FOR ELECTRICAL PENETRATIONS
- A. Install sleeves and sleeve seals at penetrations of exterior floor and wall assemblies. Comply with requirements in Section 26 05 44 "Sleeves and Sleeve Seals for Electrical Raceways and Cabling."
- 3.4 FIRESTOPPING
- A. Install firestopping at penetrations of fire-rated floor and wall assemblies.
- 3.5 PROTECTION
- A. Protect coatings, finishes, and cabinets from damage and deterioration.
 - 1. Repair damage to galvanized finishes with zinc-rich paint recommended by manufacturer.

2. Repair damage to PVC coatings or paint finishes with matching touchup coating recommended by manufacturer.

END OF SECTION 26 05 33

SECTION 26 05 44 - SLEEVES AND SLEEVE SEALS FOR ELECTRICAL RACEWAYS AND CABLING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

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

1.3 WARRANTY

- A. Special Warranty: Manufacturer agrees to repair or replace sleeves or sleeve seals that fail in materials or workmanship within specified warranty period.
 - 1. Warranty Period: Manufacturer's standard, but not less than one year from date of Substantial Completion, including components and labor.

PART 2 - PRODUCTS

2.1 SLEEVES

- A. Wall Sleeves:
 - 1. Steel Pipe Sleeves: ASTM A 53/A 53M, Type E, Grade B, Schedule 40, zinc coated, plain ends.
 - 2. Cast-Iron Pipe Sleeves: Cast or fabricated "wall pipe," equivalent to ductile-iron pressure pipe, with plain ends and integral waterstop unless otherwise indicated.
- B. Sleeves for Conduits Penetrating Non-Fire-Rated Gypsum Board Assemblies: Galvanized-steel sheet; 0.0239-inch minimum thickness; round tube closed with welded longitudinal joint, with tabs for screw-fastening the sleeve to the board.
- C. PVC-Pipe Sleeves: ASTM D 1785, Schedule 40.
- D. Molded-PVC Sleeves: With nailing flange for attaching to wooden forms.
- E. Molded-PE or -PP Sleeves: Removable, tapered-cup shaped, and smooth outer surface with nailing flange for attaching to wooden forms.

- F. Sleeves for Rectangular Openings:
 - 1. Material: Galvanized sheet steel.
 - 2. Minimum Metal Thickness:
 - a. For sleeve cross-section rectangle perimeter less than 50 inches and with no side larger than 16 inches, thickness shall be 0.052 inch.
 - b. For sleeve cross-section rectangle perimeter 50 inches or more and one or more sides larger than 16 inches, thickness shall be 0.138 inch.

2.2 SLEEVE-SEAL SYSTEMS

- A. Description: Modular sealing device, designed for field assembly, to fill annular space between sleeve and raceway or cable.
 - 1. Basis-of-Design Product: Subject to compliance with requirements, provide product by one of the following:
 - a. Advance Products & Systems, Inc.
 - b. CALPICO, Inc.
 - c. Metraflex Company (The).
 - d. Pipeline Seal and Insulator, Inc.
 - e. Proco Products, Inc.
 - 2. Sealing Elements: EPDM rubber interlocking links shaped to fit surface of pipe. Include type and number required for pipe material and size of pipe.
 - 3. Pressure Plates: Carbon steel.
 - 4. Connecting Bolts and Nuts: Carbon steel, with corrosion-resistant coating, of length required to secure pressure plates to sealing elements.

2.3 SLEEVE-SEAL FITTINGS

- A. Description: Manufactured plastic, sleeve-type, waterstop assembly made for embedding in concrete slab or wall. Unit shall have plastic or rubber waterstop collar with center opening to match piping OD.
 - 1. Basis-of-Design Product: Subject to compliance with requirements, provide product by one of the following:
 - a. Presealed Systems.

2.4 GROUT

- A. Description: Nonshrink; recommended for interior and exterior sealing openings in non-fire-rated walls or floors.
- B. Standard: ASTM C 1107/C 1107M, Grade B, post-hardening and volume-adjusting, dry, hydraulic-cement grout.
- C. Design Mix: 5000-psi, 28-day compressive strength.
- D. Packaging: Premixed and factory packaged.

2.5 SILICONE SEALANTS

- A. Silicone Sealants: Single-component, silicone-based, neutral-curing elastomeric sealants of grade indicated below.
 - 1. Grade: Pourable (self-leveling) formulation for openings in floors and other horizontal surfaces that are not fire rated.
 - 2. Sealant shall have VOC content of 250 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
- B. Silicone Foams: Multicomponent, silicone-based liquid elastomers that, when mixed, expand and cure in place to produce a flexible, nonshrinking foam.

PART 3 - EXECUTION

3.1 SLEEVE INSTALLATION FOR NON-FIRE-RATED ELECTRICAL PENETRATIONS

- A. Comply with NECA 1.
- B. Comply with NEMA VE 2 for cable penetrations.
- C. Sleeves for Conduits Penetrating Above-Grade Non-Fire-Rated Concrete and Masonry-Unit Floors and Walls:
 - 1. Interior Penetrations of Non-Fire-Rated Walls and Floors:
 - a. Seal annular space between sleeve and raceway or cable, using joint sealant appropriate for size, depth, and location of joint. Comply with requirements in Section 07 92 00 "Joint Sealants."
 - b. Seal space outside of sleeves with mortar or grout. Pack sealing material solidly between sleeve and wall so no voids remain. Tool exposed surfaces smooth; protect material while curing.
 - 2. Use pipe sleeves unless penetration arrangement requires rectangular sleeved opening.
 - 3. Size pipe sleeves to provide 1/4-inch annular clear space between sleeve and raceway or cable unless sleeve seal is to be installed.
 - 4. Install sleeves for wall penetrations unless core-drilled holes or formed openings are used. Install sleeves during erection of walls. Cut sleeves to length for mounting flush with both surfaces of walls. Deburr after cutting.
 - 5. Install sleeves for floor penetrations. Extend sleeves installed in floors 2 inches above finished floor level. Install sleeves during erection of floors.
- D. Sleeves for Conduits Penetrating Non-Fire-Rated Gypsum Board Assemblies:
 - 1. Use circular metal sleeves unless penetration arrangement requires rectangular sleeved opening.
 - 2. Seal space outside of sleeves with approved joint compound for gypsum board assemblies.
- E. Roof-Penetration Sleeves: Seal penetration of individual raceways and cables with flexible boot-type flashing units applied in coordination with roofing work.

- F. Aboveground, Exterior-Wall Penetrations: Seal penetrations using steel pipe sleeves and mechanical sleeve seals. Select sleeve size to allow for 1-inch annular clear space between pipe and sleeve for installing mechanical sleeve seals.
- G. Underground, Exterior-Wall and Floor Penetrations: Install cast-iron pipe sleeves. Size sleeves to allow for 1-inch annular clear space between raceway or cable and sleeve for installing sleeve-seal system.

3.2 SLEEVE-SEAL-SYSTEM INSTALLATION

- A. Install sleeve-seal systems in sleeves in exterior concrete walls and slabs-on-grade at raceway entries into building.
- B. Install type and number of sealing elements recommended by manufacturer for raceway or cable material and size. Position raceway or cable in center of sleeve. Assemble mechanical sleeve seals and install in annular space between raceway or cable and sleeve. Tighten bolts against pressure plates that cause sealing elements to expand and make watertight seal.

3.3 SLEEVE-SEAL-FITTING INSTALLATION

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

END OF SECTION 26 05 44

SECTION 26 05 53 - IDENTIFICATION 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. Section Includes:
 - 1. Identification for raceways.
 - 2. Identification of power and control cables.
 - 3. Identification for conductors.
 - 4. Equipment identification labels.
 - 5. Miscellaneous identification products.

1.3 COORDINATION

- A. Coordinate identification names, abbreviations, colors, and other features with requirements in other Sections requiring identification applications, Drawings, Shop Drawings, manufacturer's wiring diagrams, and the Operation and Maintenance Manual; and with those required by codes, standards, and 29 CFR 1910.145. Use consistent designations throughout Project.
- B. Coordinate installation of identifying devices with completion of covering and painting of surfaces where devices are to be applied.
- C. Coordinate installation of identifying devices with location of access panels and doors.
- D. Install identifying devices before installing acoustical ceilings and similar concealment.

1.4 WARRANTY

- A. Special Warranty: Manufacturer agrees to repair or replace electrical identification products that fail in materials or workmanship within specified warranty period.
 - 1. Warranty Period: Manufacturer's standard, but not less than one year from date of Substantial Completion, including components and labor.

PART 2 - PRODUCTS

2.1 POWER AND CONTROL RACEWAY IDENTIFICATION MATERIALS

- A. Comply with ANSI A13.1 for minimum size of letters for legend and for minimum length of color field for each raceway size.
- B. Colors for Raceways Carrying Circuits at 600 V or Less:
 - 1. White letters on a black field..

2. Legend: Indicate voltage.

C. Metal Tags: Brass or aluminum, 2 by 2 by 0.05 inch, with stamped legend, punched for use with self-locking cable tie fastener.

2.2 POWER AND CONTROL CABLE IDENTIFICATION MATERIALS

A. Comply with ANSI A13.1 for minimum size of letters for legend and for minimum length of color field for each cable size.

B. Metal Tags: Brass or aluminum, 2 by 2 by 0.05 inch, with stamped legend, punched for use with self-locking cable tie fastener.

2.3 CONDUCTOR IDENTIFICATION MATERIALS

A. Color-Coding Conductor Tape: Colored, self-adhesive vinyl tape not less than 3 milsthick by 1 to 2 incheswide.

2.4 EQUIPMENT IDENTIFICATION LABELS

A. Engraved, Laminated Acrylic or Melamine Label: Punched or drilled for screw mounting. White letters on a dark-gray background. Minimum letter height shall be 3/8 inch.

2.5 CABLE TIES

A. General-Purpose Cable Ties: Fungus inert, self extinguishing, one piece, self locking, Type 6/6 nylon.

1. Minimum Width: 3/16 inch.
2. Tensile Strength at 73 deg F, According to ASTM D 638: 12,000 psi.
3. Temperature Range: Minus 40 to plus 185 deg F.
4. Color: Black except where used for color-coding.

B. UV-Stabilized Cable Ties: Fungus inert, designed for continuous exposure to exterior sunlight, self extinguishing, one piece, self locking, Type 6/6 nylon.

1. Minimum Width: 3/16 inch.
2. Tensile Strength at 73 deg F, According to ASTM D 638: 12,000 psi.
3. Temperature Range: Minus 40 to plus 185 deg F.
4. Color: Black.

C. Plenum-Rated Cable Ties: Self extinguishing, UV stabilized, one piece, self locking.

1. Minimum Width: 3/16 inch.
2. Tensile Strength at 73 deg F, According to ASTM D 638: 7000 psi.
3. UL 94 Flame Rating: 94V-0.
4. Temperature Range: Minus 50 to plus 284 deg F.
5. Color: Black.

2.6 MISCELLANEOUS IDENTIFICATION PRODUCTS

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

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Verify identity of each item before installing identification products.
- B. Location: Install identification materials and devices at locations for most convenient viewing without interference with operation and maintenance of equipment.
- C. Apply identification devices to surfaces that require finish after completing finish work.
- D. Attach signs and plastic labels that are not self-adhesive type with mechanical fasteners appropriate to the location and substrate.
- E. System Identification Color-Coding Bands for Raceways and Cables: Each color-coding band shall completely encircle cable or conduit. Place adjacent bands of two-color markings in contact, side by side. Locate bands at changes in direction, at penetrations of walls and floors, at 50-footmaximum intervals in straight runs, and at 25-footmaximum intervals in congested areas.
- F. Aluminum Wraparound Marker Labels and Metal Tags: Secure tight to surface of conductor or cable at a location with high visibility and accessibility.
- G. Cable Ties: For attaching tags. Use general-purpose type, except as listed below:
 - 1. Outdoors: UV-stabilized nylon.
 - 2. In Spaces Handling Environmental Air: Plenum rated.

3.2 IDENTIFICATION SCHEDULE

- A. Accessible Raceways and Cables within Buildings: Identify the covers of each junction and pull box of the following systems with self-adhesive vinyl labels with the wiring system legend and system voltage. System legends shall be as follows:
 - 1. Power.
- B. Power-Circuit Conductor Identification, 600 V or Less: For conductors in pull and junction boxes use color-coding conductor tape to identify the phase.
 - 1. Color-Coding for Phase and Voltage Level Identification, 600 V or Less: Use colors listed below for ungrounded service feeder and branch-circuit conductors.
 - a. Color shall be factory applied.

- b. Colors for 208Y/120-V Circuits:
 - 1) Phase A: Black.
 - 2) Phase B: Red.
 - 3) Phase C: Blue.

- C. Control-Circuit Conductor Identification: For conductors and cables in pull and junction boxes, manholes, and handholes, use self-adhesive vinyl labels with the conductor or cable designation, origin, and destination.

- D. Control-Circuit Conductor Termination Identification: For identification at terminations provide self-adhesive vinyl labels with the conductor designation.

- E. Auxiliary Electrical Systems Conductor Identification: Identify field-installed alarm, control, and signal connections.
 - 1. Identify conductors, cables, and terminals in enclosures and at junctions, terminals, and pull points. Identify by system and circuit designation.
 - 2. Use system of marker tape designations that is uniform and consistent with system used by manufacturer for factory-installed connections.
 - 3. Coordinate identification with Project Drawings, manufacturer's wiring diagrams, and the Operation and Maintenance Manual.

- F. Equipment Identification Labels: On each unit of equipment, install unique designation label that is consistent with wiring diagrams, schedules, and the Operation and Maintenance Manual. Apply labels to disconnect switches and protection equipment, central or master units, control panels, control stations, terminal cabinets, and racks of each system. Systems include power, lighting, control, communication, signal, monitoring, and alarm systems unless equipment is provided with its own identification.
 - 1. Labeling Instructions:
 - a. Indoor Equipment: Engraved, laminated acrylic or melamine label. Unless otherwise indicated, provide a single line of text with 1/2-inch-high letters on 1-1/2-inch-high label; where two lines of text are required, use labels 2 inches high.
 - b. Outdoor Equipment: Engraved, laminated acrylic or melamine label.
 - c. Elevated Components: Increase sizes of labels and letters to those appropriate for viewing from the floor.
 - d. Fasten labels with appropriate mechanical fasteners that do not change the NEMA or NRTL rating of the enclosure.
 - 2. Equipment to Be Labeled:
 - a. Panelboards: Typewritten directory of circuits in the location provided by panelboard manufacturer. Panelboard identification shall be engraved, laminated acrylic or melamine label.
 - b. Enclosures and electrical cabinets.
 - c. Access doors and panels for concealed electrical items.
 - d. Enclosed switches.
 - e. Enclosed circuit breakers.
 - f. Enclosed controllers.
 - g. Variable-speed controllers.
 - h. Push-button stations.
 - i. Contactors.

- j. Remote-controlled switches, dimmer modules, and control devices.

END OF SECTION 26 05 53

SECTION 26 27 26 - WIRING DEVICES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section Includes:
 1. Receptacles, receptacles with integral GFCI, and associated device plates.
 2. Weather-resistant receptacles.
 3. Snap switches.
 4. Cord and plug sets.

1.3 DEFINITIONS

- A. EMI: Electromagnetic interference.
- B. GFCI: Ground-fault circuit interrupter.
- C. Pigtail: Short lead used to connect a device to a branch-circuit conductor.
- D. RFI: Radio-frequency interference.
- E. UTP: Unshielded twisted pair.

1.4 ADMINISTRATIVE REQUIREMENTS

- A. Coordination:
 1. Receptacles for Owner-Furnished Equipment: Match plug configurations.
 2. Cord and Plug Sets: Match equipment requirements.

1.5 WARRANTY

- A. Special Warranty: Manufacturer agrees to repair or replace wiring devices that fail in materials or workmanship within specified warranty period.
 1. Warranty Period: Manufacturer's standard, but not less than one year from date of Substantial Completion, including components and labor.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers' Names: Shortened versions (shown in parentheses) of the following manufacturers' names are used in other Part 2 articles:

1. Cooper Wiring Devices; Division of Cooper Industries, Inc. (Cooper).
2. Hubbell Incorporated; Wiring Device-Kellems (Hubbell).
3. Leviton Mfg. Company Inc. (Leviton).
4. Pass & Seymour/Legrand (Pass & Seymour).

- B. Source Limitations: Obtain each type of wiring device and associated wall plate from single source from single manufacturer.

2.2 GENERAL WIRING-DEVICE REQUIREMENTS

- A. Wiring Devices, Components, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- B. Comply with NFPA 70.
- C. Devices that are manufactured for use with modular plug-in connectors may be substituted under the following conditions:
1. Connectors shall comply with UL 2459 and shall be made with stranding building wire.
 2. Devices shall comply with the requirements in this Section.

2.3 STRAIGHT-BLADE RECEPTACLES

- A. Convenience Receptacles, 125 V, 20 A: Comply with NEMA WD 1, NEMA WD 6 Configuration 5-20R, UL 498, and FS W-C-596.
1. Products: Subject to compliance with requirements, provide one of the following available products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Cooper; 5351 (single), CR5362 (duplex).
 - b. Hubbell; HBL5351 (single), HBL5352 (duplex).
 - c. Leviton; 5891 (single), 5352 (duplex).
 - d. Pass & Seymour; 5361 (single), 5362 (duplex).

2.4 GFCI RECEPTACLES

- A. General Description:
1. Straight blade, non-feed-through type.
 2. Comply with NEMA WD 1, NEMA WD 6, UL 498, UL 943 Class A, and FS W-C-596.
 3. Include indicator light that shows when the GFCI has malfunctioned and no longer provides proper GFCI protection.
- B. Duplex GFCI Convenience Receptacles, 125 V, 20 A:
1. Products: Subject to compliance with requirements, provide one of the following:
 - a. Cooper; VGF20.
 - b. Hubbell; GFR5352L.
 - c. Pass & Seymour; 2095.
 - d. Leviton; 7590.

2.5 CORD AND PLUG SETS

A. Description:

1. Match voltage and current ratings and number of conductors to requirements of equipment being connected.
2. Cord: Rubber-insulated, stranded-copper conductors, with Type SOW-A jacket; with green-insulated grounding conductor and ampacity of at least 130 percent of the equipment rating.
3. Plug: Nylon body and integral cable-clamping jaws. Match cord and receptacle type for connection.

2.6 TOGGLE SWITCHES

A. Comply with NEMA WD 1, UL 20, and FS W-S-896.

B. Switches, 120/277 V, 20 A:

1. Products: Subject to compliance with requirements, provide one of the following:
 - a. Single Pole:
 - 1) Cooper; AH1221.
 - 2) Hubbell; HBL1221.
 - 3) Leviton; 1221-2.
 - 4) Pass & Seymour; CSB20AC1.
 - b. Two Pole:
 - 1) Cooper; AH1222.
 - 2) Hubbell; HBL1222.
 - 3) Leviton; 1222-2.
 - 4) Pass & Seymour; CSB20AC2.
 - c. Three Way:
 - 1) Cooper; AH1223.
 - 2) Hubbell; HBL1223.
 - 3) Leviton; 1223-2.
 - 4) Pass & Seymour; CSB20AC3.
 - d. Four Way:
 - 1) Cooper; AH1224.
 - 2) Hubbell; HBL1224.
 - 3) Leviton; 1224-2.

2.7 WALL PLATES

A. Single and combination types shall match corresponding wiring devices.

1. Plate-Securing Screws: Metal with head color to match plate finish.
2. Material for Finished Spaces: 0.035-inch- thick, satin-finished, Type 302 stainless steel.
3. Material for Unfinished Spaces: Galvanized steel.
4. Material for Damp Locations: Cast aluminum with spring-loaded lift cover, and listed and labeled for use in wet and damp locations.

B. Wet-Location, Weatherproof Cover Plates: NEMA 250, complying with Type 3R, weather-resistant, die-cast aluminum thermoplastic with lockable cover.

2.8 FINISHES

A. Device Color:

1. Wiring Devices: Brown unless otherwise indicated or required by NFPA 70 or device listing.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Comply with NECA 1, including mounting heights listed in that standard, unless otherwise indicated.

B. Coordination with Other Trades:

1. Protect installed devices and their boxes. Do not place wall finish materials over device boxes and do not cut holes for boxes with routers that are guided by riding against outside of boxes.
2. Keep outlet boxes free of plaster, drywall joint compound, mortar, cement, concrete, dust, paint, and other material that may contaminate the raceway system, conductors, and cables.
3. Install device boxes in brick or block walls so that the cover plate does not cross a joint unless the joint is troweled flush with the face of the wall.
4. Install wiring devices after all wall preparation, including painting, is complete.

C. Conductors:

1. Do not strip insulation from conductors until right before they are spliced or terminated on devices.
2. Strip insulation evenly around the conductor using tools designed for the purpose. Avoid scoring or nicking of solid wire or cutting strands from stranded wire.
3. The length of free conductors at outlets for devices shall meet provisions of NFPA 70, Article 300, without pigtails.
4. Existing Conductors:
 - a. Cut back and pigtail, or replace all damaged conductors.
 - b. Straighten conductors that remain and remove corrosion and foreign matter.

D. Device Installation:

1. Replace devices that have been in temporary use during construction and that were installed before building finishing operations were complete.
2. Keep each wiring device in its package or otherwise protected until it is time to connect conductors.
3. Do not remove surface protection, such as plastic film and smudge covers, until the last possible moment.
4. Connect devices to branch circuits using pigtails that are not less than 6 inches in length.
5. When there is a choice, use side wiring with binding-head screw terminals. Wrap solid conductor tightly clockwise, two-thirds to three-fourths of the way around terminal screw.
6. Use a torque screwdriver when a torque is recommended or required by manufacturer.

7. When conductors larger than No. 12 AWG are installed on 15- or 20-A circuits, splice No. 12 AWG pigtails for device connections.
8. Tighten unused terminal screws on the device.
9. When mounting into metal boxes, remove the fiber or plastic washers used to hold device-mounting screws in yokes, allowing metal-to-metal contact.

E. Receptacle Orientation:

1. Install ground pin of vertically mounted receptacles down, and on horizontally mounted receptacles to the right.

F. Device Plates: Do not use oversized or extra-deep plates. Repair wall finishes and remount outlet boxes when standard device plates do not fit flush or do not cover rough wall opening.

G. Arrangement of Devices: Unless otherwise indicated, mount flush, with long dimension vertical and with grounding terminal of receptacles on bottom. Group adjacent switches under single, multigang wall plates.

3.2 GFCI RECEPTACLES

- A. Install non-feed-through-type GFCI receptacles where protection of downstream receptacles is not required.

3.3 IDENTIFICATION

- A. Comply with Section 26 05 53 "Identification for Electrical Systems."
- B. Identify each receptacle with panelboard identification and circuit number. Use hot, stamped, or engraved machine printing with black -filled lettering on face of plate, and durable wire markers or tags inside outlet boxes.

3.4 FIELD QUALITY CONTROL

A. Tests for Convenience Receptacles:

1. Line Voltage: Acceptable range is 105 to 132 V.
2. Percent Voltage Drop under 15-A Load: A value of greater than 5 percent is unacceptable.
3. Ground Impedance: Values of up to 2 ohms are acceptable.
4. GFCI Trip: Test for tripping values specified in UL 1436 and UL 943.
5. Using the test plug, verify that the device and its outlet box are securely mounted.
6. Tests shall be diagnostic, indicating damaged conductors, high resistance at the circuit breaker, poor connections, inadequate fault current path, defective devices, or similar problems. Correct circuit conditions, remove malfunctioning units and replace with new ones, and retest as specified above.

- B. Test straight-blade receptacles for the retention force of the grounding blade according to NFPA 99. Retention force shall be not less than 4 oz..

- C. Wiring device will be considered defective if it does not pass tests and inspections.

D. Prepare test and inspection reports.

END OF SECTION 26 27 26

SECTION 26 28 13 - FUSES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section Includes:
 - 1. Cartridge fuses rated 600-V ac and less for use in enclosed switches and enclosed controllers.
 - 2. Plug fuses rated 125-V ac and less for use in plug-fuse-type enclosed switches and fuseholders.

1.3 QUALITY ASSURANCE

- A. Source Limitations: Obtain fuses, for use within a specific product or circuit, from single source from single manufacturer.
- B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- C. Comply with NEMA FU 1 for cartridge fuses.
- D. Comply with NFPA 70.
- E. Comply with UL 248-11 for plug fuses.

1.4 COORDINATION

- A. Coordinate fuse ratings with utilization equipment nameplate limitations of maximum fuse size and with system short-circuit current levels.

1.5 WARRANTY

- A. Special Warranty: Manufacturer agrees to replace fuses that fail in materials or workmanship within specified warranty period.
 - 1. Warranty Period: Manufacturer's standard, but not less than one year from date of Substantial Completion, including components and labor.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 1. Cooper Bussmann, Inc.
 2. Edison Fuse, Inc.
 3. Ferraz Shawmut, Inc.
 4. Littelfuse, Inc.

2.2 CARTRIDGE FUSES

- A. Characteristics: NEMA FU 1, nonrenewable cartridge fuses with voltage ratings consistent with circuit voltages.

2.3 PLUG FUSES

- A. Characteristics: UL 248-11, nonrenewable plug fuses; 125-V ac.

2.4 PLUG-FUSE ADAPTERS

- A. Characteristics: Adapters for using Type S, rejection-base plug fuses in Edison-base fuseholders or sockets; ampere ratings matching fuse ratings; irremovable once installed.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine fuses before installation. Reject fuses that are moisture damaged or physically damaged.
- B. Examine holders to receive fuses for compliance with installation tolerances and other conditions affecting performance, such as rejection features.
- C. Examine utilization equipment nameplates and installation instructions. Install fuses of sizes and with characteristics appropriate for each piece of equipment.
- D. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 FUSE APPLICATIONS

- A. Cartridge Fuses:
 1. Motor Branch Circuits: Class RK5, time delay.
 2. Other Branch Circuits: Class RK1, time delay.
 3. Control Circuits: Class CC, fast acting.
- B. Plug Fuses:

1. Motor Branch Circuits: Type S, single-element time delay.
2. Other Branch Circuits: Type S, single-element time delay.

3.3 INSTALLATION

- A. Install fuses in fusible devices. Arrange fuses so rating information is readable without removing fuse.

3.4 IDENTIFICATION

- A. Install labels complying with requirements for identification specified in Section 26 05 53 "Identification for Electrical Systems" and indicating fuse replacement information on inside door of each fused switch and adjacent to each fuse block, socket, and holder.

END OF SECTION 26 28 13

SECTION 26 28 16 - ENCLOSED SWITCHES AND CIRCUIT BREAKERS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section Includes:
 1. Fusible switches.
 2. Nonfusible switches.
 3. Molded-case circuit breakers (MCCBs).
 4. Molded-case switches.
 5. Enclosures.

1.3 DEFINITIONS

- A. NC: Normally closed.
- B. NO: Normally open.
- C. SPDT: Single pole, double throw.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of enclosed switch, circuit breaker, accessory, and component indicated. Include dimensioned elevations, sections, weights, and manufacturers' technical data on features, performance, electrical characteristics, ratings, accessories, and finishes.
 1. Enclosure types and details for types other than NEMA 250, Type 1.
 2. Current and voltage ratings.
 3. Short-circuit current ratings (interrupting and withstand, as appropriate).
 4. Detail features, characteristics, ratings, and factory settings of individual overcurrent protective devices, accessories, and auxiliary components.
- B. Shop Drawings: For enclosed switches and circuit breakers. Include plans, elevations, sections, details, and attachments to other work.
 1. Wiring Diagrams: For power, signal, and control wiring.

1.5 QUALITY ASSURANCE

- A. Source Limitations: Obtain enclosed switches and circuit breakers, overcurrent protective devices, components, and accessories, within same product category, from single source from single manufacturer.

- B. Product Selection for Restricted Space: Drawings indicate maximum dimensions for enclosed switches and circuit breakers, including clearances between enclosures, and adjacent surfaces and other items. Comply with indicated maximum dimensions.
- C. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- D. Comply with NFPA 70.

1.6 PROJECT CONDITIONS

- A. Environmental Limitations: Rate equipment for continuous operation under the following conditions unless otherwise indicated:
 - 1. Ambient Temperature: Not less than minus 22 deg F and not exceeding 104 deg F.
 - 2. Altitude: Not exceeding 6600 feet.

1.7 COORDINATION

- A. Coordinate layout and installation of switches, circuit breakers, and components with equipment served and adjacent surfaces. Maintain required workspace clearances and required clearances for equipment access doors and panels.

1.8 WARRANTY

- A. Special Warranty: Manufacturer agrees to repair or replace enclosed switches or circuit breakers that fail in materials or workmanship within specified warranty period.
 - 1. Warranty Period: Manufacturer's standard, but not less than one year from date of Substantial Completion, including components and labor.

PART 2 - PRODUCTS

2.1 FUSIBLE SWITCHES

- A. Basis-of-Design Product: Subject to compliance with requirements, provide products by one of the following:
 - 1. Eaton Electrical Inc.; Cutler-Hammer Business Unit.
 - 2. General Electric Company; GE Consumer & Industrial - Electrical Distribution.
 - 3. Siemens Energy & Automation, Inc.
 - 4. Square D; a brand of Schneider Electric.
- B. Type HD, Heavy Duty, Single Throw, 240 -V ac, 1200 A and Smaller: UL 98 and NEMA KS 1, horsepower rated, with clips or bolt pads to accommodate indicated fuses, lockable handle with capability to accept three padlocks, and interlocked with cover in closed position.
- C. Accessories:
 - 1. Equipment Ground Kit: Internally mounted and labeled for copper ground conductors.
 - 2. Neutral Kit: Internally mounted; insulated, capable of being grounded and bonded; labeled for copper neutral conductors.

3. Class R Fuse Kit: Provides rejection of other fuse types when Class R fuses are specified.
4. Auxiliary Contact Kit: One NO/NC (Form "C") auxiliary contact(s), arranged to activate before switch blades open.
5. Lugs: Mechanical type, suitable for number, size, and conductor material.

2.2 NONFUSIBLE SWITCHES

- A. Basis-of-Design Product: Subject to compliance with requirements, provide products by one of the following:
 1. Eaton Electrical Inc.; Cutler-Hammer Business Unit.
 2. General Electric Company; GE Consumer & Industrial - Electrical Distribution.
 3. Siemens Energy & Automation, Inc.
 4. Square D; a brand of Schneider Electric.
- B. Type HD, Heavy Duty, Single Throw, 240 -V ac, 1200 A and Smaller: UL 98 and NEMA KS 1, horsepower rated, lockable handle with capability to accept three padlocks, and interlocked with cover in closed position.
- C. Accessories:
 1. Equipment Ground Kit: Internally mounted and labeled for copper round conductors.
 2. Neutral Kit: Internally mounted; insulated, capable of being grounded and bonded; labeled for copper neutral conductors.
 3. Auxiliary Contact Kit: Two NO/NC (Form "C") auxiliary contact(s), arranged to activate before switch blades open.
 4. Lugs: Mechanical type, suitable for number, size, and conductor material.

2.3 MOLDED-CASE CIRCUIT BREAKERS

- A. Basis-of-Design Product: Subject to compliance with requirements, provide products by one of the following:
 1. Eaton Electrical Inc.; Cutler-Hammer Business Unit.
 2. General Electric Company; GE Consumer & Industrial - Electrical Distribution.
 3. Siemens Energy & Automation, Inc.
 4. Square D; a brand of Schneider Electric.
- B. General Requirements: Comply with UL 489, NEMA AB 1, and NEMA AB 3, with interrupting capacity to comply with available fault currents.
- C. Thermal-Magnetic Circuit Breakers: Inverse time-current element for low-level overloads and instantaneous magnetic trip element for short circuits. Adjustable magnetic trip setting for circuit-breaker frame sizes 250 A and larger.
- D. Electronic Trip Circuit Breakers: Field-replaceable rating plug, rms sensing, with the following field-adjustable settings:
 1. Instantaneous trip.
 2. Long- and short-time pickup levels.
 3. Long- and short-time time adjustments.
 4. Ground-fault pickup level, time delay, and I²t response.

- E. Ground-Fault, Circuit-Interrupter (GFCI) Circuit Breakers: Single- and two-pole configurations with Class A ground-fault protection (6-mA trip).
- F. Ground-Fault, Equipment-Protection (GFEP) Circuit Breakers: With Class B ground-fault protection (30-mA trip).
- G. Features and Accessories:
 - 1. Standard frame sizes, trip ratings, and number of poles.
 - 2. Lugs: Mechanical type, suitable for number, size, trip ratings, and conductor material.
 - 3. Application Listing: Appropriate for application; Type SWD for switching fluorescent lighting loads; Type HID for feeding fluorescent and high-intensity discharge lighting circuits.
 - 4. Ground-Fault Protection: Comply with UL 1053; integrally mounted, self-powered type with mechanical ground-fault indicator; relay with adjustable pickup and time-delay settings, push-to-test feature, internal memory, and shunt trip unit; and three-phase, zero-sequence current transformer/sensor.
 - 5. Communication Capability: Circuit-breaker-mounted communication module with functions and features compatible with power monitoring and control system, specified in Section 26 09 13 "Electrical Power Monitoring and Control."
 - 6. Shunt Trip: Trip coil energized from separate circuit, with coil-clearing contact.
 - 7. Undervoltage Trip: Set to operate at 35 to 75 percent of rated voltage without intentional time delay.
 - 8. Auxiliary Contacts: Two SPDT switches with "a" and "b" contacts; "a" contacts mimic circuit-breaker contacts, "b" contacts operate in reverse of circuit-breaker contacts.
 - 9. Alarm Switch: One NO contact that operates only when circuit breaker has tripped.
 - 10. Key Interlock Kit: Externally mounted to prohibit circuit-breaker operation; key shall be removable only when circuit breaker is in off position.
 - 11. Zone-Selective Interlocking: Integral with electronic trip unit; for interlocking ground-fault protection function.
 - 12. Electrical Operator: Provide remote control for on, off, and reset operations.

2.4 MOLDED-CASE SWITCHES

- A. Basis-of-Design Product: Subject to compliance with requirements, provide products by one of the following:
 - 1. Eaton Electrical Inc.; Cutler-Hammer Business Unit.
 - 2. General Electric Company; GE Consumer & Industrial - Electrical Distribution.
 - 3. Siemens Energy & Automation, Inc.
 - 4. Square D; a brand of Schneider Electric.
- B. General Requirements: MCCB with fixed, high-set instantaneous trip only, and short-circuit withstand rating equal to equivalent breaker frame size interrupting rating.
- C. Features and Accessories:
 - 1. Standard frame sizes and number of poles.
 - 2. Lugs: Mechanical type, suitable for number, size, trip ratings, and conductor material.

3. Ground-Fault Protection: Comply with UL 1053; remote-mounted and powered type with mechanical ground-fault indicator; relay with adjustable pickup and time-delay settings, push-to-test feature, internal memory, and shunt trip unit; and three-phase, zero-sequence current transformer/sensor.
4. Shunt Trip: Trip coil energized from separate circuit, with coil-clearing contact.
5. Undervoltage Trip: Set to operate at 35 to 75 percent of rated voltage without intentional time delay.
6. Auxiliary Contacts: Two SPDT switches with "a" and "b" contacts; "a" contacts mimic switch contacts, "b" contacts operate in reverse of switch contacts.
7. Alarm Switch: One NO contact that operates only when switch has tripped.
8. Key Interlock Kit: Externally mounted to prohibit switch operation; key shall be removable only when switch is in off position.
9. Zone-Selective Interlocking: Integral with ground-fault shunt trip unit; for interlocking ground-fault protection function.
10. Electrical Operator: Provide remote control for on, off, and reset operations.

2.5 ENCLOSURES

- A. Enclosed Switches and Circuit Breakers: NEMA AB 1, NEMA KS 1, NEMA 250, and UL 50, to comply with environmental conditions at installed location.
 1. Indoor, Dry and Clean Locations: NEMA 250, Type 1.
 2. Outdoor Locations: NEMA 250, Type 3R.
 3. Other Wet or Damp, Indoor Locations: NEMA 250, Type 4.
 4. Indoor Locations Subject to Dust, Falling Dirt, and Dripping Noncorrosive Liquids: NEMA 250, Type 12.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine elements and surfaces to receive enclosed switches and circuit breakers for compliance with installation tolerances and other conditions affecting performance of the Work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Install individual wall-mounted switches and circuit breakers with tops at uniform height unless otherwise indicated.
- B. Temporary Lifting Provisions: Remove temporary lifting eyes, channels, and brackets and temporary blocking of moving parts from enclosures and components.
- C. Install fuses in fusible devices.
- D. Comply with NECA 1.

3.3 IDENTIFICATION

- A. Comply with requirements in Section 26 05 53 "Identification for Electrical Systems."
 - 1. Identify field-installed conductors, interconnecting wiring, and components; provide warning signs.
 - 2. Label each enclosure with engraved metal or laminated-plastic nameplate.

3.4 ADJUSTING

- A. Adjust moving parts and operable components to function smoothly, and lubricate as recommended by manufacturer.

END OF SECTION 26 28 16

SECTION 26 29 13 - ENCLOSED CONTROLLERS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section includes the following enclosed controllers rated 600 V and less:
 - 1. Full-voltage manual.
 - 2. Full-voltage magnetic.

1.3 DEFINITIONS

- A. CPT: Control power transformer.
- B. MCCB: Molded-case circuit breaker.
- C. MCP: Motor circuit protector.
- D. N.C.: Normally closed.
- E. N.O.: Normally open.
- F. OCPD: Overcurrent protective device.
- G. SCR: Silicon-controlled rectifier.

1.4 ACTION SUBMITTALS

- A. Shop Drawings: For each enclosed controller. Include dimensioned plans, elevations, sections, details, and required clearances and service spaces around controller enclosures.
 - 1. Show tabulations of the following:
 - a. Each installed unit's type and details.
 - b. Factory-installed devices.
 - c. Nameplate legends.
 - d. Short-circuit current rating of integrated unit.
 - e. Features, characteristics, ratings, and factory settings of individual OCPDs in combination controllers.
 - 2. Wiring Diagrams: For power, signal, and control wiring.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Store enclosed controllers indoors in clean, dry space with uniform temperature to prevent condensation. Protect enclosed controllers from exposure to dirt, fumes, water, corrosive substances, and physical damage.
- B. If stored in areas subject to weather, cover enclosed controllers to protect them from weather, dirt, dust, corrosive substances, and physical damage. Remove loose packing and flammable materials from inside controllers; install temporary electric heating, with at least 250 W per controller.

1.6 PROJECT CONDITIONS

- A. Environmental Limitations: Rate equipment for continuous operation under the following conditions unless otherwise indicated:
 - 1. Ambient Temperature: Not less than minus 22 deg F and not exceeding 104 deg F.
 - 2. Altitude: Not exceeding 6600 feet.

1.7 COORDINATION

- A. Coordinate layout and installation of enclosed controllers with other construction including conduit, piping, equipment, and adjacent surfaces. Maintain required workspace clearances and required clearances for equipment access doors and panels.
- B. Coordinate installation of roof curbs, equipment supports, and roof penetrations.

1.8 WARRANTY

- A. Special Warranty: Manufacturer agrees to repair or replace enclosed controllers that fail in materials or workmanship within specified warranty period.
 - 1. Warranty Period: Manufacturer's standard, but not less than one year from date of Substantial Completion, including components and labor.

PART 2 - PRODUCTS

2.1 FULL-VOLTAGE CONTROLLERS

- A. General Requirements for Full-Voltage Controllers: Comply with NEMA ICS 2, general purpose, Class A.
- B. Motor-Starting Switches: "Quick-make, quick-break" toggle or push-button action; marked to show whether unit is off or on.
 - 1. Basis-of-Design Product: Subject to compliance with requirements, provide products by one of the following:
 - a. Eaton Electrical Inc.; Cutler-Hammer Business Unit.
 - b. General Electric Company; GE Consumer & Industrial - Electrical Distribution.
 - c. Rockwell Automation, Inc.; Allen-Bradley brand.
 - d. Siemens Energy & Automation, Inc.

- e. Square D; a brand of Schneider Electric.
 2. Configuration: Nonreversing.
 3. Surface mounting.
 4. Red pilot light.
- C. Fractional Horsepower Manual Controllers: "Quick-make, quick-break" toggle or push-button action; marked to show whether unit is off, on, or tripped.
1. Basis-of-Design Product: Subject to compliance with requirements, provide products by one of the following:
 - a. Eaton Electrical Inc.; Cutler-Hammer Business Unit.
 - b. General Electric Company; GE Consumer & Industrial - Electrical Distribution.
 - c. Rockwell Automation, Inc.; Allen-Bradley brand.
 - d. Siemens Energy & Automation, Inc.
 - e. Square D; a brand of Schneider Electric.
 2. Configuration: Nonreversing.
 3. Overload Relays: Inverse-time-current characteristics; NEMA ICS 2, Class 10 tripping characteristics; heaters matched to nameplate full-load current of actual protected motor; external reset push button; melting alloy type.
 4. Surface mounting.
 5. Red pilot light.
- D. Integral Horsepower Manual Controllers: "Quick-make, quick-break" toggle or push-button action; marked to show whether unit is off, on, or tripped.
1. Basis-of-Design Product: Subject to compliance with requirements, provide products by one of the following:
 - a. Eaton Electrical Inc.; Cutler-Hammer Business Unit.
 - b. General Electric Company; GE Consumer & Industrial - Electrical Distribution.
 - c. Rockwell Automation, Inc.; Allen-Bradley brand.
 - d. Siemens Energy & Automation, Inc.
 - e. Square D; a brand of Schneider Electric.
 2. Configuration: Nonreversing.
 3. Overload Relays: Inverse-time-current characteristics; NEMA ICS 2, Class 10 tripping characteristics; heaters and sensors in each phase, matched to nameplate full-load current of actual protected motor and having appropriate adjustment for duty cycle; external reset push button; melting alloy type.
 4. Surface mounting.
 5. Red pilot light.
 6. N.O. auxiliary contact.
- E. Magnetic Controllers: Full voltage, across the line, electrically held.
1. Basis-of-Design Product: Subject to compliance with requirements, provide products by one of the following:
 - a. Eaton Electrical Inc.; Cutler-Hammer Business Unit.
 - b. General Electric Company; GE Consumer & Industrial - Electrical Distribution.
 - c. Rockwell Automation, Inc.; Allen-Bradley brand.
 - d. Siemens Energy & Automation, Inc.
 - e. Square D; a brand of Schneider Electric.
 2. Configuration: Nonreversing.
 3. Contactor Coils: Pressure-encapsulated type.

- a. Operating Voltage: Depending on contactor NEMA size and line-voltage rating, manufacturer's standard matching control power or line voltage.
 4. Power Contacts: Totally enclosed, double-break, silver-cadmium oxide; assembled to allow inspection and replacement without disturbing line or load wiring.
 5. Control Circuits: 24 -V ac; obtained from integral CPT, with primary and secondary fuses, with CPT of sufficient capacity to operate integral devices and remotely located pilot, indicating, and control devices.
 - a. CPT Spare Capacity: 100 VA.
 6. Melting Alloy Overload Relays:
 - a. Inverse-time-current characteristic.
 - b. Class 10 tripping characteristic.
 - c. Heaters in each phase matched to nameplate full-load current of actual protected motor and with appropriate adjustment for duty cycle.
 7. N.O., isolated overload alarm contact.
 8. External overload reset push button.
- F. Combination Magnetic Controller: Factory-assembled combination of magnetic controller, OCPD, and disconnecting means.
1. Basis-of-Design Product: Subject to compliance with requirements, provide products by one of the following:
 - a. Eaton Electrical Inc.; Cutler-Hammer Business Unit.
 - b. General Electric Company; GE Consumer & Industrial - Electrical Distribution.
 - c. Rockwell Automation, Inc.; Allen-Bradley brand.
 - d. Siemens Energy & Automation, Inc.
 - e. Square D; a brand of Schneider Electric.
 2. Fusible Disconnecting Means:
 - a. NEMA KS 1, heavy-duty, horsepower-rated, fusible switch with clips or bolt pads to accommodate Class R fuses.
 - b. Lockable Handle: Accepts three padlocks and interlocks with cover in closed position.
 3. Auxiliary Contacts: N.O./N.C., arranged to activate before switch blades open.
 4. Nonfusible Disconnecting Means:
 - a. NEMA KS 1, heavy-duty, horsepower-rated, nonfusible switch.
 - b. Lockable Handle: Accepts three padlocks and interlocks with cover in closed position.
 - c. Auxiliary Contacts: N.O./N.C., arranged to activate before switch blades open.

2.2 ENCLOSURES

- A. Enclosed Controllers: NEMA ICS 6, to comply with environmental conditions at installed location.
1. Dry and Clean Indoor Locations: Type 1.
 2. Outdoor Locations: Type 3R.
 3. Other Wet or Damp Indoor Locations: Type 4.
 4. Indoor Locations Subject to Dust, Falling Dirt, and Dripping Noncorrosive Liquids: Type 12.

2.3 ACCESSORIES

- A. General Requirements for Control Circuit and Pilot Devices: NEMA ICS 5; factory installed in controller enclosure cover unless otherwise indicated.
 - 1. Push Buttons, Pilot Lights, and Selector Switches: Heavy -duty, oiltight type.
 - a. Push Buttons: Unguarded types; momentary as indicated.
 - b. Pilot Lights: LED types; colors as indicated; push to test.
 - c. Selector Switches: Rotary type.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine areas and surfaces to receive enclosed controllers, with Installer present, for compliance with requirements and other conditions affecting performance of the Work.
- B. Examine enclosed controllers before installation. Reject enclosed controllers that are wet, moisture damaged, or mold damaged.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Wall-Mounted Controllers: Install enclosed controllers on walls with tops at uniform height unless otherwise indicated, and by bolting units to wall or mounting on lightweight structural-steel channels bolted to wall. For controllers not at walls, provide freestanding racks complying with Section 26 05 29 "Hangers and Supports for Electrical Systems."
- B. Temporary Lifting Provisions: Remove temporary lifting eyes, channels, and brackets and temporary blocking of moving parts from enclosures and components.
- C. Install fuses in each fusible-switch enclosed controller.
- D. Install fuses in control circuits if not factory installed. Comply with requirements in Section 26 28 13 "Fuses."
- E. Install heaters in thermal overload relays. Select heaters based on actual nameplate full-load amperes after motors have been installed.
- F. Install, connect, and fuse thermal-protector monitoring relays furnished with motor-driven equipment.
- G. Comply with NECA 1.

3.3 IDENTIFICATION

- A. Identify enclosed controllers, components, and control wiring. Comply with requirements for identification specified in Section 26 05 53 "Identification for Electrical Systems."

1. Identify field-installed conductors, interconnecting wiring, and components; provide warning signs.
2. Label each enclosure with engraved nameplate.
3. Label each enclosure-mounted control and pilot device.

3.4 CONTROL WIRING INSTALLATION

- A. Bundle, train, and support wiring in enclosures.
- B. Connect selector switches and other automatic-control selection devices where applicable.
 1. Connect selector switches to bypass only those manual- and automatic-control devices that have no safety functions when switch is in manual-control position.
 2. Connect selector switches with enclosed-controller circuit in both manual and automatic positions for safety-type control devices such as low- and high-pressure cutouts, high-temperature cutouts, and motor overload protectors.

3.5 ADJUSTING

- A. Set field-adjustable switches, auxiliary relays, time-delay relays, timers, and overload-relay pickup and trip ranges.

3.6 PROTECTION

- A. Temporary Heating: Apply temporary heat to maintain temperature according to manufacturer's written instructions until enclosed controllers are ready to be energized and placed into service.
- B. Replace controllers whose interiors have been exposed to water or other liquids prior to Substantial Completion.

END OF SECTION 26 29 13

SECTION 26 51 00 - INTERIOR LIGHTING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section Includes:
 1. Interior lighting fixtures, lamps, and ballasts.
 2. Emergency fluorescent power unit.
 3. Lighting fixture supports.

1.3 DEFINITIONS

- A. BF: Ballast factor.
- B. CCT: Correlated color temperature.
- C. CRI: Color-rendering index.
- D. LER: Luminaire efficacy rating.
- E. Lumen: Measured output of lamp and luminaire, or both.
- F. Luminaire: Complete lighting fixture, including ballast housing if provided.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of lighting fixture, arranged in order of fixture designation. Include data on features, accessories, finishes, and the following:
 1. Physical description of lighting fixture including dimensions.
 2. Ballast, including BF.
 3. Energy-efficiency data.
 4. Life, output (lumens, CCT, and CRI), and energy-efficiency data for lamps.
 5. Photometric data and adjustment factors based on laboratory tests, complying with IESNA Lighting Measurements Testing & Calculation Guides, of each lighting fixture type. The adjustment factors shall be for lamps, ballasts, and accessories identical to those indicated for the lighting fixture as applied in this Project.
 - a. Testing Agency Certified Data: For indicated fixtures, photometric data shall be certified by a qualified independent testing agency. Photometric data for remaining fixtures shall be certified by manufacturer.
- B. Shop Drawings: For nonstandard or custom lighting fixtures. Include plans, elevations, sections, details, and attachments to other work.

1. Detail equipment assemblies and indicate dimensions, weights, loads, required clearances, method of field assembly, components, and location and size of each field connection.

1.5 INFORMATIONAL SUBMITTALS

- A. Product Certificates: For each type of ballast for bi-level and dimmer-controlled fixtures, from manufacturer.

1.6 QUALITY ASSURANCE

- A. Luminaire Photometric Data Testing Laboratory Qualifications: Provided by an independent agency, with the experience and capability to conduct the testing indicated, that is an NRTL as defined by OSHA in 29 CFR 1910, complying with the IESNA Lighting Measurements Testing & Calculation Guides.
- B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- C. Comply with NFPA 70.

1.7 COORDINATION

- A. Coordinate layout and installation of lighting fixtures and suspension system with other construction that penetrates ceilings or is supported by them, including HVAC equipment, fire-suppression system, and partition assemblies.

1.8 WARRANTY

- A. Special Warranty: Manufacturer agrees to repair or replace components of light fixtures that fail in materials or workmanship within specified warranty period.
 1. Warranty Period: Manufacturer's standard, but not less than one year from date of Substantial Completion, including components and labor.
- B. Special Warranty for Emergency Lighting Batteries: Manufacturer's standard form in which manufacturer of battery-powered emergency lighting unit agrees to repair or replace components of rechargeable batteries that fail in materials or workmanship within specified warranty period.
 1. Warranty Period: Seven years from date of Substantial Completion. Full warranty shall apply for first year, and prorated warranty for the remaining six years.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Products: Subject to compliance with requirements, provide product indicated on Drawings.

2.2 GENERAL REQUIREMENTS FOR LIGHTING FIXTURES AND COMPONENTS

- A. Fluorescent Fixtures: Comply with UL 1598. Where LER is specified, test according to NEMA LE 5 and NEMA LE 5A as applicable.
- B. Metal Parts: Free of burrs and sharp corners and edges.
- C. Sheet Metal Components: Steel unless otherwise indicated. Form and support to prevent warping and sagging.
- D. Doors, Frames, and Other Internal Access: Smooth operating, free of light leakage under operating conditions, and designed to permit relamping without use of tools. Designed to prevent doors, frames, lenses, diffusers, and other components from falling accidentally during relamping and when secured in operating position.
- E. Diffusers and Globes:
 - 1. Acrylic Lighting Diffusers: 100 percent virgin acrylic plastic. High resistance to yellowing and other changes due to aging, exposure to heat, and UV radiation.
 - a. Lens Thickness: At least 0.125 inch minimum unless otherwise indicated.
 - b. UV stabilized.
 - 2. Glass: Annealed crystal glass unless otherwise indicated.
- F. Factory-Applied Labels: Comply with UL 1598. Include recommended lamps and ballasts. Labels shall be located where they will be readily visible to service personnel, but not seen from normal viewing angles when lamps are in place.
 - 1. Label shall include the following lamp and ballast characteristics:
 - a. "USE ONLY" and include specific lamp type.
 - b. Lamp diameter code (T-4, T-5, T-8, T-12, etc.), tube configuration (twin, quad, triple, etc.), base type, and nominal wattage for fluorescent and compact fluorescent luminaires.
 - c. Lamp type, wattage, bulb type (ED17, BD56, etc.).
 - d. Start type (preheat, rapid start, instant start, etc.) for fluorescent luminaires.
 - e. CCT and CRI for all luminaires.

2.3 BALLASTS FOR LINEAR FLUORESCENT LAMPS

- A. General Requirements for Electronic Ballasts:
 - 1. Comply with UL 935 and with ANSI C82.11.
 - 2. Designed for type and quantity of lamps served.
 - 3. Ballasts shall be designed for full light output unless another BF, dimmer, or bi-level control is indicated.
 - 4. Sound Rating: Class A.
 - 5. Total Harmonic Distortion Rating: Less than 10 percent.
 - 6. Transient Voltage Protection: IEEE C62.41.1 and IEEE C62.41.2, Category A or better.
 - 7. Operating Frequency: 42 kHz or higher.
 - 8. Lamp Current Crest Factor: 1.7 or less.
 - 9. BF: 0.88 or higher.
 - 10. Power Factor: 0.95 or higher.

11. Parallel Lamp Circuits: Multiple lamp ballasts shall comply with ANSI C82.11 and shall be connected to maintain full light output on surviving lamps if one or more lamps fail.
- B. Luminaires controlled by occupancy sensors shall have programmed-start ballasts.
 - C. Electronic Programmed-Start Ballasts for T8 Lamps: Comply with ANSI C82.11 and the following:
 1. Lamp end-of-life detection and shutdown circuit for T5 diameter lamps.
 2. Automatic lamp starting after lamp replacement.
 - D. Single Ballasts for Multiple Lighting Fixtures: Factory wired with ballast arrangements and bundled extension wiring to suit final installation conditions without modification or rewiring in the field.
 - E. Ballasts for Low-Temperature Environments:
 1. Temperatures 0 Deg F and Higher: Electronic type rated for 0 deg F starting and operating temperature with indicated lamp types.
- #### 2.4 EMERGENCY FLUORESCENT POWER UNIT
- A. Internal Type: Self-contained, modular, battery-inverter unit, factory mounted within lighting fixture body and compatible with ballast. Comply with UL 924.
 1. Emergency Connection: Operate one or more fluorescent lamps continuously at an output as shown in the light fixture schedule on the Drawings. Connect unswitched circuit to battery-inverter unit and switched circuit to fixture ballast.
 2. Test Push Button and Indicator Light: Visible and accessible without opening fixture or entering ceiling space.
 - a. Push Button: Push-to-test type, in unit housing, simulates loss of normal power and demonstrates unit operability.
 - b. Indicator Light: LED indicates normal power on. Normal glow indicates trickle charge; bright glow indicates charging at end of discharge cycle.
 3. Battery: Sealed, maintenance-free, nickel-cadmium type.
 4. Charger: Fully automatic, solid-state, constant-current type with sealed power transfer relay.
 5. Integral Self-Test: Factory-installed electronic device automatically initiates code-required test of unit emergency operation at required intervals. Test failure is announced by an integral audible alarm and a flashing red LED.
 - B. External Type: Self-contained, modular, battery-inverter unit, suitable for powering one or more fluorescent lamps, remote mounted from lighting fixture. Comply with UL 924.
 1. Emergency Connection: Operate one or more fluorescent lamps continuously. Connect unswitched circuit to battery-inverter unit and switched circuit to fixture ballast.
 2. Battery: Sealed, maintenance-free, nickel-cadmium type.
 3. Charger: Fully automatic, solid-state, constant-current type.
 4. Housing: NEMA 250, Type 1 enclosure.
 5. Test Push Button: Push-to-test type, in unit housing, simulates loss of normal power and demonstrates unit operability.
 6. LED Indicator Light: Indicates normal power on. Normal glow indicates trickle charge; bright glow indicates charging at end of discharge cycle.

7. Integral Self-Test: Factory-installed electronic device automatically initiates code-required test of unit emergency operation at required intervals. Test failure is annunciated by an integral audible alarm and a flashing red LED.

2.5 FLUORESCENT LAMPS

- A. T8 rapid-start lamps, rated 32 W maximum, nominal length of 48 inches, 2800 initial lumens (minimum), CRI 75 (minimum), color temperature 4100 K, and average rated life 20,000 hours unless otherwise indicated.

2.6 LIGHTING FIXTURE SUPPORT COMPONENTS

- A. Comply with Section 26 05 29 "Hangers and Supports for Electrical Systems" for channel- and angle-iron supports and nonmetallic channel and angle supports.
- B. Single-Stem Hangers: 1/2-inch steel tubing with swivel ball fittings and ceiling canopy. Finish same as fixture.
- C. Twin-Stem Hangers: Two, 1/2-inch steel tubes with single canopy designed to mount a single fixture. Finish same as fixture.
- D. Wires: ASTM A 641/A 641M, Class 3, soft temper, zinc-coated steel, 12 gage.
- E. Wires for Humid Spaces: ASTM A 580/A 580M, Composition 302 or 304, annealed stainless steel, 12 gage.
- F. Rod Hangers: 3/16-inch minimum diameter, cadmium-plated, threaded steel rod.
- G. Hook Hangers: Integrated assembly matched to fixture and line voltage and equipped with threaded attachment, cord, and locking-type plug.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Lighting fixtures:
 1. Set level, plumb, and square with ceilings and walls unless otherwise indicated.
 2. Install lamps in each luminaire.
- B. Remote Mounting of Ballasts: Distance between the ballast and fixture shall not exceed that recommended by ballast manufacturer. Verify, with ballast manufacturers, maximum distance between ballast and luminaire.
- C. Lay-in Ceiling Lighting Fixtures Supports: Use grid as a support element.
 1. Install ceiling support system rods or wires, independent of the ceiling suspension devices, for each fixture. Locate not more than 6 inches from lighting fixture corners.
 2. Support Clips: Fasten to lighting fixtures and to ceiling grid members at or near each fixture corner with clips that are UL listed for the application.

3. Fixtures of Sizes Less Than Ceiling Grid: Install as indicated on reflected ceiling plans or center in acoustical panel, and support fixtures independently with at least two 3/4-inch metal channels spanning and secured to ceiling tees.

D. Suspended Lighting Fixture Support:

1. Pendants and Rods: Where longer than 48 inches, brace to limit swinging.
2. Stem-Mounted, Single-Unit Fixtures: Suspend with twin-stem hangers.
3. Continuous Rows: Use tubing or stem for wiring at one point and tubing or rod for suspension for each unit length of fixture chassis, including one at each end.
4. Do not use grid as support for pendant luminaires. Connect support wires or rods to building structure.

- E. Connect wiring according to Section 26 05 19 "Low-Voltage Electrical Power Conductors and Cables."

3.2 IDENTIFICATION

- A. Install labels with panel and circuit numbers on concealed junction and outlet boxes. Comply with requirements for identification specified in Section 26 05 53 "Identification for Electrical Systems."

3.3 FIELD QUALITY CONTROL

- A. Test for Emergency Lighting: Interrupt power supply to demonstrate proper operation. Verify transfer from normal power to battery and retransfer to normal.
- B. Prepare a written report of tests, inspections, observations, and verifications indicating and interpreting results. If adjustments are made to lighting system, retest to demonstrate compliance with standards.

3.4 STARTUP SERVICE

- A. Burn-in all lamps that require specific aging period to operate properly, prior to occupancy by Owner. Burn-in fluorescent and compact fluorescent lamps intended to be dimmed, for at least 100 hours at full voltage.

3.5 ADJUSTING

- A. Occupancy Adjustments: When requested within 12 months of date of Substantial Completion, provide on-site assistance in adjusting aimable luminaires to suit actual occupied conditions. Provide up to two visits to Project during other-than-normal occupancy hours for this purpose. Some of this work may be required after dark.
1. Adjust aimable luminaires in the presence of Architect.

END OF SECTION 26 51 00