

CITY OF BALTIMORE
Brandon M. Scott
Mayor

DEPARTMENT OF GENERAL SERVICES
Berke Attila
Director

CONTRACT NO. GS 21802

**BALTIMORE CONVENTION CENTER ELEVATOR
REPLACEMENT**

1 W PRATT STREET
BALTIMORE, MARYLAND 21201

Marwan Alkarajat
Chief
Major Projects Division

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**CITY OF BALTIMORE
DEPARTMENT OF GENERAL SERVICES
NOTICE OF LETTING**

Sealed Bids or Proposals, in duplicate, addressed to the Board of Estimates of the Mayor and City Council of Baltimore and marked for **GS 21802 – Baltimore Convention Center Elevator Replacement**, will be received at the Office of the Comptroller, Room 204, City Hall, Baltimore, Maryland until 11:00 A.M. on **WEDNESDAY, January 18, 2023**. Board of Estimates employees will be stationed at the Security Unit Counter just inside the Holliday Street entrance to City Hall from 10:45 A.M. to 11:00 A.M. on Wednesday to receive Bids. Positively no bids will be received after 11:00 A.M. The bids will be publicly opened by the Board of Estimates in Room 215, City Hall at Noon. Bid opening proceedings can be also viewed live at <https://www.charmtvbaltimore.com/live-stream> at 12:00 Noon. Bid tabulation sheets detailing the bids received will be publicly posted to the Comptroller’s website by COB on the date of bid opening.

The Contract Documents may be purchased for a non-refundable cost of **\$50.00** by contacting Azza Rizkallah at azza.rizkallah@baltimorecity.gov as of **FRIDAY, December 09, 2022**. **Conditions and requirements of the Bid are found in the bid package.**

All contractors bidding on this Contract must first be pre-qualified by the City of Baltimore Boards and Commissions. Interested contractors should call 410 396-6883 or contact the Office of Boards and Commissions at 4 South Frederick Street, 4th Floor, Baltimore, MD 21202. **If a bid is submitted by a Joint Venture (“JV”), then in that event, the documents that establish the JV shall be submitted with the bid for verification purposes.** The Prequalification Category required for bidding on this project is **G90012 – INSTALLATION OF ELEVATORS**

The Cost Qualification Range for this work shall be **\$500,000.01 to \$1,000,000.00**

A “Pre-Bidding information” session will be conducted at **THE SITE: 1 W. PRATT STREET, BALTIMORE, MD 21201 on TUESDAY, DECEMBER 20, 2022 AT 10:00 A.M.**

Principal Items of work for this project are:

- 1. Installation of Elevators**
- 2. Electrical**

The MBE goal is **5%** The WBE goal is **3%**

APPROVED:

APPROVED:

Secretary, Board of Estimates

Chief, Capital Projects Division

Assistant Solicitor

Chief, Minority and Women’s
Business Opportunity Office

Director,
Department of General Services

ADDITIONAL BIDDING INFORMATION, REQUIREMENTS, AND CONDITIONS

1. Representatives from the Board of Estimates will be stationed at the Security Unit Counter just inside the Holliday Street entrance of City Hall from 10:45 a.m. to 11:00 a.m. every Wednesday to receive Bids.
2. Bid Guarantee: A certified check of the bidder or a bank cashier's check or a bank treasurer's check drawn on a solvent clearing house bank, made payable to the Director of Finance or a bid bond executed on the form as provided in the Bid or Proposal for an amount which is not less than that determined by multiplying the total bid submitted by two percent (2%) will be required with each bid over \$100,000.00. If the bid is less than or equal to \$100,000.00 no Bid Bond is required.
3. Bidders interested in utilizing the City's Self-Insurance Program for payment and performance security for contracts not exceeding \$100,000.00 may contact the Department of Finance, the Program Administrator, for eligibility requirements and premium costs.
4. **The Board of Estimates reserves the right to reject any and all Bids and/or waive technical defects, if in its judgment, the interest of the Mayor and City Council of Baltimore may so require.**
5. Pursuant to Article 5, Subtitle 28 of the Baltimore City Code (2000 Edition)-Minority and Women's Business Program, Minority Business Enterprise (MBE) and Women's Business Enterprise (WBE) participation goals apply to this contract.
6. This contract is subject to a **Performance Evaluation** by the Department of General Services.

END OF SECTION

NOTICE TO BIDDERS**SUPPLEMENTAL BIDDING INSTRUCTION**

The following instruction supplements the bidding instructions found elsewhere in the Bid Book and those referenced therein.

EACH BIDDER IS HEREBY NOTIFIED THAT HE/SHE/IT MUST COMPLETELY FILL IN THE ORIGINAL BID AND THE REQUIRED BID/PROPOSAL AFFIDAVIT AND DOCUMENTS LOCATED IN THE BID BOOK. THE ORIGINAL BID, (WHICH MUST REMAIN ATTACHED TO THE BID BOOK) PLUS THE FULLY COMPLETED DUPLICATE BID MUST BE SUBMITTED IN THE BID ENVELOPE, IF ONE IS PROVIDED FOR THAT PURPOSE.

FAILURE TO FOLLOW THESE SIMPLE DIRECTIONS MAY CAUSE YOUR BID TO BE DECLARED UNRESPONSIVE AND THE BID MAY BE REJECTED BY THE BOARD OF ESTIMATES.

MINORITY AND WOMEN'S BUSINESS PROGRAM

- ❖ INCLUDED IN THIS CONTRACT IS A MINORITY AND WOMEN'S BUSINESS PROGRAM PACKAGE.
- ❖ MINORITY AND WOMEN'S BUSINESS PROGRAM PACKAGE FORMS MUST BE COMPLETED AND SUBMITTED WITH YOUR BID PROPOSAL.
- ❖ FAILURE TO SUBMIT THE INFORMATION AT THE TIME REQUESTED WILL BE CAUSE TO HAVE YOUR BID REJECTED.

BALTIMORE APPRENTICESHIP TRAINEE PROGRAM (BATP)

- ❖ INCLUDED IN THIS CONTRACT IS A BALTIMORE APPRENTICESHIP TRAINEE PROGRAM PACKAGE (BATP DOCUMENTS).
- ❖ BATP FORMS MUST BE COMPLETED AND SUBMITTED **WITH YOUR BID PROPOSAL**.
- ❖ FAILURE TO SUBMIT THE INFORMATION AT THE TIME REQUESTED MAY BE CAUSE TO HAVE YOUR BID REJECTED.
- ❖ COMPLETED BATP FORMS ARE ONLY REQUIRED FOR BIDS OF \$1,000,000.00 OR MORE.
- ❖ **NOTE:** ORIGINAL BATP FORMS ARE INCLUDED IN THE ACCOMPANYING MANILA BID ENVELOPE IF THE ENGINEER'S ESTIMATE FOR A PROJECT IS \$ 750,000.00 OR MORE.

**EMPLOY BALTIMORE AND
BALTIMORE CITY'S YOUTHWORKS PROGRAM**

- ❖ ALSO INCLUDED IN THIS CONTRACT IS AN EMPLOY BALTIMORE PACKET AND A BALTIMORE CITY'S YOUTHWORKS PROGRAM FORM.
- ❖ ALL FORMS IN THE EMPLOY BALTIMORE CERTIFICATION PACKET AND THE SINGLE PAGE BALTIMORE CITY'S YOUTHWORKS FORM MUST BE COMPLETED AND SUBMITTED WITH YOUR BID PROPOSAL.
- ❖ FAILURE TO SUBMIT THE INFORMATION AT THE TIME REQUESTED MAY BE CAUSE TO HAVE YOUR BID REJECTED.
- ❖ THE ACCOMPANYING MANILA BID ENVELOPE CONTAINS AN EMPLOY BALTIMORE PACKET AND BALTIMORE CITY'S YOUTHWORKS PROGRAM ORIGINAL DOCUMENTS WHICH MUST BE COMPLETED FOR ALL CONTRACTS.
- ❖ ALL FORMS IN THESE PACKETS MUST BE COMPLETED AND SUBMITTED **WITH YOUR BID PROPOSAL**.
- ❖ FAILURE TO SUBMIT THE INFORMATION AT THE TIME REQUESTED MAY BE CAUSE TO HAVE YOUR BID REJECTED.

LOCAL HIRING LAW

- ❖ ALSO INCLUDED IN THIS CONTRACT IS NOTIFICATION OF THE LOCAL HIRING LAW EFFECTIVE DECEMBER 23, 2013. PLEASE REFER TO THE "INSTRUCTION TO BIDDERS" SECTION AND THE "LOCAL HIRING LAW" SECTION WITHIN THIS SPECIFICATION FOR REQUIREMENTS OF THE LAW.

BOARD OF ESTIMATES RESOLUTIONS AND EXECUTIVE ORDER**EXECUTIVE ORDER**

WHEREAS, the Mayor and City Council of Baltimore ("City") wishes to encourage all contractors awarded City contracts to agree to employ skilled and qualified Baltimore City residents to meet the contractor's employment needs created as a result of the award of a City contract; and

WHEREAS, the Mayor's Office of Employment Development ("MOED") has established the **EMPLOY BALTIMORE** program designed to create opportunities for businesses that receive City contracts to meet their workforce needs; to access qualified City job seekers; and to ensure that City dollars contribute to the local economy; and

WHEREAS, MOED has a roster of Baltimore City residents, who are skilled and qualified for immediate employment by City contractors; and

WHEREAS, MOED wishes to establish and maintain an ongoing relationship with City contractors in an effort to address current and future employment and/or training needs; and

WHEREAS, increasing employment participation of City residents is good business and a means to improve Baltimore City's employment rate.

NOW, THEREFORE, I, Stephanie Rawlings-Blake, Mayor of the City of Baltimore, by virtue of the authority vested in me by the Charter of Baltimore City, do hereby promulgate the following **EXECUTIVE ORDER**:

1. This Executive Order shall apply to contracts awarded by the City that are in the amounts of \$50,000.01 to \$300,000.00, except for professional service contracts and emergency contracts.
2. Bidders on all contracts awarded by the City in the amounts of \$50,000.01 to \$300,000.00, except for professional service contracts and emergency contracts, shall complete the **Employ Baltimore Certification Statement** contained in the Bid Document and submit it with their bids.
3. Within two (2) weeks of receiving the award of a City contract, the contractor shall schedule a meeting with MOED to: (a) assess its employment needs, and (b) discuss other services provided by MOED. If applicable, MOED will then tailor specific hiring and/or training programs to benefit the contractor. The contractor will not receive its first progress payment under the contract, unless and until the said meeting has been scheduled.
4. Should the contractor's workforce plan indicate a need to fill new jobs, the contractor must agree to post these positions through MOED and its One Stop Career Center Network for a period of seven (7) days prior to publicly advertising the openings. This will enable MOED to identify and refer qualified City residents to the contractor as candidates for these job opportunities.

5. Each contractor shall submit an **Employ Baltimore** Employment Report to MOED on June 30th and December 31st during each and every year of its contract, and at the end of the contract, indicating the number of City residents on its payroll. The submission of the Employments Reports as required shall be a condition precedent to the City's release of a final payment or any and all retainage held by the City, pursuant to the contract.

6. A copy of this **Executive Order** shall be included in all bids, requests for proposals and/or contracts.

7. This **Executive Order** applies to all applicable City contracts entered into on or after December 23, 2013.

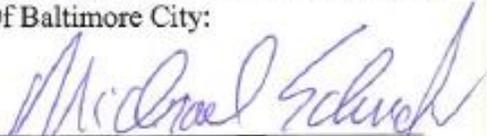
8. This **Executive Order** supersedes the Resolution of the Board of Estimates for the Employ Baltimore Executive Order signed by the Mayor on June 9, 2011, and shall take effect immediately.

IN WITNESS HEREOF, I HAVE HEREUNTO
PLACED MY HAND AND THE GREAT SEAL
OF THE CITY OF BALTIMORE THIS

DAY OF
2013.

STEPHANIE RAWLINGS-BLAKE, MAYOR

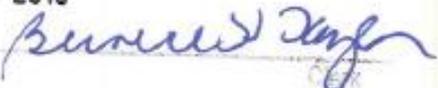
Approved As To Form and Legal
Sufficiency By The Law Department
Of Baltimore City:


Michael Schrock
Chief Solicitor

ATTEST:


Janelle Roper
Custodian of City Seal
Alternate

APPROVED BY THE BOARD OF ESTIMATES:
DEC 18 2013


Clerk



EXECUTIVE ORDER

WHEREAS, the Mayor and City Council of Baltimore ("City") is committed to promoting the well-being and positive development of the City's youth and providing educational and enrichment opportunities which will lead to academic improvement, safer environments and a reduction in high risk behavior; and

WHEREAS, Baltimore City has an estimated 76,000 citizens between the ages of 14-21, and

WHEREAS, the federal government ceased funding summer job programs for youth in 2000 after 25 years, causing local and state governments to join with businesses, philanthropic, faith-based, community, and educational organizations to obtain grants, tax-deductible donations and job opportunities to help these deserving youth; and

WHEREAS, the City and the Mayor's Office of Employment Development ("MOED") have established the Baltimore City's YouthWorks program to prepare dependable Baltimore City high school and college students for productive employment that meets the workforce needs of local businesses; and

WHEREAS, the City wishes to encourage all local businesses and contractors, service providers, consultants and vendors, etc doing business with the City to employ skilled and qualified Baltimore City youth between the ages of 14-21, who meet the job ready status, as defined by Baltimore City's YouthWorks program, during the summer of 2008; and

WHEREAS, the need to help Baltimore City's youth has never been greater

NOW, THEREFORE, I Sheila Dixon, Mayor of the City of Baltimore, by virtue of the authority vested in me by the Baltimore City Charter, do hereby promulgate the following EXECUTIVE ORDER:

- 1 Henceforth, each and every Solicitation from every City Department, Agency and Office, where the Bid is expected to be \$25,000 or more, shall contain the attached form Each and every Bidder shall provide the City with the (a) name, (b) complete address, (c) telephone number and (d) a contact person to assist MOED with the YouthWorks program.
2. MOED shall contact each and every business identified in §1 above and request that the business, contractor, service provider, consultant and vendor, etc. join with the City in reaching its goal of employing Baltimore City's YouthWorks referrals, or otherwise assist the Baltimore City's YouthWorks program.
- 3 MOED shall establish and maintain an ongoing relationship with City businesses, contractors, service providers, consultants and vendors, etc in an effort to address their current and future employment and/or training needs.
- 4 This Executive Order shall take effect immediately

IN WITNESS WHEREOF, I HAVE
PLACED MY HAND AND THE
GREAT SEAL OF THE CITY OF
BALTIMORE THIS 14TH DAY OF
JANUARY 2008

(SIGNED) SHEILA DIXON, MAYOR

Approved As To Form And
Legal Sufficiency By The Law
Department Of Baltimore City

(Signed) Leslie S. Winner
Chief Solicitor

**RESOLUTION OF THE BOARD OF ESTIMATES
OF THE CITY OF BALTIMORE**

WHEREAS, the Mayor and City Council of Baltimore, acting by and through the Board of Estimates pursuant to Article VI, Section 4 of the Charter of Baltimore City, 1964 Revision, as amended, is responsible for awarding contracts and supervising all purchasing by the City; and

WHEREAS, the Board of Estimates wishes to insure that all City contractors, subcontractors and their agents and employees conduct themselves in accordance with established federal, state, and local laws.

NOW, THEREFORE, BE IT RESOLVED BY THE BOARD OF ESTIMATES OF BALTIMORE CITY, that the following policy, which has always been applicable to City contracts, be formally adopted by this Board to apply to all City contractors, subcontractors and their agents and employees:

1. Contractors, subcontractors, and their agents and employees may not engage in unfair labor practices as defined under The National Labor Relations Act and applicable federal regulations and state laws.

2. Contractors, subcontractors, and their agents may not threaten, harass, intimidate or in any way impede persons employed by them who on their own time exercise their rights to associate, speak, organize, or petition governmental officials with their grievances.

3. If the Board of Estimates determines that a contractor, subcontractor, or their agents have violated the policy set forth in this Resolution said contractor, or subcontractor will be disqualified from bidding on City contracts, and if they are currently completing contracts, they will be found in default of their contracts.

4. A copy of this Resolution must be included in all City contracts.

5. This Resolution applies to all City contracts entered into after the date of its adoption and to each and every City contract, or subcontract in effect on the date of its adoption, and each department and agency of the City is charged with the responsibility of so notifying all present contractors, and subcontractors.

6. This Resolution takes effect immediately.

APPROVED BY THE BOARD OF
ESTIMATES

(Signed)
Shirley A. Williams June 29, 1994
Clerk Date

Approved As To Form And
Legal Sufficiency This
28th Day of June, 1994

(Signed)Leslie S. Winner
Leslie S. Winner
Principal Counsel

RESOLUTION OF THE BOARD OF ESTIMATES**APPRENTICESHIP TRAINING PROGRAMS**

WHEREAS, the Mayor and City Council of Baltimore, acting by and through the Board of Estimates, pursuant to Article VI, Section 4 of the Charter of Baltimore City, 1964 Revision, as amended, is responsible for awarding contracts and supervising all purchasing by the City; and,

WHEREAS, the Board of Estimates wishes to insure that all prime contractors performing under any City construction contract conduct apprenticeship training programs as a condition of their contracts;

NOW, THEREFORE, BE IT RESOLVED BY THE BOARD OF ESTIMATES OF BALTIMORE CITY, that the following policy applies to all prime contractors performing under any construction contract of the City that has a total cost of \$1,000,000.00 or more:

1. Prime Contractors shall conduct apprenticeship training programs as a condition of their contracts.
2. Prime Contractors shall submit to the contract administrator for the City agency supervising the contract, within ten days of their receipt of notice of award of each contract, evidence of its participation in a certified apprenticeship program that has been previously approved by the contract administrator, or an apprenticeship training action plan for approval by the contract administrator. Prime Contractors will further submit, from time to time as requested by the contract administrator, evidence of and statistics concerning the apprenticeship training actually performed by the Prime Contractors in connection with each City contract.
3. If the Board of Estimates determines that a Prime Contractor has violated the policy set forth in this Resolution, then the Prime Contractor may be disqualified from bidding on future City contracts, or may be found in default of its existing contract.
4. A copy of this Resolution must be included in all City contracts.
5. This Resolution applies to all City Contracts entered into after the date of its approval by the Board of Estimates.
6. This Resolution takes effect immediately.

NOTICE: Resolution effective February 05, 2014.

**RESOLUTION
OF
THE BOARD OF ESTIMATES OF BALTIMORE CITY
THE REGULATION OF BOARD OF ESTIMATES MEETINGS AND PROTESTS**

WHEREAS, the Mayor and City Council of Baltimore, acting by and through the Board of Estimates ("Board"), pursuant to Article VI, § 1 et seq. of the Charter of Baltimore City, 1996 Edition, as amended (HEREIN after referred to as "Charter"), is responsible for formulating and executing the fiscal policy of the City, approvals of settlements, acquisitions and dispositions of real property, awarding contracts and supervising purchasing by the City; and other duties as prescribed in the Charter; and

WHEREAS, the Board, pursuant to Article VI, § 1 of the Charter is composed of the Mayor, President of the City Council, Comptroller, City Solicitor, and Director of Public Works, and the President of the City Council shall be President of the Board, and one of the members shall act as Secretary; and

WHEREAS, the members of the Board meet in public forum each Wednesday at 9:00 a.m. (unless in periodic recess) in the Hyman Pressman Hearing Room to conduct the business of government; and

WHEREAS, the Board, pursuant to Article VI, § 2 et seq. of the Charter, may promulgate rules and regulations and summon before it heads of departments, bureaus or divisions, municipal officers, and members of commissions and boards; and

WHEREAS, in the interest of promoting better government, order and efficiency the Board wishes to establish certain rules, applicable to all private individuals, business entities, fraternal organizations, special interest groups, associations and other entities, etc. (HEREIN after collectively referred to as "entity") who wish to speak at the meetings of the Board.

NOW, THEREFORE, BE IT RESOLVED BY THE BOARD OF ESTIMATES OF BALTIMORE CITY, that the following rules for the conduct of Board meetings be formally adopted by the Board to apply to all issues to be acted upon, considered, noted, or received at any given meeting:

1. Anyone wishing to speak before the Board, whether individually or as the spokesperson of an entity must notify the Clerk of the Board in writing no later than by noon on the Tuesday preceding any Board meeting, or by an alternative date and time specified in the agenda for the next scheduled meeting. The written protest must state (1) whom you represent and the entity that authorized the representation (2) what the issues are and the facts supporting your position and (3) how the protestant will be harmed by the proposed Board action.

2. Requests to speak on matters submitted to the Board for its information, notation or status report from a previous Board action may be heard at the discretion of the President of the Board. This rule does not preclude the submitting agency from orally presenting the report or matter at the meeting of the Board.

3. Matters may be protested by any entity directly and specifically affected by a pending matter or decision of the Board. The person or entity must submit a written protest of that matter or pending decision. In order for a protest to be considered, the protestant must be present at the Board of Estimates meeting.

4. An entity affected by the disposition of the matter in a way different than an average taxpayer or citizen and who so specifies to the satisfaction of the Board may have their protest heard and considered by the Board. However, the President of the Board reserves the right to call a person or organization to give testimony that he/she determines furthers the effective and fair decision making process of the Board. Protests filed by persons not affected by the disposition of the matter in a way different than an average taxpayer or citizen will be handled and responded to as may be determined by the Clerk of the Board.

SECTION 00025
SPECIAL PROVISIONS

SP-1 CONTRACT DOCUMENTS

The Contract Documents for this project consist of but are not limited to, the following:

1. **Contract Book** which contains:

- A. Notice of Letting
- B. Special Provisions
 - 1) Instruction to Bidders
 - 2) Special Conditions
 - 3) Construction Details and Materials
 - 4) Notice of Proposed Change Order
 - 5) Extra Work Certification
 - 6) Subcontractors acknowledgement of progress payment
- C. Bid or Proposal and Detached Duplicate
- D. Agreement
- E. Bonds

May contain: Addendum

2. **Contract Plans**

The following numbered and titled Plans form a part of these Contract Documents. The Engineer will furnish, from time to time as the work progresses, such supplemental drawings as may necessary for further illustrating the details of the permanent work, and the Contractor will be required to abide by any modifications, supplemental Plans and Specifications that may be furnished by the Engineer.

The Plans referred to in the Contract Documents are entitled:

CITY OF BALTIMORE
DEPARTMENT OF GENERAL SERVICES
CONTRACT NO. GS21802
BALTIMORE CONVENTION CENTER ELEVATOR REPLACEMENT

These documents contain drawings as shown in the Table of Contents.

3. **Standard Specifications**

The City of Baltimore, Department of Public Works, Specifications for Material, Highways, Bridges, Utilities and Incidental Structures, Issue of 2006 is hereby made part of these Contract Documents and hereinafter referred to as "Standard Specifications".

Any references in the Contract Documents made to an Article, Section, Paragraph or Table shall refer to the Standard Specifications, unless otherwise noted.

4. **Book of Standards**

The City of Baltimore, Department of Public Works, Book of Standards are hereby made a part of these Contract Documents and hereinafter referred to as "Book of Standards". Any reference in the Contract Documents made to a Standard Number shall refer to the Book of Standards, unless otherwise noted.

The Book of Standards is available online at:

<https://transportation.baltimorecity.gov/transportation/bookofstandards>

5. **Guidelines for the Performance Evaluation of Design Consultants and Construction Contractors**

Pursuant to and in accordance with provisions of Article VI, Section 11 (c) AND 11(f) of the Charter of Baltimore City 1996 Edition, the City of Baltimore, City of Baltimore Rules for Qualification of Contractors, Performance Evaluations of Construction Contractors and Consultants and Procedures and Guidelines for Hearings before the Office of Boards and Commissions Review Committee November 30, 2016, Guidelines have been promulgated for the evaluation of the performance of design consultants and construction contractors and are hereby made a part of these Contract Documents.

SECTION 00100
INSTRUCTIONS TO BIDDERS

IB-1 PURCHASE OF THE STANDARD SPECIFICATIONS

The Standard Specifications, at a charge of \$35.00 per copy, may be obtained at

The Cummings Building
1st Floor Service Counter
401 E. Fayette Street
Baltimore, MD 21202

between the hours of 9:00 A.M. to 4:00 P.M. except Saturday, Sunday, and holidays. Checks must be made payable to the Director of Finance.

The Standard Specification is also available free online for download at:
<http://generalservices.baltimorecity.gov/gs-major-projects/greenbook>

IB-2 SCOPE OF WORK

The Principal Items of work under this Contract are as shown on the **NOTICE OF LETTING**

IB-3 LOCATION(S) OF WORK

Work under this Contract will be restricted to the location(s) listed herein. There shall be no deviation from the location(s) so specified either by additions, subtractions or alterations by the Contractor or his representative without advance written permission from the Engineer.

IB-4 CONTRACT BOOK

The successful Bidder, upon execution of the Agreement and Bonds, will receive up to five (5) copies of the Contract Book – no charge.

IB-5 BALTIMORE APPRENTICESHIP TRAINEE FORMS (BATP)

Also included in this contract is a Baltimore Apprenticeship Trainee Program package (BATP documents). The duplicate BATP forms must be completed and submitted with your bid proposal. Completed BATP forms are only required for bids of \$1,000,000.00 or more. Failure to submit the information at the time requested MAY be cause to have your bid rejected.

IB-6 EMPLOY BALTIMORE PACKET

Also included in this contract is an Employ Baltimore Packet. The accompanying manila bid envelope contains Employ Baltimore Packet duplicate documents which must be completed for all contracts with bids in excess of \$50,000.01. All forms in the Employ Baltimore Packet must be completed and submitted with your bid proposal. Failure to submit the information at the time requested may be cause to have your bid rejected.

IB-7 LOCAL HIRING LAW

Article 5, Subtitle 27 of the Baltimore City Code, as amended (the “Local Hiring Law”) and its rules and regulations apply to contracts and agreements executed by the City on or after the Local Hiring Law’s effective date of December 23, 2013. The Local Hiring Law applies to every contract for more than \$300,000 made by the City, or on its behalf, with any person. It also applies to every agreement authorizing assistance valued at more than \$5,000,000 to a City subsidized project. Unless the Mayor’s Office of Employment Development (“MOED”) grants an exception under the Local Hiring Law, at least 51% of the new jobs required to complete the contract of project must be filled by Baltimore City residents.

1. Within two (2) weeks of the Board of Estimate’s award of the contract or approval of the agreement, the contractor shall have a meeting, whether in person or via telephone, with MOED to complete an employment analysis and review the workforces plan required for such contract or agreement. The contractor will not receive any payments under the contract or agreement, unless and until the employment analysis is performed. Contact information for MOED can be found on its website: www.oedworks.com.
2. Should the contractor’s workforce plan indicate a need to fill new jobs, the contractor shall post the new job opening with MOED’s One Stop Career Center Network for a period of seven (7) days prior to its publicly advertising these opening. Further, the contractor shall interview qualified Baltimore City residents referred from MOED, and unless granted an exception, fill at least fifty-one percent of the new jobs required to complete the contract or project, with Baltimore City residents.

IB-8 BALTIMORE CITY’S YOUTHWORKS PROGRAM

Also included in this contract is a Baltimore City’s Youthworks Form. The accompanying manila bid envelop contains a Baltimore City’s Youthworks Form duplicate document which must be completed for all contracts. The single page Baltimore City’s Youthworks Form must be completed and submitted with your bid proposal. Failure to submit the information at the time requested MAY be cause to have your bid rejected.

IB-9 CONTRACTORS EXPENSES, PERMITS, LICENSES, CHARGES, AND NOTICES

Per the City of Baltimore, Department of Public Works, Specifications for Material, Highways, Bridges, Utilities and Incidental Structures, Issue of 2006, Sections 00 73 18 – Contractors Expense and 01 41 26 – Permits, Licenses, Charges, and Notices in the Baltimore City Green Book, the Contractor is responsible for all permit fees. “Permit fees” shall include all fees associated with any permit necessary for the Contractor to perform work, including the building permit. Information regarding the cost of the building permit, trade permits and other permits can be found at http://static.baltimorehousing.org/pdf/permits_fees.pdf.

IB-10 BOND PREMIUM

A letter from the bonding company with the bonding rate is required. Awarded Contractor is required to provide this information upon executing the Payment and Performance Bonds.

IB-11 CERTIFICATION TO ACCOMPANY REQUESTS FOR PROGRESS PAYMENTS or REQUESTS FOR PAYMENTS Per the City of Baltimore, Department of Public Works, Specifications for Material, Highways, Bridges, Utilities and Incidental Structures, Issue of 2006, Sections 01 29 76, the following language shall be included in all requests for progress Payments:

**CITY OF BALTIMORE
DEPARTMENT OF GENERAL SERVICES**

CONTRACT NUMBER: GS21802

PROJECT: BALTIMORE CONVENTION CENTER ELEVATOR REPLACEMENT

DATE: _____
(Preferably as of end of month)

To the Director of Finance:

In reference to the above referenced contract, we hereby certify that as of the above date no extra work or other conditions that would give rise to additional costs have been authorized either in writing, verbally, or otherwise except that which is represented by fully executed Change Orders Expenditure Authorization Requests and that as of the above date we are not aware of any condition that would give rise to any additional claim upon the Mayor and City Council of Baltimore in reference to the above project, EXCEPT AS FOLLOWS:

(List exceptions here):

Supporting Documents
Attached hereto:

CERTIFIED CORRECT:

- 1. Contractor's Release
conditional upon Final payment

Name of Contractor

- 2. Subcontractors' Acknowledgement
of progress Payment and Release

Date of Certification

By: _____
Authorized Signature

THIS FORM MUST ACCOMPANY ALL REQUESTS FOR PAYMENTS.

IB-12 SUBCONTRACTOR'S ACKNOWLEDGEMENT OF PROGRESS PAYMENT

Per the City of Baltimore, Department of Public Works, Specifications for Material, Highways, Bridges, Utilities and Incidental Structures, Issue of 2006, Sections 01 29 77, the following language shall be included in all requests for progress Payments:

**SUBCONTRACTOR'S ACKNOWLEDGEMENT
OF PROGRESS PAYMENT**

NOTICE: THIS DOCUMENT STATES THAT YOU HAVE BEEN PAID FOR PERFORMING CERTAIN SERVICES. PLEASE READ IT CAREFULLY BEFORE SIGNING.

As of the date listed below, the undersigned subcontractor has received progress payments totaling \$ _____ to date for labor, services, equipment, or materials furnished to _____
(Name of General Contractor)

on the following contract of the Mayor and City Council of Baltimore:

Contract No. GS21802 - BALTIMORE CONVENTION CENTER ELEVATOR REPLACEMENT

Is your company's work on this contract completed _____ Yes _____ No

Dated: _____
Subcontractor Name (Company)

By _____
Name (Signature)

Name (Printed) Title

THIS FORM MUST ACCOMPANY ALL REQUESTS FOR PAYMENT

IB 13 BID DOCUMENT CHECKLIST*

The following must occur as part of your bid submission or your bid may be deemed non-responsive:

DONE	REQUIRED ACTIONS
<input type="checkbox"/>	Each Addendum issued must be acknowledged on the specific Addendum form and attached to the contract specification with the bid submission.
<input type="checkbox"/>	Bid Prices for each and every item and the total must be entered where indicated. <u>Make sure that the Unit Price item (s) is filled out.</u>
<input type="checkbox"/>	Follow all of the instructions on the Minority Business forms contained in the bid/specification package: Complete each line with the <u>exact</u> information that is requested; If a total subcontract value is requested, do not enter a percentage instead; Execute the form on behalf of the bidder; Confirm that the proposed subcontractor has executed the form.
<input type="checkbox"/>	Provide one original Bid Bond (with original Power of Attorney) or other acceptable bid security in acceptable amount along with a copy of the bid bond or other bid security: If locally funded, 2% of the total bid amount
<input type="checkbox"/>	Complete and answer all Bid/proposal Affidavits located after the Bid or Proposal. Ensure that a representative with the proper authority signs in the appropriate pages. Should a representative who is NOT an officer or director of the company execute the bid, attach legal evidence of his/her ability to do so.
<input type="checkbox"/>	Complete the Employ Baltimore Certification Statement for projects \$300,000.00 and below, and/or the Local Hiring Certification and Compliance Statement for projects \$300,000.00 and above
<input type="checkbox"/>	Ensure the Duplicate Bid is an <u>exact replica</u> of the Original Bid and submit with the Original Bid.

***PLEASE NOTE- This list is not intended to be exhaustive nor all inclusive, but is provided for bidder’s guidance and informational purposes only.**

IB-14 DIGITAL SPECIFICATIONS & DRAWINGS

Specifications & Drawings for this project have been provided as PDF files on the enclosed Flash Drive All documents on the Flash Drive are part of the Bid documents.

IB-15 CDC Guidelines

All individuals, including Contractors and sub-contractors, on City property and in its facilities shall abide with all CDC guidelines in regard to COVID 19.

END OF SECTION

SPECIAL CONDITIONS**SC-1 MINIMUM WAGE RATES & LABOR TRAFFICKING NOTICE REQUIREMENTS**

The Baltimore City Code Art. 5 Subtitle 25 "Prevailing Wages for Work Under Construction Contracts" establishes what is more commonly referred to as the City's "Prevailing Wage" requirement. Contractors awarded City Construction contracts are required to pay their employees a "prevailing Wage" to be determined each year by the Board of Estimates. Contractors must become thoroughly familiar with the "Prevailing Wage" requirement. A copy of the City Code Art. 5 Subtitle 25 can be found on the City of Baltimore's website (<http://civilrights.baltimorecity.gov/wage-commission>).

Included is a copy of the Prevailing Wage Rates that apply to this contract and Art. 5 subtitle 25-9 (Required Records-In General) and subtitle 25-10 (Required Records-Project Payroll Reports), which sets forth certain reporting requirements. An example of a payroll report is also included to be used in complying with Subtitle 25-10. If you find it more convenient you may use your own payroll form so long as it provides the information required and is in close conformity with the form enclosed. Copies of completed payroll reports shall be submitted as follows:

One Copy: Office of Civil Rights & Wage Enforcement
7 E. Redwood St. 9th Flr.
Baltimore, MD 21202
Phone (410-396-4835
Fax: (410) 752-3190

One Copy: Contracting Agency

If you need additional clarification regarding Article 5, Subtitle 25, please contact the Wage Commission at 410-396-4835.

FISCAL YEAR 2022 PREVAILING WAGE RATES

CLASSIFICATION NO. 1

The following minimum hourly wage rates shall apply to all contracts in excess of One Hundred Thousand Dollars (\$100,000) in connection with new building construction, major remodeling and rehabilitation of buildings and for construction, reconstruction, erection, conversion installation, alteration, renovation, razing, demolition, moving or removing on any airport, pier wharf, sewer, drain, main, conduit, machinery or mechanical, electrical or other equipment or any other operation, or work to be done or performed in, on, upon or in connection with any building, bridge over water, tunnel, tower, stack, filtration plant, waste water or sewage treatment works, pumping stations, and other such structures.

JOURNEYMEN	HOURLY RATE	FRINGE BENEFITS	TOTAL
Asbestos Workers (Insulation Mechanics)	\$39.27	\$18.72	\$58.04
Boilermakers	\$17.62	\$6.96	\$24.58
Bricklayers	\$34.00	\$12.84	\$46.84
Carpenters/Resilient & Soft Floor Layers	\$30.34	\$14.02	\$44.36
- Millwright	\$33.65	\$18.06	\$51.71
- Piledriver	\$33.62	\$15.73	\$49.35
Cement Mason/Plasterers	\$28.45	\$11.47	\$39.32
Electricians	\$41.00	\$18.84	\$59.84
Elevator Construction Mechanic	\$50.04	\$41.42	\$91.46
Firestop Mechanic	\$29.41	\$8.43	\$37.84
Glaziers	\$30.77	\$22.96	\$53.73
Ironworkers			
- Ornamental	\$31.17	\$24.16	\$55.33
- Structural	\$31.17	\$24.16	\$55.33
- Reinforcing Rodmen	\$31.17	\$24.16	\$55.33
- Fence Erectors	\$28.70	\$20.66	\$49.36

APPROVED BY BOARD OF ESTIMATES



By Celeste.Amato at 4:36:17 PM, 3/16/2022

CLERK TO THE BOARD OF ESTIMATES

FISCAL YEAR 2022 PREVAILING WAGE RATES

JOURNEYMEN	HOURLY RATE	FRINGE BENEFITS	TOTAL
Laborers			
- General Laborers: Flaggers, Tool and Material Handlers (Except Tenders), Clean-Up, Janitors, Truck Checkers, Dumpmen, Spotter, Landscape Laborer, Mulcher, Watchmen (Including Fire Watchmen)	\$18.25	\$6.29	\$24.54
- Construction Laborers: All Laborers not otherwise classified	\$19.10	\$6.29	\$25.39
- Semi-Skilled Laborers: Potmen, Power or Air Tool Operators, Pipelayers, Drillers Concrete Laborers, Signalmen, Small Machine Operators, Laser Beam Operators, Scaffold Builders, Caisson Laborer, Jack Hammer Operator (80 lbs. and over), Hazmat Handler	\$19.41	\$6.29	\$25.70
Painters			
- Brush and Trim	\$25.06	\$9.86	\$34.92
- Spackling, Taping, Wall Covering	\$25.06	\$9.86	\$34.92
- Spray, Structural Steel, Steam Cleaning, Sandblasting			
Plumbers/Steamfitters/Pipefitter	\$41.92	\$22.09	\$64.01
Roofers			
- Slate and Tile	\$31.26	\$13.82	\$45.08
- Wood Block	\$31.26	\$13.82	\$45.08
- Composition - Waterproofer	\$31.26	\$13.82	\$45.08

FISCAL YEAR 2022 PREVAILING WAGE RATES

APPROVED BY BOARD OF ESTIMATES



By Celeste.Amato at 4:36:17 PM, 3/16/2022

Clerk to the Board of Estimate

FISCAL YEAR 2022 PREVAILING WAGE RATES

JOURNEYMEN

Sheet Metal Worker (Inc. Air Balance, Metal Roofing)
 Sprinkler Fitter
 Stonemason
 Tile, Terrazzo, Marble Workers
 Tile, Terrazzo, Marble Finisher

POWER EQUIPMENT OPERATORS

GROUP I: Certified Crane Operators (CCO)

GROUP II: Backfiller, backhoe, batching plants, boat captain, cableway, loader hoe, (with a front end bucket over 1 ¼ yds.), concrete mixing plant, concrete paver, derrick boat, double concrete pump, dragline, Eimco type overhead loader, elevating grader, scraper or pan type excavator (25 yds. and over), front end loader (1 ¾ yds. and over), gradall, grader, hoist (2 active drums or more), multiple conveyor, pile driving machine, power shovel, repair mechanic, shield, standard gauge locomotive, trenching machine, tunnel mucking machine, twin engine scraper, welder, whirley rig.

	HOURLY RATE	FRINGE BENEFITS	TOTAL
	\$42.67	\$22.75	\$65.42
	\$34.40	\$19.14	\$53.54
	\$38.81	\$18.66	\$57.10
	\$31.18	\$12.74	\$43.92
	\$25.81	\$11.66	\$37.47
	\$37.70	\$16.14	\$53.84
	\$31.73	\$13.15	\$44.88

APPROVED BY BOARD OF ESTIMATES



By Celeste.Amato at 4:36:17 PM, 3/16/2022

Clerk to the Board of Estimates

FISCAL YEAR 2022 PREVAILING WAGE RATES

JOURNEYMEN	HOURLY RATE	FRINGE BENEFITS	TOTAL
<p><u>POWER EQUIPMENT OPERATORS</u></p> <p>GROUP III: Asphalt spreader bulldozer, bull float, loader, hoe, (with a front end bucket 1 ¼ yds. and under), concrete mixer (with skip), concrete pump, concrete spreader, scraper or pan type excavator (under 25 yds.) finishing machine, front end tractor loader (under 1 ¾ yds.), hi-lift fork lift, longitudinal float, narrow gauge locomotive, one drum hoist, power roller, screeding machine, snooper/vac truck, stone crusher, stone spreader, sub-grader tractor with attachments (2 or more provided both attachments are being used).</p>	\$29.78	\$13.15	\$42.93
<p>GROUP IV: Crawler or rubber tire tractor no attachments), compressors, elevator operator, firemen, fuel truck, grease truck, grout pump, light plant, mighty midget with compressor, single conveyor, space heaters, welding machines, welldriller, wellpoint system, deck hands, oilers (all types).</p>	\$24.65	\$13.17	\$37.82

APPROVED BY BOARD OF ESTIMATES

By Celeste.Amato at 4:36:17 PM, 3/16/2022

Clerk to the Board of Estimates

FISCAL YEAR 2022 PREVAILING WAGE RATES

JOURNEYMEN	HOURLY RATE	FRINGE BENEFITS	TOTAL
Truck Driver			
- Goose Neck Drop Frame	\$15.82	\$3.75	\$19.57
- Trailer Driver	\$15.50	\$3.75	\$19.25
- Flat Bed and Pickup	\$13.89	\$3.75	\$17.64
- Dump Truck Driver (Site Only) Welder Receives Rate For Craft Involved	\$12.85	\$4.60	\$17.45

APPROVED BY BOARD OF ESTIMATES



By Celeste.Amato at 4:36:17 PM, 3/16/2022

Clerk to the Board of Estimates

FISCAL YEAR 2022 PREVAILING WAGE RATES

APPRENTICESHIP RATES
PERCENTAGE OF JOURNEYMAN'S HOURLY RATE
PLUS FULL JOURNEYMAN'S FRINGE BENEFITS (UNLESS PARTIAL FRINGE BENEFITS ARE APPROVED BY THE MARYLAND APPRENTICESHIP AND TRAINING COUNCIL)

Table with 2 columns: ASBESTOS WORKERS, Rate. Rows: First year (45), Second year (55), Third year (65), Fourth year (75), Fifth year (85).

Table with 2 columns: BOILERMAKERS, Rate. Rows: First 6 months (50), Second 6 months (60), Third 6 months (65), Fourth 6 months (70), Fifth 6 months (75), Sixth 6 months (80), Seventh 6 months (85), Ninth 6 months (90).

Table with 2 columns: BRICKLAYERS & STONE MASONS, Rate. Rows: First 6 months (50), Second 6 months (55), Third 6 months (60), Fourth 6 months (70), Fifth 6 months (80), Sixth 6 months (90).

APPROVED BY BOARD OF ESTIMATES

Handwritten signature: Celeste Amato

By Celeste.Amato at 4:36:17 PM, 3/16/2022

Clerk to the Board of Estimates

FISCAL YEAR 2022 PREVAILING WAGE RATES

APPRENTICESHIP RATES
PERCENTAGE OF JOURNEYMAN'S HOURLY RATE

PLUS, FULL JOURNEYMAN'S FRINGE BENEFITS (UNLESS PARTIAL FRINGE BENEFITS ARE APPROVED BY THE MARYLAND APPRENTICESHIP AND TRAINING COUNCIL)

Table with 2 columns: Category, Rate. Rows include CARPENTERS and years 1-4 with rates 60, 70, 80, 90.

Table with 2 columns: Category, Rate. Rows include CEMENT FINISHERS and 500-hour intervals with rates 50, 55, 60, 65, 70, 75, 80, 90.

Table with 2 columns: Category, Rate. Rows include ELECTRICIANS and time periods (6 months, 2 years, 3 years, 4 years, 5 years) with rates 40, 40, 55, 65, 70, 75.

APPROVED BY BOARD OF ESTIMATES

Handwritten signature: M. Amato

By Celeste.Amato at 4:36:17 PM, 3/16/2022

Clerk to the Board of Estimate

FISCAL YEAR 2022 PREVAILING WAGE RATES

APPRENTICESHIP RATES
PERCENTAGE OF JOURNEYMAN'S HOURLY RATE
PLUS FULL JOURNEYMAN'S FRINGE BENEFITS (UNLESS PARTIAL FRINGE BENEFITS ARE APPROVED BY THE MARYLAND APPRENTICESHIP AND TRAINING COUNCIL)

Table with 2 columns: Category (IRONWORKERS) and Rate. Rows include First 1,000 hours (60) through Eighth 1,000 hours (95).

Table with 2 columns: Category (MILLWRIGHTS) and Rate. Rows include First year (60) through Fourth year (90).

Table with 2 columns: Category (PAINTERS) and Rate. Rows include First 1,000 hours (55), Second 1,000 hours (70), and Third 1,000 hours (85).

APPROVED BY BOARD OF ESTIMATES

Handwritten signature of Celeste Amato

By Celeste.Amato at 4:36:17 PM, 3/16/2022

Clerk to the Board of Estimate

FISCAL YEAR 2022 PREVAILING WAGE RATES

APPRENTICESHIP RATES
PERCENTAGE OF JOURNEYMAN'S HOURLY RATE
PLUS FULL JOURNEYMAN'S FRINGE BENEFITS (UNLESS PARTIAL FRINGE BENEFITS ARE APPROVED BY THE MARYLAND APPRENTICESHIP AND TRAINING COUNCIL)

Table with 2 columns: Category (e.g., First 1,000 hours) and Rate (e.g., 50). Header: PLASTERERS

Table with 2 columns: Category (e.g., First year) and Rate (e.g., 40). Header: PLUMBERS/STEAMFITTERS/ PIPEFITTERS

Table with 2 columns: Category (e.g., First period) and Rate (e.g., 55). Header: POWER EQUIPMENT OPERATORS

APPROVED BY BOARD OF ESTIMATES

Handwritten signature: M. Amato

By Celeste Amato at 4:36:17 PM, 3/16/2022

Clerk to the Board of Estimate

FISCAL YEAR 2022 PREVAILING WAGE RATES

APPRENTICESHIP RATES
PERCENTAGE OF JOURNEYMAN'S HOURLY RATE
PLUS FULL JOURNEYMAN'S FRINGE BENEFITS (UNLESS PARTIAL FRINGE BENEFITS ARE APPROVED BY THE MARYLAND APPRENTICESHIP AND TRAINING COUNCIL)

Table with 2 columns: Category (ROOFERS) and Rate. Rows include First year (55), Second year (65), and Third year (75).

Table with 2 columns: Category (SHEET METAL WORKERS) and Rate. Rows include First 6 months (40) through Tenth 6 months (85).

Table with 2 columns: Category (SHEET METAL WORKERS) and Rate. Rows include First 6 months (45) through Tenth 6 months (90).

APPROVED BY BOARD OF ESTIMATES

Handwritten signature of Celeste Amato

By Celeste.Amato at 4:36:17 PM, 3/16/2022

Clerk to the Board of Estimate

FISCAL YEAR 2022 PREVAILING WAGE RATES

**APPRENTICESHIP RATES PERCENTAGE OF
JOURNEYMAN'S HOURLY RATE
PLUS FULL JOURNEYMAN'S FRINGE BENEFITS (UNLESS PARTIAL FRINGE
BENEFITS ARE APPROVED BY THE MARYLAND APPRENTICESHIP AND TRAINING
COUNCIL)**

<u>LABORERS</u>	
First year	70
Second year	90

LABORER'S WORK

Laborers may not assist mechanics in the performance of mechanic's work, nor use tools peculiar to established trades. Their work should be confined to the following manual tasks:

1. Digging and filling holes and trenches.
2. Loading, unloading and stockpiling materials.
3. Cleaning and sweeping.
4. Driving stakes.
5. Placing concrete and asphalt (not finishing)
6. Stripping forms.
7. Ripping out material which is to be discarded, including asbestos.
8. Clearing and grubbing.

The above definition is to preclude inadvertent misclassification of laborers.

APPROVED BY BOARD OF ESTIMATES



By Celeste Amato at 4:36:17 PM, 3/16/2022

Clerk to the Board of Estimates

ART. 5, § 25-9 BALTIMORE CITY CODE

§ 25-9. Required records - In general.

(a) Contractors to maintain.

The contractor and each of his subcontractors shall maintain payrolls and basic records relating thereto during the course of the work and shall preserve them for a period of 3 years thereafter for all laborers, mechanics, and apprentices working directly upon the site of the work.

(b) Contents.

These records shall contain:

- (1) the name and address of each such employee;
- (2) his classification in accordance with the classifications fixed in the contract;
- (3) a designation of laborer, mechanic, or apprentice;
- (4) the number of hours worked each day;
- (5) the hourly wage rate;
- (6) the gross wages, deductions made, and actual wages paid;
- (7) a copy of the Social Security returns and evidence of payment thereof;
- (8) a record of fringe benefit payments including contributions to approved plans, funds, or programs and/or additional cash payments; and
- (9) such other data as may be required by the Board of Estimates from time to time.

(City Code, 1950, art. 1, §14(e); 1966, art. 1, §16(f)(1st sen.); 1976/83, art. 1, §19(d)(1).)
(Ord. 45-225; Ord. 59-1960; Ord. 67-969; Ord. 73-348; Ord. 04-672.)

§ 25-10. Required records - Project payroll reports.

(a) Contractor to submit.

The contractor shall submit 2 complete copies of his weekly project payrolls and the weekly project payrolls of each of his subcontractors, consecutively numbered, not later than 14 days from the end of their respective payroll periods, 1 copy to be sent to the contracting agency, the other to the Wage Commission where the same will be available for public inspection during regular business hours. 02/12/16 -52- FINANCE AND PROCUREMENT ART. 5, § 25-10

(b) Contents.

The weekly project payrolls shall contain:

- (1) the name of the prime contractor and the subcontractor, if any;
- (2) a designation of the project and location;
- (3) the name, Social Security Number, and occupation of each employee;
- (4) his classification in accordance with the classifications fixed in the contract;
- (5) a designation of laborer, mechanic, or apprentice;
- (6) the number of hours worked daily by said employee at straight time and at overtime and his hourly wage rate for each;
- (7) the gross wages paid to said employee per week; and
- (8) such other data as may be required by the Board of Estimates from time to time.

(c) Prime contractor responsible for subcontractors.

The prime contractor shall be responsible for the submission of all subcontractors' payrolls covering work performed directly at the work site.

(d) Signed statement of compliance.

Each copy of the payroll shall be accompanied by a statement signed by the contractor or the subcontractor, as the case may be, indicating:

- (1) that the payroll is correct;
- (2) that the wage rates contained therein are not less than those established by the Board of Estimates as set forth in the contract;
- (3) that the classification set forth for each laborer, mechanic, or apprentice conforms with the work he performed; and
- (4) that the contractor and the subcontractor, as the case may be, has complied with the provisions of this subtitle.

(City Code, 1966, art. 1, §16(f)(2nd sen.) ; 1976/83, art. 1, §19(d)(2).) (Ord. 59-1960; Ord. 67-969; Ord. 73-348.)

U.S. Department of Labor
Wage and Hour Division

PAYROLL

(For Contractor's Optional Use; See Instructions at www.dol.gov/whd/forms/wh347instr.htm)

Persons are not required to respond to the collection of information unless it displays a currently valid OMB control number.



Rev. Dec. 2008

OMB No.: 1235-0008
Expires: 02/28/2018

NAME OF CONTRACTOR <input type="checkbox"/> OR SUBCONTRACTOR <input type="checkbox"/>		ADDRESS			PROJECT OR CONTRACT NO.	
PAYROLL NO.	FOR WEEK ENDING	PROJECT AND LOCATION			PROJECT OR CONTRACT NO.	

(1) NAME AND INDIVIDUAL IDENTIFYING NUMBER (e.g., LAST FOUR DIGITS OF SOCIAL SECURITY NUMBER) OF WORKER	(2) NO. OF WITHHOLDING EXEMPTIONS	(3) WORK CLASSIFICATION	(4) DAY AND DATE							(5) TOTAL HOURS	(6) RATE OF PAY	(7) GROSS AMOUNT EARNED	(8) DEDUCTIONS					(9) NET WAGES PAID FOR WEEK				
			O	T	U	R	S	A	S				F	I	C	A	W		I	T	O	T
HOURS WORKED EACH DAY										FICA	WITH- HOLDING TAX							OTHER				
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While completion of Form WH-347 is optional, it is mandatory for covered contractors and subcontractors performing work on Federally financed or assisted construction contracts to respond to the information collection contained in 29 C.F.R. §§ 3.3, 5.5(a). The Copeland Act (40 U.S.C. § 3145) contractors and subcontractors performing work on Federally financed or assisted construction contracts to "furnish weekly a statement with respect to the wages paid each employee during the preceding week." U.S. Department of Labor (DOL) regulations at 29 C.F.R. § 5.5(a)(3)(i) require contractors to submit weekly a copy of all payrolls to the Federal agency contracting for or financing the construction project, accompanied by a signed "Statement of Compliance" indicating that the payrolls are correct and complete and that each laborer or mechanic has been paid not less than the proper Davis-Bacon prevailing wage rate for the work performed. DOL and federal contracting agencies receiving this information review the information to determine that employees have received legally required wages and fringe benefits.

Public Burden Statement

We estimate that it will take an average of 55 minutes to complete this collection, including time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. If you have any comments regarding these estimates or any other aspect of this collection, including suggestions for reducing this burden, send them to the Administrator, Wage and Hour Division, U.S. Department of Labor, Room S3502, 200 Constitution Avenue, N.W. Washington, D.C. 20210

(over)

SUBTITLE 26A LABOR TRAFFICKING NOTICE REQUIREMENTS

This requirement went into effect on January 24, 2022.

Labor Trafficking - Notice Requirements For the purpose of requiring certain contractors with the City of Baltimore to place a notice regarding the human-trafficking prevention hotline in certain locations; providing that certain contractors may obtain the required human-trafficking notices from the United States Department of Homeland Security's Blue Campaign website; providing for certain penalties; and generally relating to labor trafficking notice requirements for city contractors.

Subtitle 26A is included hereunder;

SUBTITLE 26A
LABOR TRAFFICKING NOTICE REQUIREMENTS

§ 26A-1. Applicability.

The requirements of this subtitle apply to:

- (1) construction contracts, including:
 - (i) contracts in excess of \$5,000 made by the Board of Estimates, or on its behalf, with any person, firm, or corporation for the construction, reconstruction, erection, conversion, installation, alteration, repair, maintenance, renovation, razing, demolition, moving, removing, grading, paving, repaving, curbing, filling, excavation, or any other operation or work to be done or performed in, on, upon, or in connection with any building, bridge, viaduct, tunnel, tower, stack, or other structure, airport, land, highway, pier, wharf, sewer, drain, main, conduit, machinery, or mechanical, electrical, or other equipment;
 - (ii) each and every project approved by the Mayor and City Council on or after January 1, 2021, receiving funds from tax increment financing in excess of \$10,000,000 in the aggregate to the extent those funds are used in whole or in part for the construction, reconstruction, erection, conversion, installation, alteration, repair, maintenance, renovation, razing, demolition, moving, removing, grading, paving, repaving, curbing, filling, excavation, or any other operation or work to be done or performed in, on, upon, or in connection with any building, bridge, viaduct, tunnel, tower, stack, or other structure, airport, land, highway, pier, wharf, sewer, drain, main, conduit, machinery, or mechanical, electrical, or other equipment; and
- (2) service contracts, as defined in § 26-1(e) of this article.

(Ord. 22-10.)

§ 26A-2. Requirements.

- (1) The prime contractor must post a sign that states the following:

“LABOR TRAFFICKING 101

Labor trafficking includes recruiting, harboring, transporting, providing, or obtaining people for forced or coerced labor.

The coercion could be threats directed at the victim or someone else. Labor trafficking is often linked with exploitation of a worker. To learn more, visit www.mdhumantrafficking.org.

If a worker ...

- (1) lacks possession of their own identification and travel documents,

- (2) lives at their place of work and in isolated conditions,
- (3) experiences verbal or physical abuse from their employer or supervisor,
- (4) is made to work in unsafe conditions, prevented from taking adequate breaks, or forced to meet daily quotas

... they may be a victim of labor trafficking.

FOR IMMEDIATE ASSISTANCE
CALL THE NATIONAL HUMAN TRAFFICKING HOTLINE

+1 (888) 373-7888 OR TEXT “BeFREE” TO 233733”

(2) The sign must:

- (i) be at least 16 by 20 inches in size;
- (ii) contain the text required under subsection (1) of this section in English, Spanish, and any other languages required by the federal Voting Rights Act for voting materials in Baltimore City; and
- (iii) draw attention to the phone and text numbers of the National Human Trafficking Resource Center Hotline by showing the phone and text numbers in bold type.

(3) The prime contractor may meet the requirements of this section by creating their own signs using a font size of not less than 30 points for the hotline and text numbers and a font size of not less than 12 points for the body text, or using copies of the signs created and made available online by the United States Department of Homeland Security’s Blue Campaign website.

(Ord. 22-10.)

§ 26A-3. Sign location.

A copy of the labor trafficking sign required by § 26A-2 {“Requirements”} of this subtitle shall be posted by the contractor at the site of the work in a clear and conspicuous place where it can be easily seen and read by the workers. Example areas include break rooms, locker rooms, cafeterias, and other similar locations.

(Ord. 22-10.)

§ 26A-4. Penalties for failure to post signage.

(a) *In general.*

(1) *Prerequisite to citation.*

A citation under this section may only be issued after the issuance of a written warning and a failure to correct the violation within 30 days of the date of the warning.

(2) *Authorization to issue.*

In addition to any other civil or criminal remedy or enforcement procedure, this subtitle may be enforced by issuance of an environmental citation under City Code Article 1, Subtitle 40.

(b) *Process not exclusive.*

The issuance of a citation to enforce this subtitle does not preclude pursuing any other civil or criminal remedy or enforcement action authorized by law.

(c) *Each day a separate offense.*

Each day a violation continues is a separate offense.
(Ord. 22-10.)

SC-2 DEFINITIONS:

Supplement Standard Specification Section 00 23 00.01 as follows;

1. Design Project Manager - the representative of Department of General Services or the duly authorized representative.
2. Project Engineer – the representative of the Department of General Services, and whose authority is commensurate with that of the Engineer
3. Building Manager - the City's on-site manager of the building(s) involved in this contract.

SC-3 EQUAL OPPORTUNITY COMPLIANCE**Article 5 §29-15 Mandatory nondiscrimination contract clause:**

Contractor shall not discriminate on the basis of race, gender, religion, national origin, ethnicity, sexual orientation, gender identity or expression, age, or disability in the solicitation, selection, hiring, or treatment of subcontractors, vendors, suppliers, or commercial customers. Contractor shall provide equal opportunity for subcontractors to participate in all of its public sector and private sector subcontracting opportunities, provided that nothing contained in this clause shall prohibit or limit otherwise lawful efforts to remedy the effects of marketplace discrimination that has occurred or is occurring in the marketplace, such as those specified in Article 5, Subtitle 28 of the Baltimore City Code, as amended from time to time. Contractor understands and agrees that violation of this clause is a material breach of the contract and may result in contract termination, debarment, or other sanctions. This clause is not enforceable by or for the benefit of, and creates no obligation to, any third party.

Article 5 §29-16 Contractor bid requirements:

As part of its bid or proposal, Bidder shall provide to the City a list of all instances within the past 5 years where there has been a final adjudicated determination in a legal or administrative proceeding in the State of Maryland that the bidder has discriminated against its subcontractors, suppliers, vendors, or commercial customers on the basis of race, gender religion, national origin, ethnicity, sexual orientation, gender identity or expression, age or disability, and a description of any resulting sanction entered and remedial action taken.

Bidders may submit this document in a separate sealed envelope with the bid documents.

Article 5 §29-17 Contract disclosure requirement:

Upon the City's request, and only after filing a complaint against Contractor pursuant to Article 5, Subtitle 29, of the Baltimore City Code, as amended from time to time, Contractor agrees to provide the City within 60 calendar days, a truthful and complete list of the names of all subcontractors, vendors, and suppliers that Contractor has used in the past 4 years on any of its contracts that were undertaken within the Baltimore City Market Area as defined in Article 5, §28-1(d) of the Baltimore City Code, as amended from time to time, including the total dollar amount paid by Contractor for each subcontract or supply contract. Contractor agrees to fully cooperate in any investigation conducted by the City pursuant to the City's Commercial Non - Discrimination Policy, as contained in Article 5, Subtitle 29, of the Baltimore City Code as amended from time to time. Contractor understands and agrees that violation of this clause is a

material breach of the contract and may result in contract termination, debarment, and other sanctions. Contractor shall not discriminate on the basis of race, gender, religion, national origin, ethnicity, sexual orientation, gender identity or expression, age, or disability in the solicitation, selection, hiring, or treatment of subcontractors, vendors, suppliers, or commercial customers. Contractor shall provide equal opportunity for subcontractors to participate in all of its public sector and private sector subcontracting opportunities, provided that nothing contained in this clause shall prohibit or limit otherwise lawful efforts to remedy the effects of marketplace discrimination that has occurred or is occurring in the marketplace, such as those specified in Article 5, Subtitle 28 of the Baltimore City Code, as amended from time to time. Contractor understands and agrees that violation of this clause is a material breach of the contract and may result in contract termination, debarment, or other sanctions. This clause is not enforceable by or for the benefit of and creates no obligation to, any third party.

SC-4 PAYMENTS TO THE CITY

Any payments to the Mayor and City Council or any of its Departments, Agencies, Board or Commissions due under the terms of this Agreement or arising incident thereto, shall be made to the Director of Finance and be mailed or delivered to:

Director of Finance
Abel Wolman Municipal Building
200 Holliday St., Room One
Baltimore, Maryland 21202

SC-5 CONTRACTOR TO EXECUTE REQUIRED DOCUMENTS AND START WORK PROMPTLY

~~DELETE~~ Standard Specification Section 00 51 00.07 CONTRACTOR TO EXECUTE REQUIRED DOCUMENTS AND START WORK PROMPTLY and

REPLACE it with the following:

The successful Bidder shall promptly execute and submit a formal Contract, all subcontract agreements in accordance with Article 5 Subtitle 28 of the Baltimore City Code, any and all contract documents specified in an Award Letter, the required Bonds, and all insurance policies or certified copies thereof issued in favor of the Mayor and City Council of Baltimore, as provided in the Special Provisions, all of which shall be subject to the approval of the City Solicitor as to form, terms and conditions. Failure to comply with these requirements within thirty (30) calendar days after the Award shall be just cause for the annulment of the Award. It is understood and agreed that in the event of annulment of the Award, the Board of Estimates may require the Bidder to forfeit, to the use of the City, the amount of the certified check deposited with its Proposal, not as penalty, but as liquidated damages. As an alternative remedy, the City may elect to start the running of contract time (without allowing the Contractor to start work) or to pursue any other remedy allowed to the City under the law or equity.

SC-6 NOISY WORK

SUPPLEMENT Standard Specification Section 01 14 23 as follows:

Work creating excessive noise (jack hammering, demolition, etc.) in or near occupied areas is prohibited after 7:00 PM or before 9:00 AM, and must be coordinated with the Building Manager

and Project Engineer, and performed at times which do not unduly disturb the building's occupants or surrounding occupied areas; and at no additional cost to the City.

SC-7 MAINTENANCE OF TRAFFIC

SUPPLEMENT Standard Specification Section 01 55 26 with the following:

If violations to Maintenance of Traffic restrictions are not remedied/corrected within twelve (12) hours from the documented notice being given to the Contractor, an appropriate deduction will be made from the Contractor's next Progress Estimate. The deduction will be equal to the daily pro rata share of the Schedule of Values price bid for Maintenance of Traffic, which is determined by the lump sum price bid for Maintenance of Traffic divided by the number of days in the contract, or \$200.00 per day, whichever is more, for each day or portion thereof that the deficiencies exist and will continue until the deficiencies are satisfactorily corrected and accepted by the Project Engineer. The amount of money deducted will be a permanent deduction from the Contract and will not be recoverable. Upon satisfactory correction of the deficiencies, payment of the Maintenance of Traffic Schedule of Values item will resume.

SC-8 OVERTIME REIMBURSEMENT

DELETE Paragraph "C." of the Standard Specification Section 00 73 18 CONTRACTOR'S EXPENSE and

REPLACE it with the following:

- C. The Contractor shall reimburse the City for inspection and all other services required when and if, the Contractor chooses to work in excess of the normal eight (8) hour workday, forty (40) hour work week, weekends, or on a City holiday. The amount due the City shall be deducted from the Contractor's monthly pay estimate at the hourly rate of one hundred fifty dollars (\$150.00). The rate specified is per inspector and/or Building Manager on the project while the overtime work is ongoing. The Contractor should assume that, if one (1) to two (2) crews are working, at least one (1) inspector will be on site. If three (3) to five (5) crews are working, at least two (2) inspectors will be on site. If more than five (5) crews are working, at least three (3) inspectors will be on site. This overtime reimbursement shall not apply to overtime work done at the City's request due to no fault of Contractor.

SC-9 PROJECT IDENTIFICATION:

SUPPLEMENT Standard Specification Section 01 58 00 PROJECT IDENTIFICATION as follows:

The Contractor shall furnish, install, and maintain project signs using the design shown below and at a location as directed by the Engineer.

The Contractor shall update the completion date on the project signs quarterly until substantial completion.




Work In Progress

Mayor Brandon M. Scott



Better Schools. Safer Streets. Stronger Neighborhoods.

DEPARTMENT OF GENERAL SERVICES
PROJECT NAME (ALL CAPS)
 informational phone #
 completion date

SC-10 CONTRACTOR PHOTO IDENTIFICATION

The Contractor shall provide a photograph identification badge for each member of his workforce. Each individual shall display the identification badge before entering the project site and as requested during their presence on the project site. The identification badge shall include the individual's photograph, name, organization, and the contract number. Contractor's workforce shall include, but is not limited to, subcontractors, suppliers, manufacturers' representatives, testing agencies, etc. The Contractor shall furnish a photocopy of an individual's identification badge to the Engineer prior to the individual's beginning work at the site. In those instances where the duration of an individual's on-site visit is to be very limited, the Contractor will issue a temporary, non-photo, identification card. The individual may not enter the site until the temporary, non-photo, identification card is issued.

SC-11 CONTRACTOR WORK HOURS

SUPPLEMENT Standard Specifications Section 01 14 18 GENERAL WORK HOURS as follows:

Except otherwise Specified in the Special Provisions or other Contract Documents, or directed by the Engineer, the regular eight (8) hour working day shall begin no earlier than 7:00 A.M. and end no later than 5:00 P.M. Any other working hours must be coordinated with the Engineer and the Building Manager.

SC-12 SUNDAY AND HOLIDAY WORK

DELETE from Paragraph “A.” of Section 01 14 21 SUNDAY AND HOLIDAY WORK of the Standard Specification the word “SUNDAY”, and

SUBSTITUTE the words “SATURDAY AND SUNDAY”.

ADD to Paragraph “B.” of Section 01 14 21 SUNDAY AND HOLIDAY WORK of the Standard Specifications the following holidays:

Martin Luther King, Jr. Birthday, Presidents Day, Good Friday, Columbus Day, Veterans Day, and any other holidays or City non-work days as indicated by the Baltimore City Labor Commissioner at <http://labor-commissioner.baltimorecity.gov/official-city-holidays>.

SC-13 WARRANTIES

DELETE Paragraph A of Standard Specification Section 01 78 36 WARRANTIES

REPLACE it with:

“The Contractor warrants and guarantees to the City all the improvements made for a period of two (2) years after the date of acceptance or occupancy by the City”.

SC-14 PROGRESS MEETING DUTIES

The Contractor shall employ and provide a clerk, satisfactory to the Engineer, who shall be available at all times to record minutes of all meetings and send sufficient copies of minutes of the meetings to all interested parties or as directed by the Engineer.

SC-15 ENGINEER’S OFFICE

An ENGINEER’S OFFICE will be required as per Section 13 22 00 of the City of Baltimore, Department of Public Works – Specifications – Materials, Highways, Bridges, Utilities, and Incidental Structures 2006.

SUPPLEMENT section 13 22 00 as follows:

PART 1 GENERAL

DESCRIPTION

This Work shall consist of furnishing, cleaning and maintaining in good condition an Engineer’s office at a location within the immediate vicinity of the project and approved by the Engineer. The Engineer’s office shall be separated from any offices used by the Contractor and it and all items therein shall be for the exclusive use of the City’s Engineers and Inspectors. Rented properties that conform to the type of office specified in the Contract Documents will be acceptable.

PART 2 PRODUCTS

2.1 MATERIALS

Not applicable.

PART 3 EXECUTION

3.1 GENERAL

- The office shall be set up, equipped and made ready for use a minimum of five (5) days prior to commencement of any Work on the project and shall remain until all field records have been completed. Upon removal, the location shall be restored and left in a condition acceptable to the Engineer.
- Unless otherwise specified, the Engineer's office and all equipment and accessories furnished by the Contractor shall become the property of the Contractor at the completion of the project.

3.2 MOBILE HOUSING UNIT

Not Applicable

3.3 HANDICAP ACCESSIBILITY

When handicap accessibility is necessary, it shall comply with the Federal Americans with Disability Act (ADA) Accessibility Guidelines for Buildings and Facilities.

3.4 MOBILE OFFICE TRAILERS

Office trailers shall be anchored in conformance with the manufacturer's recommendations. Office trailers defined under the Industrial Building and Mobile Act of Maryland shall be approved by the Maryland Department of Housing and Community Development and bear the Maryland Certification Insignia. The Insignia shall be located in the interior of the office.

3.5 CONSTRUCTION REQUIREMENTS FOR ALL OFFICES

- The Contractor shall provide a mobile office trailer that is entirely enclosed, waterproofed and completely insulated to a minimum R11 rating. Satisfactory heating and cooling shall be provided.
- Double thick floor with building paper placed on top of the lower floor.
- Finished inside and outside as approved by the Engineer.
- The building shall have a minimum ceiling height of seven feet (7') and have a pitched roof with a ventilating louver in each gable.

- A four foot by one foot (4' X 1') minimum sign with the message "ENGINEER'S OFFICE – BALTIMORE CITY" shall be attached to or mounted in front of the office. The sign shall have a black background with minimum three inch (3") height white lettering. It shall have a one inch (1") wide white border around the entire sign.
- A five inch by seven inch (5" X 7") minimum no smoking sign shall be posted on the outside of each entrance to the office, plant laboratory and mobile housing unit.
- Interior and exterior doors shall be equipped with different key locks. Interior doors shall be keyed alike and exterior doors shall be keyed alike. Exterior doors shall have an additional dead bolt lock. The Contractor shall provide the Engineer four (4) keys for the interior and exterior locks.
- Windows shall be capable of being opened and closed and be equipped with latches and screens. Each window shall have venetian blinds or shades.
- Electrical service shall conform to national and State electrical codes with satisfactory artificial lighting and lighting services. The minimum illumination level shall be seventy-five (75) foot-candles.
- Equipment shall be provided to enable heating the office to at least seventy-eight degrees (78°) F and cooling to at least seventy-eight degrees (78°) F.
- The restroom facility shall include washbasin, water closet, soap holder, paper towel holder and mirror, (Toilet paper and paper towels available at all times). It shall be connected to water and sewage or a well and septic system. A pressurized water system capable of maintaining a minimum pressure of twenty (20) psi shall be provided. These facilities shall conform to the State Department of Health and Mental Hygiene or other authorities having jurisdiction.
- The Contractor shall maintain the Engineer's facilities in a clean and sanitary condition and have the trash removed daily. Floors shall be swept daily and damp mopped and waxed biweekly. The interior and exterior of all windows shall be cleaned monthly. Additionally, this Work shall be performed on an as needed basis when requested by the Engineer.
- Fire extinguishers shall be dry chemical, multi-purpose ABC type (minimum ten (10) lb), equipped with a visual air pressure gauge. They shall be maintained in conformance with OSHA safety and health standards.
- A twenty-four (24) unit first aid kit shall be furnished and maintained as described in the Federal Regulations.
- Emergency telephone numbers shall be conspicuously posted in the office.
- A waterproof bulletin board, minimum four feet by eight feet (4' X 8'), shall be installed within the limits of the project in an easily accessible area and shall be conspicuously displayed to all

employees. The Contractor shall post all pertinent and required notices and shall maintain it for the duration of the project.

- One (1) sanitary type electric water cooler including bottled water and disposable cups shall be provided with cold/hot water taps. The Contractor shall replenish water supply as needed throughout the project.
- One (1), Four (4) cu.ft. Electric refrigerator shall be provided.
- One (1), microwave 1000 w
- One (1) modern Wi-Fi/Bluetooth desktop printer/scanner/copier.
- Furnish as needed 8-1/2"x 11" paper and ink for the above stated Wi-Fi/Bluetooth desktop printer/scanner/copier throughout the project.
- Internet Access: Wi-Fi Internet access approved by the Project Engineer.
- One (1) Drafting Table.
- One (1) stool for Drafting Table.
- One (1) Coat rack.
- Four (2) Office desks.
- One (1) 8' long folding table.
- Four (4) cushioned office chairs.
- Four (4) power strips.

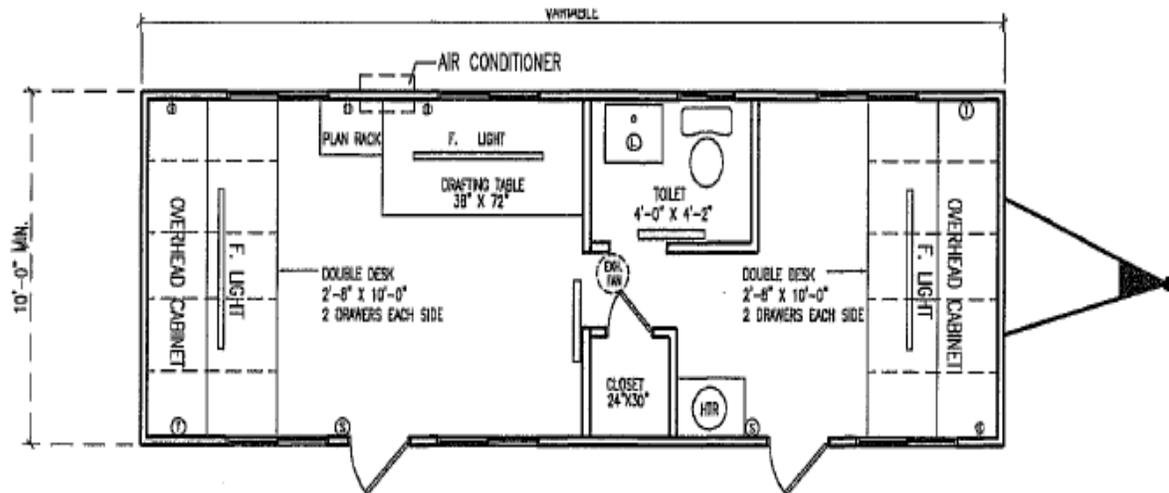
3.8 SPECIFIC FIELD OFFICE REQUIREMENTS

Type 2 Engineer's Office — Standard office trailer see end of Document.

PART 4 MEASUREMENTS AND PAYMENT

Engineer's office cost will be incorporated in the General Conditions cost and will be paid on a monthly basis.

TRAILER 2



Notes:

In addition to the equipment indicated above, air conditioning will be required. The cost of which is to be included in the Lump Sum Bid Price of the office. The system must be capable of maintaining a temperature of eighty degrees (80°) F dry bulb and approximately fifty percent (50%) relative humidity in the conditioned area when outside temperatures are ninety-five degrees (95°) F dry bulb and seventy-eight degrees (78°) F wet bulb. At least one (1) unit will be required for each of the two (2) compartments.

Dimensions for the trailer length may be varied so that when multiplied by the width, a minimum required square footage is provided.

The requirements for the trailer may be modified by the Engineer.

Furnishings, Fixtures, and equipment must have the approval of the Engineer prior to installation.

SC-16 BUILDER'S RISK

Supplement Standard Specification Section 00 73 16.01 as follows:

Contractor shall have and maintain during the life of the Contract such Property Insurance upon the Contractor's entire work at the site up to the complete value thereof. This insurance shall protect the City, as its interest may appear in the work, and shall insure against the perils of fire and extended coverage, theft vandalism and malicious mischief. All Risk Insurance may not contain exclusions relating to flood, earthquake, mysterious disappearance, hail and terrorism.

If the Property Insurance contains a co-insurance provision, the Contractor shall be responsible for the amount of the insurance satisfying the co-insurance amount so as to make the co-

insurance clause inoperable. If not covered otherwise, the Contractor shall have and maintain during the life of the Contract similar Property Insurance on portions of the work stored off the site or in transit when such portions of the work are to be included in any payment.

SC-17 MATERIALS:

Supplement Standard Specification Section 01 45 14 as follows:

Materials and equipment shall be new, and shall be those of the manufacturers named in the specifications or of a quality, capacity, etc., approved as equal by the Project Engineer.

SC-18 REUSE AND RECYCLING OF SELECTED MATERIALS

The contractor shall include the processing of certain materials to be recycled and/or reused as noted in the Contract Documents.

It is the intention of the City to recycle as much of the materials resulting from New Construction, Restoration, Stabilization and Demolition projects as feasible. The Contractor, therefore, shall be required to source separate certain materials that have recycling potential. These items include but are not limited to: structural steel, concrete, bricks (excluding refractory type), lumber, plaster, plasterboard, insulation cement, roofing materials, floor and wall tiles, pipes, wires and other items physically attached to the structure, including appliances.

MATERIALS MANAGEMENT REPORTING: At each Project Progress Meeting the contractor shall provide spreadsheet (one electronic and one hardcopy) inventory of the following:

- The material type,
- The number of truckloads and/or containers,
- Their overall individual vehicle daily volumes hauled, and
- Individual vehicles “net” payload weights, of all materials intended to be reused, recycled and /or disposed.

DATE						
	Material Type	Unit of Measure	# of Units	Total Weight of Day's Material	Total Volume of Day's Material	End Use: Reused / Recycled / Disposed
1						
2						
3						
4						
5						
6						

7						
8						
9						

SC-19 TERMINATION FOR CONVENIENCE OF THE CITY

- A. Performance of work under this Contract may be terminated by the City in accordance with this clause, in whole or in part, whenever the City shall determine that such termination is in the best interest of the City. Any such termination shall be effected by delivery to the Contractor of a written Notice of Termination specifying the extent to which performance of work is terminated and the effective date of termination.

- B. After receipt of a Notice of Termination, and except as otherwise directed by the Engineer, the Contractor shall:
 - 1. Stop work under the Contract on the date and to the extent specified in the Notice of Termination;
 - 2. Place no further orders or subcontracts for materials, services or facilities, except as may be necessary for completion of the portion of the work under the Contract as is not terminated;
 - 3. Terminate all orders and subcontracts to the extent that they relate to the work terminated by the Notice of Termination;
 - 4. Assign to the City, in the manner, at times, and to the extent directed by the Engineer, all of the right, title, and interest of the Contractor under the orders and subcontracts so terminated, in which case the City shall have the right, in its discretion, to settle or pay any or all claims arising out of the termination of such orders and subcontracts;
 - 5. Settle all outstanding liabilities and all claims arising out of such termination of orders and subcontracts, with the approval or ratification of the Engineer, to the extent he may require, which approval or ratification shall be final for all the purposes of this clause;
 - 6. Transfer title and deliver to the City, in the manner, at the times, and to the extent, if any, directed by the Engineer, fabricated or unfabricated parts, work in process, completed work, supplies, and other material produced as a part of, or acquired in connection with the performance of the work terminated by the Notice of Termination, and/or completed or partially completed plans, drawings, information, and other property which, if the Contract had been completed, would have been required to be furnished to the City;

7. Use its best efforts to sell, in the manner, at the times, to the extent, and at the price or prices directed or authorized by the Engineer, any property of the types referred to in (6) above. The Contractor will not be required to extend credit to any purchaser, and may acquire any such property under the conditions prescribed by and at a price or prices approved by the Engineer; provided further that the proceeds of any such transfer or disposition shall be applied in reduction of any payments to be made by the City to the Contractor under this contract or shall otherwise be credited to the price or cost of the work covered by this contract or paid in such other manner as the Engineer may direct;
 8. Complete performance of any part of the work that has not been terminated by the Notice of Termination; and
 9. Take any action that may be necessary, or as the Engineer may direct, for the protection and preservation of the property related to this Contract which is in the possession of the Contractor and in which the City has or may acquire an interest.
 10. Submit to the Engineer a list, certified as to quantity and quality, of any or all items of termination inventory not previously disposed of, exclusive of those items for which the disposition has been directed or authorized by the Engineer. The Contractor may request the City to remove such items or enter into a storage agreement covering them. Not later than fifteen (15) days thereafter, the City shall accept title to these items and remove them or enter into a storage agreement covering the same; provided, that the list submitted shall be subject to verification by the Engineer upon removal of the items, or if the items are stored, within forty-five (45) days from the date of submission of the list. Any correction to this list shall be made prior to final settlement.
- C. After receipt of a Notice of Termination, the Contractor shall submit to the Engineer its termination claim, in the form and with certification prescribed by the Engineer. This claim shall be submitted promptly but in no event later than six (6) months from the effective date of termination, unless one or more extensions in writing are granted by the Engineer upon request of the Contractor made in writing within the six-month period or authorized extension thereof. However, if the Engineer determines that the facts justify such action, he may receive and act upon any such termination claim at any time after the six-month period or any extension thereof. Upon failure of the Contractor to submit his termination claim within the time allowed, the Engineer may determine, on the basis of information available to him, the amount, if any, due to the Contractor by reason of the termination and shall thereupon pay to the Contractor the amount so determined.
- D. Subject to the provisions of paragraph (C), the Contractor and the Engineer may agree upon the whole or any part of the amount or amounts to be paid to the Contractor by reason of the total or partial termination of work pursuant to this clause, which amount or amounts

may include a reasonable allowance for profit on work done; provided, that such agreed amount or amounts, exclusive of settlement costs, shall not exceed the total contract price as reduced by the amount of payments otherwise made and as further reduced by the contract price of work not terminated. The Contract shall be amended accordingly, and the Contractor shall be paid the agreed amount. Nothing in paragraph (E) of this clause, prescribing the amount to be paid to the Contractor in the event of failure of the Contractor and the Engineer to agree upon the whole amount to be paid to the Contractor by reason of the termination of work pursuant to this clause, shall be deemed to limit, restrict, or otherwise determine or affect the amount or amounts that may be agreed upon to be paid to the Contractor pursuant to this paragraph.

- E. In the event of the failure of the Contractor and the Engineer to agree as provided in paragraph (D) upon the whole amount to be paid to the Contractor by reason of the termination of work pursuant to this clause, the Engineer shall pay to the Contractor the amounts determined by the Engineer as follows, but without duplication of any amounts agreed upon in accordance with paragraph (D):
1. With respect to all contract work performed before the effective date of the Notice of Termination, the total (without duplication of any items) of:
 - i. the cost of the work;
 - ii. the cost of settling and paying claims arising out of the termination of work under subcontracts or orders, as provided in paragraph (B)(5) above, exclusive of amounts paid or payable on account of supplies or materials delivered or services furnished by subcontractors or vendors before the effective date of the Notice of Termination, which amounts shall be included in the costs payable under (i) above; and
 - iii. a sum, as profit on (i) above, determined by the Engineer to be fair and reasonable; provided, however, that if it appears that the Contractor would have sustained a loss on the entire Contract had it been completed, no profit shall be included or allowed under this subdivision (iii) and an appropriate adjustment shall be made reducing the amount of the settlement to reflect the indicated rate of loss; and
 2. The reasonable cost of the preservation and protection of property, incurred pursuant to paragraph B(8) above, and any other reasonable cost incidental to termination of the work under this Contract, including expenses incidental to the determination of the amount due to the Contractor as the result of the termination of the work under the Contract.
 3. The total sum to be paid to the Contractor under (1) of this paragraph shall not exceed the total contract price as reduced by the amount of

payments otherwise made and as further reduced by the contract price of work not terminated. Except for normal spoilage, and except to the extent that the City shall have otherwise expressly assumed the risk of loss, there shall be excluded from the amounts payable to the Contractor as provided in (E)(1) above, the fair value, as determined by the Engineer, of property that is destroyed, lost, stolen, or damaged so as to become undeliverable to the City or to a buyer pursuant to paragraph B(7).

- F. Costs claimed, agreed to, shall be in accordance with all applicable City, State and local laws, regulations and ordinances.

- G. The Contractor shall have the right of appeal, under the clause of the Specifications entitled "Disputes," from any determination made by the Engineer unless the Contractor has failed to submit his claim within the time provided herein and has failed to request and receive a written extension of time in which to submit his claim. In any case where the Engineer has made a determination of the amount due to the Contractor, the City shall pay to the Contractor the following:
 - 1. if there is no right of appeal hereunder or if no timely appeal has been taken, the amount so determined by the Engineer, or
 - 2. if an appeal has been taken, the amount finally determined on such appeal.

- H. In arriving at the amount due the Contractor under this clause there shall be deducted
 - 1. all unliquidated advances or other payments made to the Contractor, applicable to the terminated portion of this contract,
 - 2. any claim that the City may have against the Contractor in connection with this contract, and
 - 3. the agreed price for, or the proceeds of sale of, any materials, supplies, or other things acquired by the Contractor or sold, pursuant to the provisions of this clause, and not otherwise recovered by or credited to the City.

- I. If the termination hereunder is partial, the Contractor may file with the Engineer a claim for an equitable adjustment of the price or prices specified in the contract relating to the continued portion of the contract (the portion not terminated by the Notice of Termination), and such equitable adjustment as may be agreed upon shall be made in such price or prices. Any claim by the Contractor for an equitable adjustment under this clause shall be asserted within ninety (90) days from the effective date of the termination notice, unless an extension is granted in writing by the Engineer.

- J. The City may from time to time, under such terms and conditions as it may prescribe, make partial payments and payments on account against costs incurred by the Contractor in connection with the terminated portion of this contract whenever in the opinion of the Engineer the aggregate of such payments shall be within the amount to which the Contractor shall be entitled hereunder.
- K. Unless otherwise provided for in this Contract, or by applicable statute, the Contractor shall, from the effective date of termination until the expiration of three years after final settlement under this contract, preserve and make available to the City at all reasonable times at the office of the Contractor but without direct charge to the City, all books, records, documents and other evidence bearing on the costs and expenses of the Contractor under this contract and relating to the work terminated hereunder, or, to the extent approved by the Engineer, reproductions thereof.

SC-20 PROJECT MANAGEMENT SOFTWARE

The Contractor shall provide a schedule of deliverables utilizing Professional Project Management software approved by the Engineer. This schedule shall reflect the anticipated activities, time frames, and in work days for the activities listed. Also, the contractor is expected to utilize "Unifier" for submittals, RFIs, invoicing and any other reports and documents as required and directed by the Engineer. The City will provide the license and Training material for Unifier as required.

SC-21 TEMPORARY TOILET ROOM FACILITIES

Contractor to Provide and maintain temporary toilet room facilities and enclosures.

SC-22 PROJECT SUPERVISION BY THE CONTRACTOR

The Contractor shall have a Superintendent on the premises during all phases and operations of work. The Superintendent shall be English Speaking.

SC-23 MODIFICATION OF SCOPE

Contractors should be aware that the project is not limited to the scope as defined in these bid documents and that DGS reserves the right to modify the scope of work as necessary with a change order.

SECTION 00300

NOTE: NO INFORMATION OTHER THAN THAT INCLUDED IN OR ATTACHED TO THIS ORIGINAL BID DOCUMENT (WHERE SUCH ATTACHMENT IS PERMITTED) WILL BE USED IN DETERMINING AWARD.

ORIGINAL (NOT TO BE DETACHED)
NOTICE TO BIDDERS

CITY OF BALTIMORE
DEPARTMENT OF GENERAL SERVICES
CONTRACT NUMBER GS21802

THE COMPLETE (ORIGINAL)
CONTRACT BOOK AND
DUPLICATE OF BID OR
PROPOSAL MUST BE
INCLUDED IN THE
BID ENVELOPE

BID OR PROPOSAL

A. BID PRICES

Proposal of _____

Address _____

Made this _____ day of _____ 20_____

Bid Due **WEDNESDAY, JANUARY 18, 2023**

Certified Check or Bank Cashier’s Check or Bank Treasurer’s Check or Bid Bond: Equal to two percent (2%) of the Total Bid Submitted.

Completion Time: **365** consecutive calendar days

Liquidated Damages: **\$ 1,500.00** per consecutive calendar day

To the Board of Estimates of Baltimore City:

_____ propose to furnish all necessary labor and materials, tools, implements, tackle, equipment and machinery, and to construct and complete the **GS 21802 – BALTIMORE CONVENTION CENTER ELEVATOR REPLACEMENT** at 1 W. Pratt St, Maryland, all in strict accordance with the attached contract documents, at and for the lump sum base bid price of:

A. Base Bid:

_____ (\$ _____)
Written Words Numerical

Proposals will be evaluated based on the Base bid price.

The foregoing price is to include and cover the furnishing of all materials and labor requisite and proper, and the providing of all necessary machinery, tools' apparatus, and means for performing the work and the doing as set forth and described in the Contract Documents.

ALTERNATES

3.1 SCHEDULE OF ALTERNATES

1. Add Alternate No.1: Elevator No.4, All associated work in the elevator machine room and associated sump pump.

_____ \$ _____
Written Words Numerical

2. Add Alternate No.2: Elevator No.6, all associated work in the elevator machine room and associated sump pump.

_____ \$ _____
Written Words Numerical

3. Add Alternate No.3: VVVF Emergency Return/Auxiliary Power System (New) Elevator No.5, Specification Section 142113.

_____ \$ _____
Written Words Numerical

4. Add Alternate No.4: VVVF Emergency Return/Auxiliary Power System (New) Elevator No.4, Specification Section 142143.

_____ \$ _____
Written Words Numerical

End of Schedule of Alternates

B. BIDDER'S REPRESENTATION

The undersigned bidder certifies that (he/she) has thoroughly examined the site on which the work is to be done, and is thoroughly conversant with all the work called for on the drawings and in all the specifications and with all the requirements necessary and existing to properly execute the work in its entirety; that all allowances have been made for contingencies, etc., for the through, prompt and intelligent execution and completion of the work, within the time required.

C. RECEIPT OF ADDENDA:

The Bidder acknowledges receipt of the following Addenda:

- Addendum No. _____ dated _____
- Addendum No. _____ dated _____
- Addendum No. _____ dated _____
- Addendum No. _____ dated _____

Signature and Title

The foregoing price is to include and cover the furnishing of all materials and labor requisite and proper, and the providing of all necessary machinery, tools, apparatus and means for performing the work and the doing of all the above mentioned work as set forth and described in the Contract Documents.

Note: Each and every person Bidding and Named above must sign here.

In case of Firms, give the first and last name of each member, in full, with Title.

In case a Bid shall be submitted by or in behalf of any Corporation, it must be signed in the name of such Corporation by some authorized Officer or Agent, thereof, who shall also subscribe his Name and Title. If practicable, the Seal of the Corporation shall be affixed.

In case a Bid shall be submitted by joint venture ("JV"), the document that established the JV must be submitted with the bid for verification purposes, and Officers or Agents of all of the firms that are part of the Joint Venture must sign below as acknowledgement of their participation in this bid.

WITNESS _____ (SIGNED) _____

(TITLE) _____

WITNESS _____ (SIGNED) _____

(TITLE) _____

WITNESS _____ (SIGNED) _____

(TITLE) _____

D. ALTERNATE PRICES:

Attention is directed to the Contract and General Conditions for the Construction, and Division, and Subdivisions which are hereby made a part of the Alternate Prices and which shall apply as fully as if repeated herein.

Consult the drawings and the applicable portions of the Specifications for location and extent. All work shall be subject to all stipulation as set forth in the individual sections of the specifications for the work involved as fully as if repeated herein.

In as much possible, the work that comprises the alternates is defined on the drawings and labeled accordingly. For special conditions that occur between the Base Bid and an Alternate, or between different Alternates, hereinafter described. Should a clarification of intent regarding what is included in a particular Alternate be required, it shall be requested of the DGS Project Engineer in a timely manner prior to receipt of Bids, but in no event later than the date for submission of bid RFIs, otherwise it shall be understood that the Contractor will complete all work covered by the Base Bid and whatever Alternates that are accepted plus whatever coordination or permanent or temporary work that is required to effectively and satisfactorily terminate incomplete construction or service either at the point of juncture with the new work or where directed.

E. STANDARD UNIT PRICES:	
In all instances when the Engineer, with the approval of the Director, Department of General Services, orders extra work to be performed and/or orders alterations, changes, additions and/or omissions to be made in the work, in accordance with Paragraph 14 of the General Conditions of the Specifications, the unit prices set out in the following schedule shall prevail:	
A. Price per cubic yard for earth excavation in general; including disposal of the excavated material either on or off the site, and/or placing the excavated material in compacted fill, as directed by the Engineer	\$20.00
B. Price per cubic yard for pit and trench excavation, either hand or machine, in material other than rock; including all required pumping, sheeting, sheet piling, bracing and shoring; compacted backfill using the excavated material and disposal of all surplus excavated material either on or off site as directed by the Engineer.	\$47.50
C. Price per cubic yard of pit and trench excavations in rock; including all required blasting, drilling, hand tool wedging, pumping, bracing, shoring, compacted backfill using approved material available on the site, and disposal of all excavated rock either on or off the site, as directed by the Engineer.	\$140.00
D. Concrete Material and Installation	
1. Concrete material costs for the actual amount of additional concrete placed will be paid for at the per-yard amount shown on the supplier's invoice plus an additional 10% to cover all overhead and profit for the same.	
2. Installation costs per cubic yard of concrete in place will be paid as follows:	
a. Placement of footings, pedestals, grade beams, and pile caps, including curing but excluding forms and reinforcing	\$45.00
b. Placement of walls and columns placed at elevations not higher than 5 feet above grade, including curing and finishing of vertical services, but excluding forms and reinforcing	\$35.00
E. Price per pound of reinforcing steel place including all required accessories, bracing, shores and stripping	\$.76
F. Price per square foot of concrete contact area for forms in place, including all required accessories, bracing, shores and stripping	
1. Footings, grade beams and pile caps	\$4.15
2. Walls, columns and other vertical surfaces not higher than 5 feet above grade including steel column encasement.	\$6.10
G. Price per square foot of masonry foundation walls, including horizontal steel reinforcing for specified foundation walls in place.	
For 4" thick walls	\$4.80
For 8" thick walls	\$6.75
For 10" thick walls	\$8.50
For 12" thick walls	\$10.40
For 16" thick walls	\$13.00
All unit prices shall apply equally to both additions and/or deductions, and include all costs of and permitted percentages for, overhead, profit, taxes, Workmen's Compensation Insurance, Public Liability Insurance, Health and Welfare Payment, Social Security Taxes, Unemployment Compensation, etc. If a change involves an omission and no extra work, the Contractor shall receive a sum not in excess of 5% of the unit price for overhead.	

The definition of rock, as listed under Item C. shall be as follows:

Any material, which cannot be removed by methods other than drilling, wedging and/or blasting, shall be termed rock excavation. All other excavations shall be termed earth excavation. Should boulders be encountered, those in size up to ½ cubic yard shall be termed earth excavation.

F. BID/PROPOSAL AFFIDAVIT

INSTRUCTIONS: The following Bid/Proposal Affidavit is a material and integral part of this Bid. Each Bidder shall read it carefully and enter all information required therein prior to executing it before a Notary Public. Failure to properly complete and execute this Bid/Proposal Affidavit MAY cause your bid to be found non-responsive and it may be rejected by the Board of Estimates.

1. AUTHORIZED REPRESENTATIVE

I HEREBY AFFIRM THAT:

I am the (title) _____ and the duly authorized representative of (business name) _____ and that I possess the legal authority to make this Affidavit on behalf of myself and the business for which I am acting.

2. AFFIRMATION REGARDING BRIBERY CONVICTIONS

I FURTHER AFFIRM THAT:

Neither I, nor to the best of my knowledge, information, and belief, the above business (as is defined in Section 16-101(b) of the State Finance and Procurement Article of the Annotated Code of Maryland), or any of its officers, directors, partners, controlling stockholders, or any of its employees directly involved in the business's contracting activities including obtaining or performing contracts with public bodies has been convicted of, or has had probation before judgment imposed pursuant to Criminal Procedure Article, §6-220, Annotated Code of Maryland, or has pleaded nolo contendere to a charge of, bribery, attempted bribery, or conspiracy to bribe in violation of Maryland law, or of the law of any other state or federal law, **except** as follows (indicate the reasons why the affirmation cannot be given and list any conviction, plea, or imposition of probation before judgment with the date, court, official or administrative body, the sentence or disposition, the name(s) of person(s) involved, and their current positions and responsibilities with the business):

3. AFFIRMATION REGARDING OTHER CONVICTIONS

I FURTHER AFFIRM THAT:

Neither I, nor to the best of my knowledge, information, and belief, the above business, or any of its officers, directors, partners, controlling stockholders, or any of its employees directly involved in the business's contracting activities including obtaining or performing contracts with public bodies, has:

(1) Been convicted under state or federal statute of:

(a) A criminal offense incident to obtaining, attempting to obtain, or performing a public or private contract; or

(b) Fraud, embezzlement, theft, forgery, false pretenses, falsification or destruction of records or receiving stolen property;

(2) Been convicted of any criminal violation of a state or federal antitrust statute;

(3) Been convicted under the provisions of Title 18 of the United States Code for violation of the Racketeer Influenced and Corrupt Organization Act, 18 U.S.C. §1961 et seq., or the Mail Fraud Act, 18 U.S.C. §1341 et seq., for acts in connection with the submission of bids or proposals for a public or private contract;

(4) Been convicted of a violation of the State Minority Business Enterprise Law, §14-308 of the State Finance and Procurement Article of the Annotated Code of Maryland;

(5) Been convicted of a violation of the City of Baltimore's Minority and Women's and Business Enterprises Law, Baltimore City Code, Article 5, Subtitle 28;

(6) Been convicted of conspiracy to commit any act or omission that would constitute grounds for conviction or liability under any law or statute described in subsections (1)—(5) above;

(7) Been found civilly liable under a state or federal antitrust statute for acts or omissions in connection with the submission of bids or proposals for a public or private contract; or

(8) Admitted in writing or under oath, during the course of an official investigation or other proceedings, acts or omissions that would constitute grounds for conviction or liability under any law or statute described in §§B and C(1)—(7) above, **except** as follows (indicate reasons why the affirmations cannot be given, and list any conviction, plea, or imposition of probation before judgment with the date, court, official or administrative body, the sentence or disposition, the name(s) of the person(s) involved and their current positions and responsibilities with the business, and the status of any debarment):

4. AFFIRMATION REGARDING DEBARMENT

I FURTHER AFFIRM THAT:

Neither I, nor to the best of my knowledge, information, and belief, the above business, or any of its officers, directors, partners, controlling stockholders, or any of its employees directly involved in the business's contracting activities, including obtaining or performing contracts with public bodies, has ever been suspended or debarred (including being issued a limited denial of participation) by any public entity, **except** as follows (list each debarment or suspension providing the dates of the suspension or debarment, the name of the public entity and the status

of the proceedings, the name(s) of the person(s) involved and their current positions and responsibilities with the business, the grounds of the debarment or suspension, and the details of each person's involvement in any activity that formed the grounds of the debarment or suspension).

5. AFFIRMATION REGARDING DEBARMENT OF RELATED ENTITIES

I FURTHER AFFIRM THAT:

(1) The business was not established and it does not operate in a manner designed to evade the application of or defeat the purpose of debarment pursuant to Sections 16-101, et seq., of the State Finance and Procurement Article of the Annotated Code of Maryland and/or Article 5, Subtitle 40, of the Baltimore City Code; and

(2) The business is not a successor, assignee, subsidiary, or affiliate of a suspended or debarred business, **except** as follows (you must indicate the reasons why the affirmations cannot be given without qualification):

6. AFFIRMATION REGARDING COLLUSION

I FURTHER AFFIRM THAT:

Neither I, nor to the best of my knowledge, information, and belief, the above business has:

(1) Agreed, conspired, connived, or colluded to produce a deceptive show of competition in the compilation of the accompanying bid or offer that is being submitted;

(2) In any manner, directly or indirectly, entered into any agreement of any kind to fix the bid price or price proposal of the bidder or offeror or of any competitor, or otherwise taken any action in restraint of free competitive bidding in connection with the contract for which the accompanying bid or offer is submitted.

7. POLITICAL CONTRIBUTION DISCLOSURE AFFIRMATION

I FURTHER AFFIRM THAT:

I am aware of, and the above business will comply with, Election Law Article, Title 14, Disclosure By Persons Doing Public Business, Annotated Code of Maryland, which requires that every person that enters into contracts, leases, or other agreements with the State of Maryland, including its agencies or a municipal corporation or a political subdivision of the State, during a calendar year in which the person receives in the aggregate \$100,000 or more shall file with the State Board of Elections a statement disclosing contributions in excess of \$500 made during the reporting period to a candidate for elective office in any primary or general election.

I am aware of, and the above business will comply with all applicable provisions of the Maryland Annotated Code, Election Law Article, §14-101 *et seq.*, “Disclosure By Persons Doing Public Business”, (“Election Law”). I hereby certify, in accordance with §14-107 of the Election Law, that the above business has filed the statement required under §14-104(b)(1) of the Election Law.

8. CERTIFICATION OF CORPORATION REGISTRATION AND TAX PAYMENT

I FURTHER AFFIRM THAT:

(1) The business named above is a (domestic ___) (foreign ___) corporation registered in accordance with the Corporations and Associations Article, Annotated Code of Maryland, and that it is in good standing and has filed all of its annual reports, together with filing fees, with the Maryland State Department of Assessments and Taxation.

(If not applicable, so state). _____

(2) Except as validly contested, the business has paid, or has arranged for payment of, all taxes due the City of Baltimore and the State of Maryland and has filed all required returns and reports with the Comptroller of the Treasury, the State Department of Assessments and Taxation, the Department of Labor, Licensing, and Regulation and the City of Baltimore, as applicable.

(3) If awarded the contract resulting from this Bid/Proposal, the business shall remain in full compliance with all requirements of this § 8 during the term, and any extensions thereof, of the said contract.

9. CONTINGENT FEES

I FURTHER AFFIRM THAT:

The business has not employed or retained any person, partnership, corporation, or other entity, other than a bona fide employee, bona fide agent, bona fide salesperson, or commercial selling agency working for the business, to solicit or secure the Contract, and that the business has not paid or agreed to pay any person, partnership, corporation, or other entity, other than a bona fide employee, bona fide agent, bona fide salesperson, or commercial selling agency, any fee or any other consideration contingent on the making of the Contract.

10. CERTIFICATION OF WORK CAPACITY AND PREQUALIFICATION CLASSIFICATIONS

I FURTHER AFFIRM THAT:

We hold Certificate No. _____ which expires on _____.

We have the Work Capacity to perform this contract as provided in the Standard Specifications and in accordance with the rules, regulations and requirements of the Baltimore City Contractors' Qualification Committee.

Furthermore, our current Certificate of Prequalification includes work Classifications covering Contract Items to a total of at least Fifty Percent (50%) of the Aggregate Amount Bid.

11. ACKNOWLEDGEMENT

I ACKNOWLEDGE THAT this Affidavit shall be included in my Bid/Proposal and that my failure to furnish it MAY be cause for my Bid/Proposal to be rejected. I further acknowledge that this Affidavit is subject to applicable laws of the United States, the State of Maryland and the City of Baltimore, both criminal and civil, and that nothing in this Affidavit or any contract resulting from the submission of this Bid/Proposal shall be construed to supersede, amend, modify or waive, on behalf of the City of Baltimore, the exercise of any statutory right or remedy conferred by the Constitution and the laws of Maryland and Baltimore City with respect to any misrepresentation made or any violation of the obligations, terms and covenants undertaken by the above business with respect to (1) this Affidavit, (2) the contract, and (3) other Affidavits comprising part of the contract.

I FURTHER ACKNOWLEDGE THAT if the business is awarded the contract resulting from this Bid/Proposal, this Affidavit shall become a material part of the contract and the business agrees that it shall remain in full compliance with all Affirmations contained herein during the term of the contract an any and all extensions thereto.

I DO SOLEMNLY DECLARE AND AFFIRM UNDER THE PENALTIES OF PERJURY THAT THE CONTENTS OF THIS AFFIDAVIT ARE TRUE AND CORRECT TO THE BEST OF MY KNOWLEDGE, INFORMATION, AND BELIEF.

By: _____
Name/Title

Subscribed and sworn to me this _____ day of _____ 20__.

Notary Public

My commission expires on _____.

**G. MAYOR AND CITY COUNCIL OF BALTIMORE CITY
BALTIMORE CITY CODE, ARTICLE 5, SUBTITLE 28
MINORITY AND WOMEN'S BUSINESS PROGRAM**

PART A: INSTRUCTIONS

The requirements of Article 5, Subtitle 28 of the Baltimore City Code – Minority and Women's Business Program are a part of this contract and are incorporated by reference. The failure of any bidder, contractor or subcontractor to comply with Article 5, Subtitle 28 is subject to any or all of the following penalties: (1) suspension of contract; (2) withholding of funds; (3) rescission of contract based on material breach; (4) refusal to accept a bid; (5) disqualification of a bidder, contractor, or other business from eligibility for providing goods or services to the City for a period not to exceed 2 years; and (6) payment of liquidated damages. Art. 5, §28-122.

All bidders are advised to read all instructions and forms carefully. Please follow the instructions for each section of the forms. Failure to respond or properly execute the forms can result in disqualification and possible rejection of your bid.

A complete copy of Article 5, Subtitle 28 of the Baltimore City Code is available online at: <https://legislative.reference.baltimorecity.gov/city-codes>

1. BID REQUIREMENTS

Bids must include a commitment to utilize MBEs and WBEs at a percentage that equals or exceeds the contract goals indicated in the contract specifications. **Bidder must submit the following completed documents WITH THE BID:**

- ✓ **Part B: Statement of Intent Form(s)** – to be signed by Bidder and MBE and/or WBE.
 - ✓ **Part D: MBE/WBE Participation Affidavit** – to be completed and signed by Bidder
- Any bid that does not include a signed Statement of Intent Form(s) and the MBE/WBE Participation Affidavit is non-responsive and will be rejected. MBE/WBE MUST be certified with the City of Baltimore.**

ONLY SUBMIT IF APPLICABLE:

- ✓ **Part C: Statement of Self-Performance** – to be signed by Bidder who is certified by the City as MBE and/or WBE. This is only filled out if the prime plans to self-perform to fulfill the MBE/WBE goals.
- ✓ **Part E: MBE/WBE Participation Waiver Request** – to be completed and submitted by Bidder if unable to meet the participation goals. (Please note: Substantial documentation must be provided to justify reasons for not being able to meet goals) Specifically, on Part E numbers one, two, and three must be addressed in detail.

2. VERIFYING CERTIFICATION

- Bidder is responsible for verifying that each MBE and WBE to be used on a contract is certified with Baltimore City by the Minority and Women's Business Opportunity

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- Office (MWBOO) at bid opening for the work and/or services to be performed on the contract. Art. 5, §28-48(d).
- The MBEs and WBEs named must be certified for the services they are listed to perform, and the services must be required as part of the Detailed Specifications of the contract.
- A directory of certified MBEs and WBEs is available online at <https://cityservices.baltimorecity.gov/mwboo/>
- County, State, or Federal certification is not acceptable, the MBE and WBE **must** be certified with the City of Baltimore.

3. COUNTING MBE AND WBE PARTICIPATION

a) Participation of M/WBE's

A business enterprise that is certified as both an MBE and WBE (M/WBE) may not be counted toward both the MBE and WBE goals for the same project. The bidder must select the goal to which the business enterprise is to be counted. Art. 5, §28-31(b) and §28-35.

b) Credit for Self-Performance

A bidder that is an MBE or WBE may count up to 50% of the dollar value of the work it intends to perform with its own forces toward the applicable MBE or WBE goal. The amount of credit may not exceed the MBE's or WBE's available work capacity as calculated with the Contractor Prequalification rules. **Intentions to count self-performance toward the MBE or WBE goal must be indicated on Part C: Statement of Intent to Self-Perform.** Art. 5, §28-31(d).

c) Commercially Useful Function

The bidder may count toward the contract goals only expenditures to MBEs and WBEs that perform a commercially useful function in the execution of the contract. Commercially useful function means the performance of real and distinct work for which the business enterprise has the skill, expertise, and actual responsibility to perform, manage and supervise. Art. 5, §28-32.

d) Joint Ventures

A bidder may count toward the contract goal the portion of its expenditure to a joint venture that is equal to the percentage of the MBE or WBE participation in the joint venture. The MBE or WBE member of the joint venture must have an interest in the control, management, risks and operation of the joint venture commensurate with the member's percentage of ownership. The MBE or WBE member of the joint venture must be responsible for a clearly defined portion of the work to be performed, equal to its share in the ownership, control and management of the joint venture. Art. 5, §28-33.

e) Subcontracting by MBE or WBE

A bidder may not count toward its contract goal any agreement with a certified MBE or WBE subcontractor who intends to subcontract more than 10% of the dollar amount of the services to be performed under its agreement with the bidder. This restriction does not apply to an MBE's

or WBE's contracts for the purchase of materials, equipment or supplies that are incidental to the performance of services under its agreement with the bidder. Art. 5, §28-34.

f) Manufacturers and Suppliers

Manufacturers – A bidder may count toward the contract goal its entire expenditure to a certified MBE or WBE that manufactures the goods supplied. Art. 5, §28-36.

Non-Manufacturers – **Only 25% of each contract goal may be attained by expenditures to MBEs and WBEs that are non-manufacturing suppliers.** Art. 5, §28-37. *Example:* If the bid amount is \$100,000 and the MBE or WBE goal is 15% or \$15,000; then the limit for the MBE or WBE suppliers that are non-manufacturers is \$3,750 or 25% of the 15% goal.

g) Insurance Companies and Travel Agents

A bidder may count toward the contract goals only the fees or commissions charged by an MBE or WBE insurance company or travel agent. Art. 5, §28-38.

h) Financial Institutions

A bidder may count toward the contract goals only the fees charged and earned by an MBE or WBE financial institution. Art. 5, §28-39.

i) Non-Affiliation

A bidder may not use an MBE or WBE to meet a contract goal if the bidder has a financial interest in, has an interest in the ownership or control of, or is significantly involved in the operation of the MBE or WBE. Art. 5, §28-41.

4. **WAIVER REQUESTS**

If a bidder is unable to comply with a contract goal, the bidder may submit a waiver request with the bid. The waiver request must be made on the MBE/WBE Participation Waiver Request Form. A waiver will not be granted unless the waiver request includes documentation that demonstrates good faith efforts to meet the goals. Art. 5, §28-62.

5. **SUBSTITUTION OF MBE OR WBE**

The Minority and Women's Business Opportunity Office must approve the substitution, after award of a contract, of any MBE or WBE that is included on a bidder's Statement of Intent at the time of bid opening. Any unjustified failure to comply with this requirement after award of a contract is a material breach of contract. Art. 5, §28-63(a).

6. CONTRACT REQUIREMENTS

During the term of the contract, any unjustified failure to comply with the levels of MBE and WBE participation identified in the bid is a material breach of contract. Art. 5, §28-48 (e).

Before final payment, the contractor must submit the Subcontractor Utilization Form with its final payment request. The Subcontractor Utilization Form will include a list of the names of all subcontractors utilized on the contract, both MBE/WBE and non-MBE/WBE, the total amount paid to each subcontractor, and the owner's race/ethnicity and gender.

**THIS PACKAGE OF MBE AND WBE PARTICIPATION
COMMITMENT FORMS, AS DETAILED IN INSTRUCTION 1.
BID REQUIREMENTS, ARE DUE WITH THE BID.**

**MBE AND WBE PARTICIPATION
COMMITMENT FORMS**

Name of Bidder (Proposer): _____

Address: _____

Contracting Agency: _____

Contract (Project) Title: _____

Contract Number: _____

Bid Due Date: _____

The MBE goal is 5 % The WBE goal is 3 %

If MBE Sub-Goals Apply: (the MBE sub-goals will be listed in the solicitation, if there are no MBE sub-goals listed please leave blank)

African American: % Asian American: % Hispanic American: % Native American: %

**PART B:
MBE/WBE AND PRIME CONTRACTOR'S STATEMENT OF INTENT**

COMPLETE A SEPARATE FORM FOR EACH MBE and WBE NAMED IN THIS BID. (You are permitted to make additional copies of this form as needed). PART A: INSTRUCTIONS MUST BE REVIEWED BEFORE COMPLETING THIS FORM, WITH PARTICULAR ATTENTION PAID TO SECTIONS 2, 3A and 3F.

Contract Number: _____

Name of Prime Contractor: _____

Name of Baltimore City Certified Subcontractor:

City Certification Number: _____ **MBE** _____ **WBE**

List the City certified Work and/or Service to be performed by MBE or WBE:
(The selected MBE and/or WBE above must be City certified for the work/service being performed)

Materials/Supplies to be furnished by MBE or WBE:

Percentage of work to be performed by MBE or WBE: _____%

Dollar Amount to be paid to MBE or WBE for work performed: \$ _____
(If MBE sub-goals apply, please list the percentage for this Statement of Intent.) (the MBE sub-goals would be listed in the solicitation, if there are no MBE sub-goals listed please leave blank)

African American: ___% Asian American: ___% Hispanic American: ___ % Native American: ___%

The undersigned Prime Contractor and Subcontractor agree to enter into a contract for the work/service indicated above for the percentage and corresponding dollar amount listed to meet the MBE/WBE participation goals. This form is subject to the Prime Contractor's execution of a contract with the City of Baltimore. The Subcontractor is currently certified as an MBE or WBE with the City of Baltimore Minority and Women's Business Opportunity Office to perform the work described above.

Signature of Prime Contractor **(REQUIRED)** Date

Email Address Phone

Signature of MBE or WBE **(REQUIRED)** Date

Email Address Phone

PLEASE NOTE: CHANGES TO INFORMATION ON PART B: MBE/WBE AND PRIME CONTRACTOR'S STATEMENT OF INTENT THAT ARE MATERIAL TO THE AGREEMENT BETWEEN THE PRIME CONTRACTOR AND MBE OR WBE MUST BE INITIALED BY BOTH PARTIES.

**PART C:
STATEMENT OF INTENT TO SELF-PERFORM**

PART A: INSTRUCTIONS MUST BE REVIEWED BEFORE COMPLETING THIS FORM, WITH PARTICULAR ATTENTION PAID TO SECTION 2, 3a, 3b and 3f.

Name of Prime Contractor: _____

City Certification Number: _____ **MBE** _____ **WBE**

List the City certified Work and/or Service to be self-performed:
(The Prime Contractor MBE or WBE above must be City certified for the work/service being performed)

Materials/Supplies to be furnished:

Total Percentage of Self-Performed Work toward the MBE or WBE Goal: _____%

Total Dollar Amount of Work/Services to be Self-Performed by the Prime Contractor on this Contract:
\$ _____

(If MBE sub-goals apply, please list the percentage for this Statement of Intent.) (the MBE sub-goals would be listed in the solicitation, if there are no MBE sub-goals listed please leave blank)

African American: ___% Asian American: ___% Hispanic American: ___% Native American: ___%

The undersigned Prime Contractor agrees to Self-Perform the Work/Service indicated above for the Dollar Amount and/or Percentage indicated to meet the MBE/WBE participation goals, subject to the Prime Contractor's execution of a contract with the City of Baltimore. The Prime Contractor is currently certified as an MBE or WBE with the City of Baltimore Minority and Women's Business Opportunity Office to perform the work described above.

Signature of Prime Contractor (**REQUIRED**) _____
Date

Email Address _____
Phone

PART D: MBE/WBE PARTICIPATION AFFIDAVIT

The Undersigned authorized representative of Contractor does hereby make the following Affidavit: Contractor has read the Bidder Information and Instructions regarding the MBE/WBE Program. Contractor acknowledges the MBE goal of 5% and the WBE goal of 3% for this contract. Contractor has achieved the following participation:

MBE _____ % and \$ _____

WBE _____ % and \$ _____

of the total contract amount which is \$ _____.

My firm has made good faith efforts to achieve the MBE and WBE participation goals for this contract. I understand that, if awarded the contract, my firm must submit to the Minority and Women’s Business Opportunity Office (MWBOO) copies of all executed agreements with the MBE and WBE firms being utilized to achieve the participation goals and other requirements of Article 5, Subtitle 28 of the Baltimore City Code. I understand that these documents must be submitted prior to the issuance of a notice to proceed.

I understand that, if awarded the contract, my firm must submit to the MWBOO the Subcontractor Utilization Form, canceled checks, and any other documentation and reports required by MWBOO verifying payments to the MBE and WBE firms utilized on the contract, including electronic verification.

I understand that, if awarded this contract and I find that I am unable to utilize the MBEs or WBEs identified in my Statements of Intent, I must substitute other certified MBE and WBE firms to meet the participation goals. I understand that I may not make a substitution until I have obtained the written approval of MWBOO.

I understand that, if awarded this contract, authorized representatives of the City of Baltimore may examine, from time to time, the books, records and files of my firm to the extent that such material is relevant to a determination of whether my firm is complying with the MBE and WBE participation requirements of this contract.

I do solemnly declare and affirm under the penalty of perjury that the contents of the foregoing Affidavit are true and correct to the best of my knowledge, information, and belief.

Contractor Company Name

Signature

Email Address and Phone

Print Name and Title

PART E: MBE/WBE PARTICIPATION WAIVER REQUEST FORM

Name of Bidder _____

Address _____

Contracting Agency: _____

Contract (Project) Number and Title: _____

Bid Due Date: _____

Goals on this contract..... MBE: _____% and WBE: _____%

If MBE Sub-Goals Apply:

African American: ___% Asian American: ___% Hispanic American: ___ % Native American: ___%

I have achieved.....MBE: _____% and WBE: _____%

If MBE Sub-Goals Apply:

African American: ___% Asian American: ___% Hispanic American: ___ % Native American: ___%

I am requesting a waiver of.....MBE: _____% and WBE: _____%

If MBE Sub-Goals Apply:

African American: ___% Asian American: ___% Hispanic American: ___ % Native American: ___%

I have contacted MWBOO for assistance: _____Yes _____No (Check One)

Number of MBE firms contacted: _____ (Attach a list of names.)

Number of WBE firms contacted: _____ (Attach a list of names.)

Attach documentation of your good faith efforts to secure, contact and negotiate with MBEs and WBEs, including:

- (1) The reasons your company is unable to secure sufficient MBE/WBE participation to meet the stated goals
- (2) The efforts made by your company to select portions of the contract to be performed by MBEs and WBEs
- (3) For each MBE or WBE that placed a bid that you consider to be unacceptable, a statement that explains the basis for that conclusion
- (4) **Please consult the Bidder Information Guide & MWBOO FAQ for additional waiver guidance.**

Signature of Authorized Company Representative

Date

BIDDER SUBMISSION CHECKLIST

- You have reviewed the **Bidder Information Guide** following this checklist
- You retained the **Subcontractor Utilization Form** for submission after performing on the contract, if awarded. **This form is not to be submitted with your bid.**

— **Part B: Statement of Intent Form(s)**

- Name of Bidder and Name of MBE or WBE included at the top of the form
- Form is signed by both Bidder and MBE or WBE
- Form indicates whether the subcontractor is a MBE or WBE
- Checked MWBOO database to verify MBE and WBE certification
- Listed the MBE or WBE subcontractor's City certification number
- Checked SDAT database to verify good standing of MBE and WBE
- Detailed Brief description of work to be provided
- Detailed Materials/supplies to be provided (if applicable)
- Stated Percentage of Work to be performed
- Stated Dollar amount of work to be performed
- The percentages being performed by the MBE and WBE meet the goals set on the bid solicitation

— **Part D: MBE/WBE Participation Affidavit**

- The applicable MBE/WBE goal was entered in the first paragraph (this goal should match the goal stated in the bid solicitation)
- Stated MBE or WBE percentage (%) of work to be performed (this percentage should match the goals set on the bid solicitation)
- Stated dollar value corresponding to the percentage of work to be performed (if this is a requirements contract, this can be left blank)
- Completed Company name and address
- Signed your name
- Printed name and title of the person who signed the form

OPTIONAL FORMS, these should only be submitted if applicable

— **Part C: Statement of Self-Performance**

- You are certified MBE/WBE by Baltimore City MWBOO
- Included the percentage of work to be applied to the applicable MBE or WBE participation goal
- Self-performing percentage is not over 50%
- Detailed Brief description of work to be provided
- Detailed Materials/supplies to be provided (if applicable)
- Stated Percentage of Work to be self-performed
- Stated Dollar amount of work to be self-performed
- Form is signed by the Bidder

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— **Part E: MBE/WBE Participation Waiver Request**

- You submitted an additional document addressing questions one, two and three on Part E.**
- You exercised good faith efforts to achieve the applicable contract participation goals
- You reviewed the Bidder Information Guide for guidance regarding waivers and good faith efforts
- You detailed all efforts that were undertaken to secure MBE and/or WBE participation on this contract in the Waiver Request Form and submitted additional documentation of these efforts.
- You have double-checked that all bid forms that will be submitted are complete, contain the required information, and are signed and dated.**

Bidder Information Guide

What are some common mistakes or omissions that I should try to avoid and things to keep in mind?

- Any bid that does not include a signed Statement of Intent Form(s) and the MBE/WBE Participation Affidavit is non-responsive and will be rejected.
- Any Statement of Intent Form(s) and/or MBE/WBE Participation Affidavit that are not properly executed or do not contain all required information will result in a finding of non-compliance and will be rejected.
- **Utilizing a business that is not certified with the City of Baltimore or that has an expired certification, without an extension due to a pending application for renewal, will not count towards meeting a MBE/WBE participation goal.** City Code Article 5, §28-41(d) states that each bidder is responsible for verifying that all MBEs and WBEs to be used have been certified by the Office before bid opening.
- The failure to exercise good faith efforts when requesting a waiver and not meeting the applicable MBE/WBE goals for the contract will result in a finding of non-compliance
- A business enterprise that is Baltimore City certified as both an MBE and WBE (M/WBE) may not be counted toward both the MBE and WBE goals for the same project. The bidder must select the goal to which the business enterprise is to be counted. Art. 5, §28-31(b) and §28-35.
- A bidder that is a City certified MBE/WBE may only count up to 50% of the dollar value of the work it intends to perform with its own forces toward the applicable MBE or WBE goal. The amount of credit may not exceed the MBE/WBE's available work capacity as calculated with the Contractor Prequalification rules. Intentions to count self-performance toward the MBE or WBE goal must be indicated on Part C: Statement of Intent to Self-Perform. A bidder's statement that they will self-perform, but the business is not City certified as a MBE/WBE, may result in the bid being found non-compliant.
- A bidder may count toward the contract goal the portion of its expenditure to a joint venture that is equal to the percentage of the MBE or WBE participation in the joint venture. The MBE or WBE member of the joint venture must have an interest in the control, management, risks and operation of the joint venture commensurate with the member's percentage of ownership. The MBE or WBE member of the joint venture must be responsible for a clearly defined portion of the work to be performed, equal to its share in the ownership, control and management of the joint venture. Art. 5, §28-33.

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- A bidder may not count toward its contract goal any agreement with a certified MBE or WBE subcontractor who intends to subcontract more than 10% of the dollar amount of the services to be performed under its agreement with the bidder. This restriction does not apply to an MBE/WBE that contracts for the purchase of materials, equipment or supplies that are incidental to the performance of services under its agreement with the bidder. Art. 5, §28-34.
- A bidder may count toward the contract goal its entire expenditure to a certified MBE or WBE that manufactures the goods supplied. Art. 5, §28-36.
- Only 25% of each contract goal may be attained by expenditures to MBEs and WBEs that are non-manufacturing suppliers. Art. 5, §28-37.
- A bidder may count toward the contract goals only the fees or commissions charged by an MBE or WBE insurance company or travel agent. Art. 5, §28-38.
- A bidder may count toward the contract goals only the fees charged and earned by an MBE or WBE financial institution. Art. 5, §28-39.
- A bidder may not use an MBE or WBE to meet a contract goal if the bidder has a financial interest in, has an interest in the ownership or control of, or is significantly involved in the operation of the MBE or WBE. Art. 5§28-41.

Is there any limitation of what services a MBE/WBE can perform that count towards the contract participation goals?

MBE/WBEs subcontractors must perform a commercially useful function. Commercially useful function is defined in the City Code as the performance of real and distinct work for which the business enterprise has the skill, expertise, and actual responsibility to perform, manage and supervise. Art. 5, §28-32. As a result, the bidder should think broadly and consider all functions and services necessary to fully perform the contract.

Can I get a waiver of the contract participation goals?

If a bidder is unable to comply with a contract goal, the bidder may submit a waiver request with the bid. The waiver request must be made on the MBE/WBE Participation Waiver Request Form. A waiver will not be granted unless the waiver request includes documentation that demonstrates good faith efforts to meet the goals. Art. 5, §28-62. The bidder should have previously consulted the MWBOO certification directory, <https://cityservices.baltimorecity.gov/mwboo/>, and made attempts to secure MBE/WBE subcontractor participation.

Each waiver request **must include documentation** of your good faith efforts to secure, contact and negotiate with MBEs and WBEs, including:

(1) The reasons your company is unable to secure sufficient MBE/WBE participation to meet the stated goals;

(2) The efforts made by your company to select portions of the contract to be performed by MBEs and WBEs; &

(3) For each MBE or WBE that placed a bid that you consider to be unacceptable, a statement that explains the basis for that conclusion.

Each waiver is reviewed individually, highly scrutinized, and will not be granted if the bidder's submission does not evidence that they undertook several steps to secure participation in good faith.

What are "good faith efforts"?

MWBOO uses the term good faith efforts in several contexts including bid participation forms, waivers, and in evaluating efforts to meet contract participation goals by bidders. All efforts must begin with an evaluation of the availability of certified MBE/WBEs to perform the contract services by consulting the MWBOO certification directory:

<https://cityservices.baltimorecity.gov/mwboo/>

If there are certified MBE/WBEs that can provide the goods or services under the contract the contractor/vendor must undertake efforts to contact those businesses, secure price quotes, and exercise diligence in determining if they have the capabilities and expertise to perform. The availability of MBE/WBEs strongly undercuts any request for participation goals to be waived.

The following are additional examples of actions that can show that efforts were undertaken in good faith to meet the applicable contract goals, including but not limited to:

- The bidder should solicit interest as early in the acquisition process as practicable to allow the MBE/WBEs to respond to the solicitation and submit a timely offer for the subcontract. The bidder should determine with certainty if the MBE/WBEs are interested by taking appropriate steps to follow-up on initial solicitations.
- The bidder should identify portions of the work to be performed by MBE/WBEs in order to increase the likelihood that the MBE/WBE goals will be achieved. This includes, where appropriate, breaking out contract work items into economically feasible units (for example, smaller tasks or quantities) to facilitate MBE/WBE participation, even when the prime contractor might otherwise prefer to perform these work items with its own forces. This may include, where possible, establishing flexible timeframes for performance and delivery schedules in a manner that encourages and facilitates MBE/WBE participation.
- The bidder should provide interested MBE/WBEs with adequate information about the plans, specifications, and requirements of the contract in a timely manner to assist them in responding to a solicitation with their offer for the subcontract.
- A bidder using good business judgment would consider a number of factors in negotiating with subcontractors, including MBE/WBEs subcontractors, and would take a

firm's price and capabilities as well as contract goals into consideration. However, the fact that there may be some additional costs involved in finding and using MBE/WBEs is not sufficient reason for a bidder's failure to meet the contract MBE/WBEs goal, as long as such costs are reasonable and not excessive.

- The bidder should engage in negotiations in good faith with interested MBE/WBEs. It is the bidder's responsibility to make a portion of the work available to MBE/WBEs subcontractors and suppliers and to select those portions of the work or material needed that is consistent with the available MBE/WBEs subcontractors and suppliers, so as to facilitate MBE/WBEs participation.
- Evidence of such negotiation includes: the names, addresses, and telephone numbers of MBE/WBEs that were considered; a description of the information provided regarding the plans and specifications for the work selected for subcontracting; and evidence as to why additional agreements could not be reached for MBE/WBEs to perform the work.
- Bidders should include detailed information regarding their attempts to secure participation. MWBOO cannot accept unsupported statements about efforts to secure MBE/WBE participation. **All waivers must include documentation of those efforts.** For example: you should include email correspondence with subcontractors to show their response or lack of response.
- It is insufficient to simply state that you contacted a business and provide their directory entry or contact information. It is insufficient to make arguments why you believe the goals should be waived and you should be permitted to perform the entire contract with no participation goals. It is insufficient to detail that the contract was previously granted a waiver or that you were previously awarded this contract. A promise to use MBE/WBEs after contract award is not considered to be responsive to the contract solicitation or to constitute good faith efforts. Also, the ability or desire of a prime contractor to perform the work of a contract with its own organization does not relieve the bidder of the responsibility to make good faith efforts or to meet the contract MBE/WBE participation goals.
- It is the bidder's responsibility to establish and document the efforts that were undertaken to secure MBE/WBE participation. **Waivers are judged solely based upon the information provided and detailed to MWBOO in the bid submission.**
- There are numerous ways to identify subcontractors to participate on the contract such as: the MWBOO certification directory, <https://cityservices.baltimorecity.gov/mwboo/>, attending pre-bid information sessions, business matchmaking meetings and events, advertising and/or written notices, posting of Notices of Sources Sought and/or Requests for Proposals, and/or written notices or emails to all MBE/WBEs listed in MWBOO's directory that specialize in the services or goods required to perform the contract.

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- MBE/WBEs should not be rejected as unqualified without sound reasons based on a thorough investigation of their capabilities. Factors such as the contractor's standing within their industry, membership in specific groups, organizations, or associations and political or social affiliations (for example union vs. non-union status) are not legitimate causes for the rejection or non-solicitation of bids in the contractor's efforts to meet the project goal.
- Bidders should make reasonable efforts, if needed, to assist interested MBE/WBEs in obtaining bonding, lines of credit, insurance, or related assistance or services as required by the subcontractor.
- Contacting and utilizing the services of available minority/women community organizations; minority/women contractors' groups; local, State, and Federal minority/women business assistance offices (including MWBOO); and other organizations as allowed on a case-by-case basis to assist in the recruitment and placement of MBE/WBEs. When considering a waiver, you should contact MWBOO if you feel as though you have exhausted the ability to identify additional MBE/WBEs who could perform on the contract.

MWBOO will evaluate all of the detailed efforts in determining if the bidder has exercised good faith efforts.

SUBCONTRACTOR UTILIZATION FORM

THIS FORM MUST BE INCLUDED WITH REQUEST FOR FINAL PAYMENT

Prime Contractor's Name: _____

Contract Number and Title: _____

Total Contract Dollar Amount: _____

Provide the following information for EACH and EVERY subcontractor, both MBE/WBE and NON-MBE/WBE used on this contract. (Make additional copies of this form as needed).

Name of Subcontractor	Goods or services provided on subcontract
Race/ethnicity AND gender of subcontractor's owner	Dollar amount of subcontract
Dollar amount paid to date	If amount paid to date is less than subcontract dollar amount, explain why.

Name of Subcontractor	Goods or services provided on subcontract
Race/ethnicity AND gender of subcontractor's owner	Dollar amount of subcontract
Dollar amount paid to date	If amount paid to date is less than subcontract dollar amount, explain why.

Prime Contractor's Signature

Date

H. **MAYOR AND CITY COUNCIL OF BALTIMORE, MARYLAND**

THE BALTIMORE APPRENTICE TRAINEE PROGRAM (BATP)

BID FORM

Contracting Agency DEPARTMENT OF GENERAL SERVICES
Contract (Project Title) **GS21802 - BALTIMORE CONVENTION CENTER ELEVATOR
REPLACEMENT**

Scheduled Bid Due Date: **Wednesday, January 18, 2023**

THIS APPRENTICE TRAINEE FORM IS DUE WITH THE BID.

FOR MORE INFORMATION ABOUT THIS FORM OR ASSISTANCE, CONTACT:

Minority and Women's Business Opportunity Office (MWBOO)
100 N. Holliday Street, Rm. 101
Baltimore, MD 21202
(410) 396-4355

MWBOO (12/00)

MAYOR AND CITY COUNCIL OF BALTIMORE, MARYLAND
THE BALTIMORE APPRENTICE TRAINEE PROGRAM (BATP)

PART I.

The City of Baltimore has established an Apprenticeship Trainee Program which requires all bidders on City Construction Projects costing \$1,000,000.00 dollars or more to participate in an Apprenticeship/OJT Training Program certified by the State of Maryland.

Training and upgrading of minorities and women toward journeyman status is a primary objective of this Training Provision. The purpose for this objective is to insure a pool of qualified minorities and women to replace those journeymen who, in the natural course of events will leave the workforce.

The bidder, shall commit to use its best efforts to meet the BATP requirements set forth in these contract documents. If awarded this contract, the bidder shall notify each firm with which the bidder proposes to contract, of the BATP requirements and make these requirements a material part of the subcontract where appropriate.

The bidder hereby designates:

NAME _____

TITLE _____

PHONE # _____

as the person who has been charged by the bidder with the responsibility for carrying out and reporting the bidders compliance with this program.

Page 2

1. The Bidder shall use its best efforts to comply with the BAT Program requirements set forth in these contract documents. Failure to implement and carry out the BAT Program requirements set forth in these contract documents shall be a material breach of this contract and grounds for termination of the contract.

2. The contractor shall prepare and submit to the contracting agency a plan for apprentice participation together with the construction schedule. The agency engineer shall designate the number of trainees and hours to be utilized and the area in which the trainees are to be required.

A. The draft construction schedule submitted to the contracting agency shall include a copy of the state certified apprentice/ojt program in which the bidder is participating, required labor resources by trade in order to determine the availability of apprentice opportunities, and a trade breakdown of anticipated participation by apprentices. The construction schedule and any updates shall include the apprentice participation by trade.

B. Apprentice participation shall be distributed throughout each technical discipline or trade designated by the engineer.

C. The contracting agency will review and approve the apprenticeship participation plan and forward a copy of the approved plan to MWBOO.

D. Goals for trainees will be based on the contractor's current utilization (Exhibit I in the contract document) and the availability of minorities and females in specified trade areas as indicated in the publication of the Maryland Department of Labor, Licensing and Regulation, Office of Labor Market Analysis and Information.

E. The specific efforts proposed to be undertaken by the contractor or its subcontractors if additional efforts are required to implement the BAT Program.

F. With each progress payment request, the contractor shall submit a BAT Program Report (AA2A) and a written projection for the following month of Apprentice hourly participation by trade.

G. The BAT Program participation plans shall apply to all change orders and extra work orders.

H. Requests for modifications or amendments of the contractors must be submitted to the contracting agency with copies to MWBOO.

The contractor will receive a written response to the request.

PART II. AFFIDAVIT

The undersigned, being first duly sworn, on oath states to the City of Baltimore on behalf of the bidder as follows:

- 1. The bidder gives assurance that it will provide opportunity for training and employment for minorities and women in apprenticeship positions, and other positions whether with the bidder or subcontractors, employed on the project.
- 2. The bidder gives assurance that it will use its best efforts to comply with the BAT Program.
- 3. The bidder will maintain records in an easily retrievable and understandable form that will document any and all openings and opportunities for apprentice/trainee and, where appropriate, will make these requirements a part of all subcontract agreements on this project.
- 4. Bidder acknowledges that any and all bids which fail to include this form duly executed and notarized with the M/WBE portion of the bid documents may be declared as non-responsive by the Baltimore City Board of Estimates.
- 5. The bidder agrees to submit all forms as required in Part I & III of this document.

Name of Bidder

Name of Project Contract

By _____

Title _____

Date _____

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I hereby certify that on this _____ day of _____, 20____, before me the subscriber, a Notary Public of the State of _____, in and for _____
_____ City or County, personally appeared _____ who acknowledged himself-herself to be the (title) _____ of (company) _____ and being duly authorized, executed the foregoing affidavit for the purposes and uses therein contained.

Signature of Notary Public

My Appointment Expires (SEAL)

THE BALTIMORE APPRENTICE TRAINEE PROGRAM (BATP)

INSTRUCTIONS

Part III

I. Advertisement for Construction Bids (Contracting Agency)

All bid advertisements for construction projects where the cost is estimated to be \$ 1,000,000.00 or more shall include the following language:

"The City of Baltimore has established an apprentice participation program requirement for this contract."

II. Bid Documents

All bid documents where the cost of the bid is estimated to be \$1,000,000.00 or more shall include the BATP BID FORM unless otherwise determined by the agency engineer.
The BATP Bid Form Must Be Submitted With the Bid.

III. Pre-Bid Conference

If there is a pre-bid conference, an MWBOO Compliance Representative shall be present to discuss the BAT Program.

IV. The following forms must be submitted as indicated.

A. The Plan for the Apprenticeship Participation must be completed and submitted for each area of training as designated by the agency engineer before the notice to proceed is issued.

B. The Maryland Apprenticeship Agreement forms must be submitted with each Progress Payment request to the contracting agency or as new trainees are hired.

C. With each progress payment request, the prime contractor must submit the MWBOO AA2 and AA2A to the contracting agency.

D. If an apprentice is terminated, the contracting agency shall be informed within 10 working days. A new Apprentice Agreement form on the replacement trainee should be attached.

E. MWBOO forms AA1 and 1A shall be submitted semi-annually on June 30th and December 31st of each year to the contracting agency.

ATTACHMENT

V. Penalties and Sanctions

A. A determination by the Board of Estimates after recommendation by the Minority and Women's Business Opportunity Office (MWBOO) that the contractor has failed to comply with any portion of the BATP rules as herein provided and described, or its approved apprenticeship plan, shall subject the offending party to any or all of the following:

1. suspension of contract;
2. withholding of funds;
3. rescission of contract based upon a material breach of contract;
4. disqualification of a bidder, contractor for a period of not to exceed two years;
5. payment of liquidated damages.

B. Violation; disqualification. It is a violation of this program to:

1. Willfully falsify, conceal or cover up by a trick, scheme or device a material fact, or make any false, fictitious or fraudulent statements or representations or make use of any false, fictitious or fraudulent statement or entry.
2. Willfully obstruct, impede, or attempt to obstruct or impede any authorized official or employee who is investigating the validity of any activity under the BATP

**BALTIMORE APPRENTICE TRAINEE PROGRAM
TRAINEE REVIEW**

PROJECT NUMBER: GS21802 DATE: _____

PROJECT NAME: BALTIMORE CONVENTION CENTER ELEVATOR REPLACEMENT

CONTRACTOR: _____

TRAINEE'S SUPERVISOR: _____

CONTRACTOR'S EEO OFFICER: _____

Name	Race	Classification	Rqd. Prog. Hrs.	Actual Training for the Month	Actual Training Hours to Date	Min. Rate	Pres. Rate	Jrnymn. Rate
1. _____	_____	_____	_____	_____	_____	_____	_____	_____
2. _____	_____	_____	_____	_____	_____	_____	_____	_____
3. _____	_____	_____	_____	_____	_____	_____	_____	_____
4. _____	_____	_____	_____	_____	_____	_____	_____	_____
5. _____	_____	_____	_____	_____	_____	_____	_____	_____
7. _____	_____	_____	_____	_____	_____	_____	_____	_____
8. _____	_____	_____	_____	_____	_____	_____	_____	_____
9. _____	_____	_____	_____	_____	_____	_____	_____	_____

MWBOO (AA2)

12/00

To Be Submitted With Each
Payout Request by the Subcontractor
to the Prime Contractor

Signed: _____

Date: _____

CITY OF BALTIMORE																					
SEMI ANNUAL TRAINEE REPORT																					
ADMINISTRATION CENTER		PERIOD ENDING						LEGEND BA – BLACK AMERICAN AMERICAN			AI – AMERICAN INDIAN HA – HISPANIC AMERICAN			AA – ASIAN							
LINE NO	TRAINING CLASSIFICATION A	NUMBER RECEIVING TRAINING DURING REPORT PERIOD B						NUMBER STARTING TRAINING DURING REPORT PERIOD C						NUMBER COMPLETING TRAINING DURING REPORT PERIOD D			TOTAL HRS OF TRAINING DURING PERIOD				
		TOTAL	BA	AA	AI	HA	O	TOTAL	BA	AA	AI	HA	O	TOTAL	BA	AA	AI	HA	O	TOTAL	
03	EQUIPMENT OPERATOR																				
04	MECHANICS																				
05	TRUCK DRIVERS																				
06	IRON WORKERS																				
07	CARPENTERS																				
08	CEMENT MASONS																				
09	ELECTRICIANS																				
10	PIPEFITTERS																				
11	PAINTERS																				
12	OTHER SKILLS																				
13	TOTAL																				
14	NUMBER OF FEMALES RECEIVING TRAINING						NUMBER OF FEMALES STARTING TRAINING						NUMBER OF FEMALES COMPLETING TRAINING								
	NUMBER OF NEW HIRES RECEIVING TRAINING						NUMBER IN APPRENTICESHIP TRAINING						NUMBER OF TERMINATIONS PRIOR TO COMPLETION OF TRAINING								
	NUMBER OF UPGRADES RECEIVING TRAINING						NUMBER IN OTHER JOB TRAINING						NUMBER OF PROJECTS UNDER WAY DURING REPORTING PERIOD AND CONTAINING TRAINING SPECIAL PROVISIONS								
COMMENTS:																					
REPORT PREPARED BY (SIGNATURE) AND TITLE OF CITY OFFICIAL															DATE			AA1			

CONTRACT NO: GS21802 **TRAINEE'S NAME:** _____
PROJECT NAME: BALTIMORE CONVENTION CENTER ELEVATOR REPLACEMENT
START DATE: _____
SUBCONTRACTOR: _____ **WAGE RATE:** _____

MONTH	YEAR	PHASES											
DATE	DAILY TOTAL												
1													
2													
3													
4													
5													
6													
7													
8													
9													
10													
11													
12													
13													
14													
15													
16													
17													
18													
19													
20													
21													
MONTHLY TOTAL													
PREV. TOTAL													
GRAND TOTAL													
REQ'D HOURS													

CERTIFIED CORRECT BY _____ DATE: _____
 INSTRUCTOR'S COMMENTS:

 DISTRIBUTION: Original Project Engineer:
 MWBOO (AA2A)

REVIEWED BY:
 CITY OF BALTIMORE

 SIGNATURE

 DATE

BALTIMORE APPRENTICE TRAINEE PROGRAM CONTRACTOR'S SEMIANNUAL TRAINEE REPORT	PROJECT NO GS21802
	PROJECT NAME BALTIMORE CONVENTION CENTER ELEVATOR REPLACEMENT

INSTRUCTIONS - This report is to be completed by the contractor semiannually for each individual employed on this contract (including any subcontractor under it) who has received training during the reporting period under the training special provisions (a part of the contract proposal). The report is to be submitted by the 10th of the month following the reporting period (July 10, and January 10). The original of this report is to be furnished to the trainer and two copies submitted to the City of Baltimore

1. NAME OF CONTRACTOR NAME OF SUBCONTRACTOR (IF APPLICABLE)		1.A. ADDRESS
2. NAME OF TRAINEE	2A. SEX (check one) <input type="checkbox"/> M <input type="checkbox"/> F	2.B. ADDRESS
3. AGE OF TRAINEE	4. SOCIAL SECURITY NO.	5. EMPLOYEE STATUS (check one) <input type="checkbox"/> NEW HIRE <input type="checkbox"/> UP-GRADE
6. ETHNIC GROUP DESIGNATION (check one) <input type="checkbox"/> Black <input type="checkbox"/> Hispanic <input type="checkbox"/> American <input type="checkbox"/> Asian <input type="checkbox"/> American <input type="checkbox"/> American <input type="checkbox"/> Indian <input type="checkbox"/> American <input type="checkbox"/> White		

7. SUMMARY OF PREVIOUS TRAINING (ENTER AMOUNT AND TYPE OF TRAINING RECEIVED BY TRAINEE ON OTHER CONTRACTS UNDER APPROVED TRAINING PROGRAMS)

8. JOB CLASSIFICATION OF TRAINEE	9. DATE TRAINING STARTED ON THIS CONTRACT	10. TYPE OF ON THE JOB TRAINING (Check one) <input type="checkbox"/> Apprenticeship <input type="checkbox"/> Other
----------------------------------	---	---

REPORTING PERIODS

INSTRUCTIONS: One vertical column is to be completed for each succeeding reporting period and the form submitted. Enter June 30, Dec. 30, as applicable in

HOURS OF TRAINING DATA								
11. PROVIDED DURING REPORT PERIOD								
12. PROVIDED TO DATE								
13. REMAINING TO COMPLETE THE APPROVED PROGRAM								
14. TERMINATION (IF TRAINING WAS TERMINATED PRIOR TO COMPLETION OF APPROVED PROGRAM EXPLAIN REASON FOR TERMINATION)								
15. REPORT PREPARED BY (SIGNATURE AND TITLE OF CONTRACTOR'S REPRESENTATIVE)							16. DATE	
17. REPORT REVIEWED BY (SIGNATURE AND TITLE OF CITY OF BALTIMORE OFFICIAL)							18. DATE	

MWBOO (1A)

I. **BALTIMORE CITY'S YOUTHWORKS PROGRAM**

TO: Mayor's Office of Employment Development ("MOED")

FROM: _____

(Legal name of Bidder)

Pursuant to Executive Order, the aforesaid Bidder hereby presents MOED with the following information to assist its outreach efforts for the Baltimore City YouthWorks Program:

Contact Person: _____

Address: _____

Telephone Number: _____

Facsimile Number: _____

E-mail address: _____



J. EMPLOY BALTIMORE

Employ Baltimore is designed to create opportunities for businesses that receive municipal contracts to access qualified City residents to meet their workforce needs. The initiative will also ensure that City dollars contribute to the local economy and improve the lives of employable Baltimoreans.

Employ Baltimore meets the business development need by helping employers save time and money in the recruitment process. This service also offers businesses customized training resources that build worker pipelines for hard-to-fill job vacancies, and provides easy access to tax credit programs that support investments in the City's growth. Every year, hundreds of area employers utilize the Mayor's Office of Employment Development's resources to assist their expansion efforts. We look forward to serving you also.

Employ Baltimore

Requirements

1. Complete the *Employ Baltimore* "Certification Statement" contained in the bid document and submit it with your bid package.
2. Contact the Mayor's Office of Employment Development (MOED) within two (2) weeks of receiving the contract award to schedule a meeting. At this meeting MOED will review your workforce/employment plan; explain the employment report requirements and discuss other workforce services available. You will not receive your first payment from the contract until MOED verifies with the contracting city agency that the meeting has been scheduled.
3. Should the workforce plan indicate a need to fill new jobs, the company will agree to post these positions through MOED and its One Stop Career Center network for a period of seven (7) days prior to publicly advertising the openings. This will enable MOED to identify and refer qualified city residents as candidates for these job opportunities.
4. Complete the "Employment Reports" as required on June 30th and December 31st during each year of the contract and at contract completion. Submit "Employment Reports" to:

**Employ Baltimore
Mayor's Office of Employment
Development
3001 East Madison Street
Baltimore, Maryland 21205**

- Or -

employbaltimore@oedworks.com

The City will not release a final payment or any retainage held by the City until MOED verifies that the Employment Reports have been submitted.

5. Businesses awarded construction contracts that fully participate in the Employ Baltimore program and comply with the conditions listed in the certification statement may receive an early release or reduction in the retainage fee assigned to the contract.

To Schedule Your Meeting with MOED Please Contact:

**Rosalind Howard
Employ Baltimore
Mayor's Office of Employment Development
3001 East Madison Street
Baltimore, Maryland 21205
Phone 443-984-3014 • Fax 410-361-9648
rhoward@oedworks.com**

- Or -

employbaltimore@oedworks.com

Employ Baltimore

CERTIFICATION STATEMENT

Contracting City Agency	Bid Number	Bid Due Date
Dept. Of General Services		

To promote the commitment to utilize **Employ Baltimore** to meet employment needs, all businesses awarded contracts, franchises and development opportunities with the City of Baltimore, shall comply with the terms of the Executive Order as described in the bid specification. Under this agreement, contract awardees will complete and submit the certification statement with the bid package.

This Executive Order shall apply to contracts awarded by the City that are in the amounts of \$50,000.01 to \$300,000.00, except for professional service contracts and emergency contracts.

Additionally, companies awarded construction contracts that fully participate in the **Employ Baltimore** program and submit and comply with the certification statement, may receive an early release of or reduction in the retainage fee assigned to the contract.

CERTIFICATION STATEMENT

As a representative of _____, I _____
 (NAME OF COMPANY) (PRINT NAME AND TITLE)

Certify that a company representative will schedule a meeting with the Mayor’s Office of Employment Development within two weeks of contract award to review the workforce plan required for this contract.

If there is a need for additional employees, I agree to post the new job openings with MOED’s One Stop Career Center Network for seven (7) days prior to publicly advertising these openings. I agree to interview qualified Baltimore City residents referred from MOED. I agree to submit an Employment Report on June 30th and December 31st identifying the total number of workers on this project and the total number of Baltimore City residents on payroll during each year of the contract and at the contract completion as a condition of release of the final payment of any retainage due.

Name: _____ Telephone: _____

Company Address: _____ Email: _____

Send to: Rosalind Howard
Employ Baltimore/ Mayor’s Office of Employment Development
3001 East Madison Street
Baltimore, Maryland 21205
Phone 443-984-3024 . Fax 410-361-9648
employbaltiore@oedworks.com

Employ Baltimore

EMPLOYMENT REPORT

Contracting City Agency	Bid/Contract Number & Name
Dept. of General Services	Contract No. GS21802 - BALTIMORE CONVENTION CENTER ELEVATOR REPLACEMENT
Contract Start Date	Contract End Date

To promote the commitment to utilize the *Employ Baltimore Executive Order* and to meet workforce needs, all businesses awarded contracts, franchises and development opportunities with the City of Baltimore, shall comply with the terms of the Executive Order as described in the bid package. Under this Executive Order, contract awardees will complete and submit this Employment Report on June 30th and December 31st during each year of the contract and at contract completion. You must identify the number of total workers and the number of Baltimore City residents on payroll for this contract. Also, please indicate any new positions created as a result of the award and filled by Baltimore City residents. Employment Reports should be sent to:

**Employ Baltimore
 Mayor’s Office of Employment Development
 3001 East Madison Street
 Baltimore, Maryland 21205**

- Or email -

employbaltimore@oedworks.com

The Employment Report below is hereby submitted by the undersigned for this period:

___December 31, 20___ ___June 30, 20___ ___End of Contract Date_____

No. of total workers on payroll for this contract	
No. of Baltimore City residents on payroll for this contract	
No. of new positions filled by Baltimore City residents	

Name: _____ Signature: _____

Title: _____ Date: _____



The Mayor's Office of Employment Development provides businesses with a pipeline of qualified, skilled job candidates and supports businesses in retaining and developing their employees. We offer customized workforce solutions including outreach and recruitment, applicant prescreening, assessment and testing services, tax credit information, human resources support and training funds for new or existing employees. Training funds are available through several strategies.

Hiring new employees?

Customized Training is a business-driven strategy that helps companies train and hire people to fit their job-specific needs. MOED Business Services staff recruit and pre-screen applicants based on the company requirements. Your business saves on recruitment costs and could receive up to 50% reimbursement on costs associated with the required training. The positions must be full-time and meet minimum salary requirements. The training can be employer-based, on-the-job, or offered by qualified vendors. Companies awarded Customized Training grants must agree to hire successful trainees. Many companies have used this strategy to increase their workforce and reduce their hiring budget.

Want to improve and increase the skills of your current staff?

Incumbent Worker training

MOED works closely with other local, state and federal agencies to promote the link between the city's workforce and economic development initiatives.

For Further Information Contact:

Rosalind Howard or Susan Tagliaferro
 Employ Baltimore
 Mayor's Office of Employment Development
 3001 East Madison Street
 Baltimore, Maryland 21205
 Phone 443-984-3014 • Fax 410-361-9648
rhoward@oedworks.com stagliaferro@oedworks.com
employbaltimore@oedworks.com

K. LOCAL HIRING LAW**Rules and Regulations**

1. The Local Hiring Law (Council Bill 12-0159) (the "Law") is applicable to all City contracts that are greater than \$ 300,000.00, or agreements authorizing assistance that are within the terms of §27-2 of the Law executed by the City on or after the Law's effective date, December 23, 2013. The Law requires compliance by vendors/contractors and their subcontractors regardless of the subcontractor award amount and by all persons benefitting from an agreement involving more than \$ 5,000,000.00 in assistance for a City subsidized project.
2. The Law only applies to the original term of contract awards greater than \$ 300,000.00. Extra Work Orders and contract modifications do not affect the applicability of the Law. Whether a City subsidized project is subject to the Law shall be finally determined when an agreement authorizing assistance valued at more than \$5,000,000.00 is executed by the City.
3. Any contract that was originally subject to the Employ Baltimore Executive Order and the dollar amount of the contract increases to over 300K, will become subject to the Local Hiring Law.
4. All City bids, RFP's and requests for bid packages and final contracts must include reference to the requirements of the Law. All bid documents and contracts subject to the Law will include a section referencing the requirements of the Law. The bidder's signature will verify a commitment to abide by the Law.
5. Upon contract award or approval of an agreement for subsidy covered by the Law, the contracting city agencies or agencies entering into an agreement for the City subsidized project must immediately complete the Mayor's Office of Employment Development (MOED) Vendor Contact form, providing contact information for each vendor/contract awarded and each beneficiary of a qualifying City subsidized project. MOED will contact the vendor or beneficiary upon receipt of the completed form from the city agency.
6. Within two weeks of the contract award or agreement for a City subsidized project covered by the Law, the awardee must work with a representative of the Mayor's Office of Employment Development (MOED) to complete an Employment Analysis that will project the total workforce and the "new hires" in the Baltimore area needed to fulfill the contract/agreement. That Analysis shall include all information reasonably required by MOED showing at a minimum general locations (Baltimore area or not) of all workforce positions required to complete the contract/agreement.
7. Vendors who report that they do not have any "employees" needed for the contract" at the initial workforce meeting or on the required monthly Employment Report form must meet with the City Agency to discuss how the work is getting done and how the funding is being utilized.

8. A Local Hiring Review Committee (“LHRC”) will be established. The LHRC will be comprised of representatives/designees from the following:

- Office of the City Council President
- Office of the Deputy Chief of Economic Development and Neighborhoods
- Mayor’s Office of Employment Development
- Office of the Director of Finance
- Baltimore City’s Procurement Office – Bureau of purchases
- Baltimore City Department of Transportation
- Baltimore City Department of Public Works
- Baltimore City Department of General Services
- Baltimore Development Corporation
- Baltimore City Law Department
- Community Resident to be appointed by the President of the City Council

The LHRC will appoint a chair and meet no less than quarterly and as frequently as needed. Its primary role will be to review the monthly Employment Reports and to make recommendations to MOED regarding the approval or denial of any waiver requests made. The LHRC will also recommend to the Board of Estimates potential penalties and debarment for persons and others subject to the Law that has not complied with the Law. MOED will coordinate the materials to be presented to the LHRC and provide it with administrative staff support.

9. Vendors and others subject to the Law must submit Monthly Employment Reports by the fifth business day of the month for the preceding month beginning no later than 90 days after the Board of Estimates has awarded the contract or approved the agreement. City agency directors will be notified of persons or others subject to the Law that do not submit reports by the due date; continued delinquent persons or others subject to the Law will be reported to the LHRC.

10. Vendors and others subject to the Law that have binding collective bargaining agreements with unions will be granted a waiver from only utilizing MOED recruitment services, since they are bound by union regulations to utilize union halls. However, the persons or others subject to the Law must still meet the 51% residency requirement on new hires and must submit the monthly Employment Reports as required by the Law.

11. If MOED cannot fill a job posting provided by a vendor or others subject to the Law within the seven day period, the person or others subject to the Law must still meet the 51% residency requirement on new hires. This requirement will only be waived if : 1) the person or others subject to the Law requests a waiver in writing and can provide documentation that they made good faith efforts in the form of job posting and other recruitment methods and that there were insufficient qualified applicants to fill the available new positions or ; 2) the bidder is able to confirm in the bid process that the contract will be only for services that will be performed or for

products that will be manufactured outside the Baltimore Metropolitan Area and as such, no new positions will be called for in Baltimore area.

12. The Law is not applicable to a contract or an agreement that is made by the City, or on its behalf with any person in the event of an emergency pursuant to Article VI, § 11 (e)(ii) of the Baltimore City Charter.

13. Definitions:

a. *Good Faith Effort* is defined as a set of activities conducted by the contractor/vendor or other person which demonstrate multiple types of outreach efforts have been made to City residents including, but not limited to: ads in local papers, paid local job boards, information to local educational and workforce organizations, as well as an objective review and rating of resumes of city residents. (§ 27-6 (B) (1))

b. *Substantially below appraised value* is the sale or transfer of land applicable to property that has been approved and sold for an amount below 30% of the appraised value. (§ 27-1 (C) (1))

c. *“Satisfactory Special Workforce Development Training or Placement Arrangement”* is defined as a written agreement with MOED or a recognized workforce partner for a customized training or On-The-Job-Training opportunity leading to unsubsidized employment. (§27-6(B) (3))

LOCAL HIRING

Article 5, Subtitle 27 of the Baltimore City Code, as amended (the "Local Hiring Law") and its rules and regulations apply to contracts and agreements executed by the City on or after the Local Hiring Law's effective date of December 23, 2013. The requirements for the Local Hiring Law are summarized below:

A. The Local Hiring Law applies to every contract for more than \$300,000 made by the City, or on its behalf, with any person. It also applies to every agreement authorizing assistance valued at more than \$5,000,000 to a City-subsidized project. Unless the Mayor's Office of Employment Development ("MOED") grants an exception under the Local Hiring Law, at least 51% of the new jobs required to complete the contract or project must be filled by Baltimore City residents.

B. Within two (2) weeks of the Board of Estimate's award of the contract or approval of the agreement, the contractor shall have a meeting, either in person or via telephone, with MOED to complete an employment analysis and review the workforce plan required for such contract or agreement. The contractor will not receive any payments under the contract or agreement, unless and until the employment analysis is performed. Contact information for MOED can be found on its website: www.oedworks.com.

C. Should the contractor's workforce plan indicate a need to fill new jobs, the contractor shall post the new job openings with MOED's One Stop Career Center Network for a period of seven (7) days prior to its publicly advertising these openings. Further, the contractor shall interview qualified Baltimore City residents referred from MOED; and unless granted an exception, fill at least fifty-one percent (51%) of the new jobs required to complete the contract or project with Baltimore City residents.

D. For all contracts subject to the Local Hiring Law, the contractor shall submit an Employment Report to MOED by the fifth (5th) day of each month throughout the duration of the contract or agreement, regardless of whether MOED has granted a waiver of any of the Local Hiring Law's requirements.



**City of Baltimore
Local Hiring Certification and Compliance Statement**

CERTIFICATION STATEMENT (Complete and submit this certification statement with your bid package. Your bid may be considered non-responsive if you fail to include this signed document)

For the purpose of requiring employers (contractors and their subcontractors) benefitted by City contracts and subsidies to take measures to hire Baltimore City residents, all businesses awarded a contract with the City for more than \$300,000 or will benefit from more than \$5,000,000 in assistance for a subsidized project, shall agree to comply with the terms of the Local Hiring Law 12-0159 as described in the bid specification.

By signing below as a representative of _____(Company Name), I certify that if awarded this contract, a company representative will meet with the Mayor’s Office of Employment Development (MOED) within two weeks of the contract award to complete an employment analysis review the workforce plan required for this contract. If there is a need for new hires, I agree to post the new job openings with MOED’s One Stop Career Center Network for a period of seven (7) days prior to publicly advertising these openings. I agree to interview qualified Baltimore City residents referred from MOED and to fill at least 51% of the new jobs required with Baltimore City residents. I also agree to submit an Employment Report by the 5th day of each month throughout the duration of contract.

Signature: _____ Title: _____ Phone: _____

Company Address: _____ Email: _____

CONTRACT AWARD INFORMATION (To be completed by the responsible Baltimore City agency representative and submitted to MOED within two (2) business days of the contract award.)

Baltimore City Agency: _____

Contract No./Description: _____

Award Amount: _____ Award Date: _____

Contractor’s Rep for Local Hiring compliance: _____

Telephone #: _____ Email: _____

City Agency Staff Name/Title	Date

COMPLIANCE VERIFICATION (To be completed by MOED and returned to the City agency.)

As required by the Law, “before the disbursement of any funds”, the beneficiary must meet with and complete an employment analysis with MOED. This is to certify that the information below is accurate as verified by MOED:

- Complied with the requirements of the Local Hiring Law 12-0159 and met with MOED on _____ to assess their employment needs, complete the workforce plan and identify new jobs. We have been informed that an estimate of _____ jobs will be created as a result of the contract award.

- NOT** complied with the Local Hiring Law. In accordance with the Law, the City Agency is required to withhold payments associated with this award until the meeting has occurred.

MOED Staff Name/Title	Date

If there are any questions, please call Rosalind Howard at 410-396-9045

L. BID BOND

KNOW ALL MEN BY THESE PRESENTS, that we, the undersigned _____

as Principal, and _____

as Surety, are hereby held and firmly bound unto the Mayor and City Council of Baltimore as Owner, in the amount of at least Two Percent (2%) of the Total Bid submitted for the payment of which, well and truly to be made, we hereby jointly and severally bind ourselves, our heirs, executors, administrators, personal representatives, successors and assigns. Signed this

_____ day of _____, 20_____.

The condition of the above obligation is such that WHEREAS the Principal has submitted to the Board of Estimates of the Mayor and City Council of Baltimore a certain Bid, attached hereto, and hereby made a part hereof to enter into a Contract, in writing, for **CONTRACT NO. GS21802 – BALTIMORE CONVENTION CENTER ELEVATOR REPLACEMENT**

NOW, THEREFORE,

- (a) If said Bid shall be rejected or in the alternate.
- (b) If said Bid shall be accepted and the Principal shall execute and deliver a Contract in the form of Contract attached here to (properly completed in accordance with said Bid), and shall furnish a bond for his faithful performance of said Contract, and for the payment of all persons performing labor or furnishing materials in connection therewith and shall in all other respects perform the Agreement created by the acceptance of said bid.

Then this obligation shall be void, otherwise the same shall remain in force and effect; it being expressly understood and agreed that the liability of the Surety for any and all claims hereunder shall in no event, exceed the penal amount of this obligation, as herein stated.

The Surety, for value received, hereby stipulates and agrees that the obligations of said Surety and its bond shall be in no way impaired or affected by an extension of the time within which the Owner may accept such Bid; and said Surety does hereby waive notice of any such extension.

IN WITNESS WHEREOF, the Principal and the Surety have hereunto set their Hand and Seals, and such of them as are Corporation have caused their Corporate Seals to be hereto affixed and these presents to be signed by their proper Officers, the day and year first set forth above.

ATTEST:

PRINCIPAL

(SEAL)

ATTEST:

SURETY

(SEAL)

END OF SECTION

SECTION 00500
AGREEMENT

THIS AGREEMENT, made this _____ Day of _____
in the year 20____, by and between _____

hereinafter called the "Contractor", and the Mayor and City Council of Baltimore, a
Municipal Corporation, hereinafter called the "City", for Contract No. **GS21802 -**
BALTIMORE CONVENTION CENTER ELEVATOR REPLACEMENT

WHEREAS, the Contract designated as to be performed in strict accordance with the Contract Documents, which Standard Specifications, Plans and other Contract Documents are in all respects made a part hereof, has recently been awarded to the Contractor by the City, through the Agency of its Board of Estimates, at and for a sum equal to the aggregate cost of the work, labor, materials and supplies done or furnished at the prices and rates respectively named therefore in the Proposal attached hereto; and

WHEREAS, it was one of the conditions of said award that a formal Contract should be executed by and between the Contractor and the City evidencing the terms of said award.

NOW, THEREFORE, THIS AGREEMENT WITNESSETH, That the Contractor doth hereby covenant and agree with the City that it will well and faithfully construct, and complete the said Work in accordance with each and every one of the conditions, covenants, stipulations, terms and provisions contained in the Contract Documents, at and for a sum equal to the aggregate cost of the work, labor, materials and supplies done or furnished at the prices and rates respectively named therefore in the Proposal attached hereto, and will well and faithfully comply with and conform to each and every obligation imposed upon it by the Contract Documents, or by the terms of said award. Time is of the essence of this Agreement.

And the City doth hereby covenant and agree with the Contractor that it will pay the Contractor, when due and payable under the terms of the Contract Documents and of said award, the above mentioned sum; and that it will well and faithfully comply with and perform each and every obligation imposed upon it by the Contract Documents or by the terms of said award.

In WITNESS WHEREOF, Said _____
has caused this Agreement to be signed in its name by its President/Vice President and its
Corporate Seal to be hereunto and duly attached and the City has caused these presents to be
signed by the Mayor of Baltimore City and the Corporate Seal of the City to be hereunto affixed,
duly attested by the Custodian of the City Seal.

ATTEST:

SIGNATURE

SIGNATURE

PRINT NAME AND TITLE (SEAL)

ATTEST:

Mayor and City Council of Baltimore

Custodian of the City Seal

By: _____
BRANDON M. SCOTT, MAYOR

APPROVAL OF AGREEMENT
FOR
DEPARTMENT OF GENERAL SERVICES
CONTRACT NO. **GS21802**

APPROVED AS TO FORM AND
LEGAL SUFFICIENCY:

Assistant Solicitor

APPROVED:

APPROVED:

Chief, Capital Projects Division

Director of General Services

SECTION 00610

PERFORMANCE BOND

Principal	Business Address of Principal
Surety a Corporation of the State of and authorized to do business in the State of Maryland	Obligee Mayor and City Council of Baltimore

Sum of Bond (Equal to Contract Price)
 SUM OF _____ Dollars
 (\$ _____)

Contract Number and Identification City of Baltimore Department of General Services	Date of Contract _____, <u>20</u>
Contract No. GS21802 - BALTIMORE CONVENTION CENTER ELEVATOR REPLACEMENT	Date Bond Executed _____, <u>20</u>

KNOW ALL MEN BY THESE PRESENTS, That we, the PRINCIPAL above named and SURETY above named, are held and firmly bound unto the OBLIGEE above named in the full and just sum of the amount stated above, for the payment of which sum well and truly to be made, we bind ourselves, our heirs, executors, administrators, personal representatives, successors and assigns, jointly and severally, firmly by these presents.

WHEREAS, the PRINCIPAL is entering into a certain Contract with the OBLIGEE described and dated, as shown above and attached hereto, and is required under the Provisions of the Public General Laws of Maryland to give a bond conditioned as hereinafter set forth.

NOW THEREFORE, if the PRINCIPAL shall well and truly perform and fulfill all the undertakings, covenants, terms, conditions and agreements of said Contract during the original term of said Contract and any extensions thereof that may be granted by the OBLIGEE, with or without notice to the SURETY, and during the term or terms of any maintenance, repair, guaranty and warranty required under the Contract, and

PERFORMANCE BOND

shall also well and truly perform and fulfill all the undertakings, covenants, terms, conditions and agreements of any and all duly authorized modifications of said Contract that may hereafter be made, notice of which modifications to the SURETY being hereby waived, and shall indemnify and save harmless the Mayor and City Council of Baltimore, its agents and employees against and from all costs, expenses, damages, injury or loss to which the said Mayor and City Council of Baltimore, its agents and employees, may be subjected by reason of any wrongdoing, misconduct, want of care or skill, negligence or default on the part of said PRINCIPAL, its agents or employees, or in any manner arising directly or indirectly from any and all causes whatsoever, in or about the execution or performance of the Contract, during the Original term of said Contract and/or any authorized extension or modification thereof and/or during the term or terms of any maintenance, repair, guaranty and warranty required under the Contract, then this obligation shall be null and void; otherwise to remain in full force and effect.

No right of action shall accrue on this bond to or for the use of any person or corporation other than the OBLIGEE, or the successors or assigns of OBLIGEE.

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

ATTEST: as to principal

SIGNATURE

SIGNATURE

PRINT NAME
ATTEST: as to surety

PRINT NAME AND TITLE (SEAL)

SIGNATURE

SIGNATURE

PRINT NAME

PRINT NAME AND TITLE (SEAL)

AGENT (COMPANY): _____

AUTHORIZED BY: _____
NAME AND TITLE

SECTION 00620

PAYMENT BOND

Principal	Business Address of Principal
Surety a Corporation of the State of and authorized to do business in the State of Maryland	Obligee Mayor and City Council of Baltimore
Sum of Bond (Equal to Contract Price) SUM OF _____ Dollars (\$ _____)	
Contract Number and Identification City of Baltimore Department of General Services Contract No. GS21802 - BALTIMORE CONVENTION CENTER ELEVATOR REPLACEMENT	Date of Contract _____, ____ Date Bond Executed _____, ____

KNOW ALL MEN BY THESE PRESENTS, That we, the PRINCIPAL above named and SURETY above named, are held and firmly bound unto the OBLIGEE above named in the full and just sum of the amount stated above, for the payment of which sum well and truly to be made, we bind ourselves, our heirs, executors, administrators, personal representatives, successors and assigns, jointly and severally, firmly by these presents.

WHEREAS, the PRINCIPAL is entering into a certain Contract with the OBLIGEE described and dated, as shown above and attached hereto, and is required under the Provisions of the Public General Laws of Maryland to give a bond conditioned as hereinafter set forth.

NOW THEREFORE, the condition of this obligation is such that if the PRINCIPAL shall promptly make payments to all persons supplying labor and/or material in the prosecution of the work provided for in said Contract and any and all duly authorized extensions and/or modifications of said contract that may hereafter be made, notice of such extensions and/or modifications to the SURETY being hereby waived, and any maintenance, repair, guaranty and warranty required under the Contract, then this obligation to be null and void; otherwise they remain in full force and effect.

PAYMENT BOND

A suit or action commenced hereunder shall comply with applicable Provisions of the Public General Laws of Maryland. No suit or action shall be commenced hereunder against the OBLIGEE, its successors or assigns, nor shall OBLIGEE be liable for any costs or expenses of such suit.

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

ATTEST: as to principal

SIGNATURE

SIGNATURE

PRINT NAME

PRINT NAME AND TITLE (SEAL)

ATTEST: as to surety

SIGNATURE

SIGNATURE

PRINT NAME

PRINT NAME AND TITLE (SEAL)

AGENT (COMPANY): _____

AUTHORIZED BY: _____
NAME AND TITLE

PAYMENT BOND

APPROVED:

APPROVED:

Mayor of Baltimore City

Director of General Services

Comptroller

Chief, Capital Projects Division
Department of General Services

APPROVED AS TO FORM AND
LEGAL SUFFICIENCY:

APPROVED BY BOARD OF ESTIMATES:

Assistant Solicitor

Clerk Date

SECTION 011000 - SUMMARY OF WORK

PART 1 GENERAL

1.1 SECTION INCLUDES

Elevator Renovations at The Baltimore Convention Center, Baltimore City, Maryland, for the Department of General Services.

A. The Work as described in the Project Manual and as indicated on the Construction Drawings.

B. Description of Work:

The project includes the demolition and replacement of two passenger elevators, one freight elevator, associated elevator equipment, HVAC for elevator machine rooms, sprinkler piping and head modifications. In addition, the electrical power, lighting and fire alarm system devices shall be replaced and/or upgraded in the elevator machine rooms, pits, and landings. The project has Base Bid work and four Alternates. Refer to Section 012300 ALTERNATES for additional information.

C. Project Duration: 12 months for Base Bid work from the Notice to Proceed and 3 additional months per Alternate No.1 and No.2 for a total of 18 months.

D. Contractor is required to obtain the latest edition of the City of Baltimore Department of Public Works Specifications (Green Book). Any conflicts between these specifications and the latest edition of the City of Baltimore Department of Public Works Specification (Green Book), the latest edition of the City of Baltimore Department of Public Works Specification (Green Book) shall take precedence unless the conflict is more stringent.

1.2 PROJECT INFORMATION

A. Project Identification: Contract No. 21802 Baltimore Convention Center Elevator Renovations-Baltimore City.

1. Project Location: 1 West Pratt Street, Baltimore, MD 21201.

2. Contact: See "Owner Representative" below for contact information.

B. Owner: Mayor and City Council of Baltimore c/o Baltimore City Department of General Services, Abel Wolman Municipal Building, Baltimore, MD 21202.

1. Owner's Representative: Major Projects Division, Baltimore City, Department of General Services.

a. Address: 200 N. Holliday Street, Room 204, Baltimore, MD 21202

2. Phone: 410-545-6071

3. Prime Consultant (Mechanical/Electrical Engineer): Gipe Associates, Inc.

C. Prime Consultant (Mechanical/Electrical Engineer):

1. Gipe Associates, Inc.

- a. Address: 1220 E. Joppa Rd., Building A, Suite 223, Towson, MD 21286
- b. Phone: 410-832-2420
- c. Fax: 410-832-2428
- d. Contact: Scott E. Dixon

D. Sub-Consultants: Prime Consultant has retained the following design professional who have prepared designed portions of the Contract Documents:

1. Architect: KPN Architects

- a. Address: 1800 Washington Blvd., Suite 414, Baltimore, MD 21230
- b. Phone: 443-682-7757
- c. Fax: 443-863-6500

2. Structural Engineer: Carroll Engineering, Inc. (Assessment Only)

3. Elevator Consultant: VDA Associates

- a. Address: 601 13th Street, NW, Suite 900 South, Washington, D.C. 20005
- b. Phone: 202-851-3368

1.3 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to the Work of this Section.

1.4 RELATED SECTIONS

A. Divisions Zero and One Specification Sections.

1.5 REGULATORY REQUIREMENTS

A. Building Code:

1. Comply with requirements of International Building Code (2018) and adopted Supplements.

B. The State Fire Prevention Code (COMAR 12.03.01).

C. Maryland Accessibility Code, MAC, 2015 (COMAR 05.02.02)

D. Life Safety Code - NFPA 101, Life Safety Code 2015, inclusive of all supplements and modifications.

E. IFG – 2018 International Fuel Gas Code.

F. IgCC – 2018 International Green Construction Code.

G. IMC – 2018 International Mechanical Code.

H. IPC – 2018 International Plumbing Code.

I. NFPA-13 – 2015 Sprinkler Code.

J. National Electrical Code: NEC-2017

- K. IFC-2018 International Fire Code.
- L. IECC-2018 International Energy Conservation Code.
- M. Accessibility Code: MAC (COMAR 05.02.02 & 2010 ADA Standards).

1.6 QUALITY CONTROL AND QUALITY ASSURANCE

- A. Coordinate with requirements of Division 1 Specification Sections and Standard Specifications.
- B. The Contractor shall take note of the following:
 - 1. When the words Quality, Quality Control, and Quality Assurance are used within the Contract Documents the work of providing qualitative control, monitoring and documenting the quality of the contract is the sole responsibility of the Contractor.
- C. The Contractor is fully and wholly responsible for Quality Control of the Project.
- D. The Contractor shall employ a full time, on-site Quality Control Manager (QCM) for the duration of the contract to provide and implement Quality Control measures and services identified in the Contract Documents and in accordance with the Contractor's written Quality Control Program as reviewed and approved by the City.

1.7 USE OF PREMISES

- A. General.
 - 1. Confine operations to areas indicated by Contract Documents.
 - 2. Do not unreasonably encumber site areas with materials or equipment.
 - 3. When required by other construction activities, relocate, move and/or remove materials and temporary facilities as directed by the Owner's representative.
 - 4. Keep all exits required by code open during construction period; provide temporary exit signs if exit routes are temporarily altered.
 - 5. Do not obstruct roadways, sidewalks, or other public ways without permit.
- B. Partial Owner Occupancy:
 - 1. The Owner intends to occupy this property while under construction. Coordination with the Owner will be required during the construction period.
- C. Placing of equipment and partial occupancy by the Owner shall not constitute final acceptance of the Work.
 - 1. Prior to partial Owner occupancy, mechanical equipment and electrical and security systems shall be fully operational.
 - 2. Required inspections and tests shall have been successfully completed.
 - 3. Upon occupancy, the Owner will provide operation and maintenance of mechanical and electrical systems in occupied portions of the building.
 - 4. A Certificate of Substantial Completion will be executed for each specific portion of the Work to be occupied prior to Owner occupancy.
 - 5. Contractor shall obtain a Certificate of Occupancy from local building officials prior to Owner occupancy.
 - 6. Areas of the building may be occupied during the period of construction only if all required exits and all required fire protection features are in place and

continuously maintained for the parts occupied. (NFPA 101, 1-3.11.1).

- D. When Owner has occupied a portion of the project prior to final completion, Contractor's employees shall not use facilities within occupied portion of buildings, unless they are instructed to do so as part of construction work.
- E. Contractor Use of Premises
 - 1. Coordinate use of premises under direction of Owner.
 - 2. Other concurrent and contiguous contracts may be ongoing during the term of this Contract.
 - 3. Follow directions provided by the Owner regarding locations of temporary facilities and utilities, storage areas, stockpile areas, and staging areas to prevent interference with Work by other Contractors.
 - 4. Assume full and sole responsibility for protection and safekeeping of materials and products under this Contract.
 - 5. When not indicated and if available, the Owner's representative will assist the Contractor in identifying on-site staging and storage areas or work areas needed for operations under this Contract.
 - 6. If on-site storage areas are not available, the Contractor shall obtain and pay for use of off-site storage or work areas.
 - 7. Contractor shall include in their Bid a minimum of two (2) containers for storing project materials in the loading dock area.
- F. Related Contract Documents:
 - 1. Contractor may contact the Owner to review and/or obtain copies of other relevant documents prepared under separate contracts for the City of Baltimore.
 - 2. Duplication costs of other site documents are the responsibility of the Contractor.

1.8 CONTRACTOR'S COORDINATION

- A. Submit coordination drawings in compliance with requirements of the Contract Documents, and as directed by the Engineer and/or Owner.
- B. Coordinate openings and locations for the work between various Sections to include, but not necessarily limited to the following:
 - 1. Fire Detection.
 - 2. Electrical.
 - 3. Mechanical.
- C. Concurrent, Contiguous, and Other Contracts:
 - 1. Contractor is hereby notified that there are other concurrent and contiguous contracts awarded by DGS and that these contracts may overlap the limits of work of this contract.
 - 2. The Contractor shall recognize this contiguous relationship and shall make provisions in the schedule and work plan to comply with this critical contract requirements, inclusive of right-of-way and access.
 - 3. Incidental and scheduled disruption to the Contractor work schedule and work plan shall not constitute the basis for additional compensation from the Owner.

1.9 WORK SEQUENCE

- A. Sequence of work and phasing shall be finalized dependent on Base Bid via CPM

schedule. Contractor shall phase the work as indicated in "SCHEDULE OF WORK" in this specification.

1.10 OWNER OCCUPANCY

- A. Owner intends to continue to occupy adjacent portions of the building during the entire construction period.
- B. Cooperate with Owner to minimize conflict and to facilitate Owner's operations.
- C. Schedule the work to accommodate the Owner occupancy. Contractor shall obtain the current Convention Center Schedule of events for coordination. Additional time has been allocated in the project duration for event coordination. Contractor shall plan for two-weeks of some after-hour work during the project duration.

PART 2 PRODUCTS (Not Used)

PART 3 EXECUTION

3.1 CONTRACT COMPLETION

- A. The Contractor is ultimately responsible for a complete, operational, functional, and final project that includes:
 - 1. All portions of the work as defined in the Contract Documents for this Project.
 - 2. Project Duration: 12 months for Base Bid work from the Notice to Proceed and 3 additional months per Alternate No.1 and No.2 for a total of 18 months.

3.2 SCHEDULE OF WORK

- A. Contractor shall schedule phase work as follows:
 - 1. Maintain operation of two (2) elevators at all times during the construction period. The first elevator to be replaced shall be Elevator No.5. The second elevator to be replaced shall be Elevator No.4 and the final elevator shall be Elevator No.6. Once an elevator is completed it shall be tested, inspected, and accepted, after which time work on the next elevator in the sequence may commence.
 - 2. Work on the elevator may commence at any time convenient to the building management.

END OF SECTION 011000

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SECTION 011400 – WORK RESTRICTION

PART 1 GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.
- B. Applicable Sections of the 2006 edition of the City of Baltimore Department of Public Works Specifications (“Green Book”).

1.2 USE OF PREMISES

- A. Construction will occur in areas/floors of the facility as per the plans. The Contractor shall limit work to one area or floor at any given time. During that time, the Contractor shall limit use of the facility to the area/floor where work is being performed. The Contractor shall not disturb the areas/floors beyond the present work area.
 - 1. Limits: Confine construction operations to the present work area.
 - 2. Owner Occupancy: Allow for Owner occupancy of Facility and full operation of Facility.
 - 3. Driveways and Entrances: Keep driveways and entrances serving premises clear and available to Owner, Owner’s employees, and emergency vehicles at all times. Do not use these areas for parking or storage of materials.
 - a. Schedule deliveries to minimize use of driveways and entrances.
 - b. Schedule deliveries to minimize space and time requirements for storage of materials and equipment on-site.
- B. Use of Existing Building: Repair damage caused by construction operations. Protect building and its occupants during construction period.

1.3 OCCUPANCY REQUIREMENTS

- A. Full Owner Occupancy: Owner will occupy site and existing building during entire construction period. Cooperate with Owner during construction operations to minimize conflicts and facilitate Owner usage. Perform the Work so as not to interfere with Owner’s operations.

PART 2 PRODUCTS (Not Used)

PART 3 EXECUTION (Not Used)

END OF SECTION 011400

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SECTION 012300 - ALTERNATES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

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

1.3 DEFINITIONS

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

1.4 PROCEDURES

- A. Coordination: Revise or adjust affected adjacent work as necessary to completely integrate work of the alternate into Project.
 - 1. Include as part of each alternate, miscellaneous devices, accessory objects, and similar items incidental to or required for a complete installation whether or not indicated as part of alternate.
- B. Execute accepted alternates under the same conditions as other work of the Contract.
- C. Schedule: A schedule of alternates is included at the end of this Section. Specification Sections referenced in schedule contain requirements for materials necessary to achieve the work described under each alternate.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 SCHEDULE OF ALTERNATES

1. Alternate No.1: Elevator No.4, all associated work in the elevator machine room and associated sump pump.
2. Alternate No.2: Elevator No.6, all associated work in the elevator machine room and associated sump pump.
3. Alternate No.3: VVVF Emergency Return/Auxiliary Power System (New) Elevator No.5, Specification Section 142113.
4. Alternate No.4: VVVF Emergency Return/Auxiliary Power System (New) Elevator No.4, Specification Section 142143.

END OF SECTION 012300

SECTION 012500 – SUBSTITUTION PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.
- B. Applicable Sections of the 2006 edition of the City of Baltimore Department of Public Works Specifications ("Green Book").

1.2 EQUAL OR APPROVED EQUAL

- A. On City Contracts the terms "or equal" and "substitution" are to be considered interchangeable. Where any item or material is specified by proprietary name, the trade names, and/or name of manufacturer, with or without the addition of such expressions as "or equal" or "approved equal", it is to be understood that the item or material named or the equal thereof, is intended, subject to the advance written approval of the Engineer as to the equality thereof, and it is distinctly and expressly understood by the Contractor.
 - 1. That the Engineer is to use his own judgment in determining, from time to time, whether or not any item or material proposed to be substituted is the equal of any item or material so specified.
 - 2. That the decision of the Engineer on all such questions of equality shall be final; and,
 - 3. That in the event of any adverse decision by the Engineer, no claim of any sort shall be made or allowed against the Engineer or the City.
- B. Should the Contractor elect to submit an "or equal" for any specified equipment or material for approval by the Engineer, the Contractor shall be responsible for any modifications which are necessary to make the equipment or material operate or function so as to meet the requirements of the Contract Documents, at no additional costs or expense to the City, including without limitation, costs and expenses arising out of or related to additional testing.
- C. If, subsequent to award of the Contract, it becomes necessary or desirable because of the inability of the Contractor to obtain promptly any items, equipment or materials as specified, or because the Contractor intends to use an "or equal" thereof, the Engineer, at his sole discretion, may authorize use of "or equal" or substitute items, equipment or materials of the same, greater, or less cost than those specified. In such cases the Contractor shall submit, in writing, its request for permission to use "or equal" equivalents or make such a substitution and shall furnish full information as to costs of the item, equipment or material specified, and the item, equipment or material to be equaled or substituted therefore. Such information shall be in such form and detail as to permit the Engineer to check to his satisfaction the specifications, quality and costs issues involved with any such request. Prior to the approval of the "or equal" or substitution, when the direct cost thereof is less than the direct costs of the item, equipment or material specified, the Engineer will issue a written authorization and directive setting forth the appropriate credit(s) to be allowed the City. The credit(s) so authorized by the Engineer shall represent the difference between the net cost to the Contractor of the "or equal" or substituted items, equipment or material, and the price at which it could have obtained the lowest priced item, equipment or material specified. Under no circumstances shall the Contractor be entitled to any increase in the cost or time of performance arising out of or

- relating to the approval by the Engineer of any "or equal" or substitute item, equipment or material.
- D. The decision of the Engineer, from time to time, as to the proper credits to be allowed the City shall be final and conclusive upon the Contractor.
- E. The Contract Documents may specify the name of manufacturer, trade name, model number or type of item, equipment or materials to be used in the project. All Bids shall be based on the named items, equipment or materials so specified without exception, and any credit authorized and directed by the Engineer for approval of any "or equal" or substitute item, equipment or material may be calculated on such use in the Contractor's Bid regardless of whether the Contractor did, in fact, base its Bid on the named item, equipment or materials. Reference made to a particular product or model of the manufacturer is made to identify a particular design, quality, construction, arrangement, style, etc.
- F. If the Contractor wishes to substitute a product of equal quality and fitness for a named material or item of equipment, it shall submit to the Engineer complete information and Working Drawings for such proposed substitute item, including without limitation all necessary redesign of the structure, partitions, foundations, piping, ductwork, wiring, or of any part of the project needed to accommodate such substitution. This submittal shall accompany the submission of the materials list. All such redesign and all new Drawings and detailing required therefore shall be prepared by the Contractor at the Contractor's sole costs and expense. If substitution of any item requires a different quantity and arrangement of structure, partitions, foundations, piping, ductwork, wiring, conduit and equipment from that specified or indicated on the Contract Drawings, the Contractor shall perform all such changes, modifications or Extra Work required arising out of or relating thereto at no additional cost, expense or time to the City. Requests for increases in the Contract amount or Contract Time to accommodate substitutions shall not be considered by the City, and the Contractor expressly waives any and all claims arising out of or relating thereto. The City shall pursue credits for substitute items of lower cost from the Contractor, and the Contractor shall be responsible for the payment thereof. It shall be expressly understood that equipment and materials named shall be furnished in full accordance with the Contract Drawings and/or Specifications.
- G. The attention of the Contractor is especially directed to the requirement that, if the Contractor proposes to substitute materials or equipment as "equals" to those specified, it shall be the Contractor's responsibility to furnish complete, specific, detailed information from the manufacturer or supplier of the material or equipment it proposes to furnish, in which the requirements of the Contract Documents are shown to be met or exceeded within twenty (20) days after Notice to Proceed. This submission by the Contractor shall include, without limitation, a point-by-point comparison of the specification requirements with the material or equipment proposed to be furnished. This comparison will include actual bid day pricing for the "or equal" substitution and specified equipment. In the event the Contract Documents mention a model number and manufacturer, a point-by-point comparison of the equipment specified under the Contract and the proposed substitute shall be provided. The full burden of responsibility for furnishing this information is with the Contractor. If, in the Engineer's sole discretion, incomplete or irrelevant data is submitted by the Contractor to comply with this requirement, the data shall be returned to the Contractor and the request for approval of the substitution shall be denied. Names of manufacturers for substitute items, which are not approved by the Engineer, shall not be considered and the Contractor shall supply the products named in the Specifications. The Contractor accepts all responsibility for any delays that result from the "or equal" approved process.

PART 2 - PRODUCTS (Not Used)

PART 3 – EXECUTION (Not Used)

END OF SECTION 012500

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SECTION 013100 - PROJECT MANAGEMENT AND COORDINATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.
- B. Applicable Sections of the 2006 edition of the City of Baltimore Department of Public Works Specifications ("Green Book").

1.2 SUMMARY

- A. This Section includes administrative provisions for coordinating construction operations on project including, but not limited to, the following:
 - 1. General project coordination procedures.
 - 2. Coordination Drawings.
 - 3. Administrative and supervisory personnel.
 - 4. Project meetings.
- B. Each contractor shall participate in coordination requirements. Certain areas of responsibility will be assigned to a specific contractor.

1.3 COORDINATION

- A. Coordination: Coordinate construction operations included in various Sections of the Specifications to ensure efficient and orderly installation of each part of the Work. Coordinate construction operations, included in different Sections, which depend on each other for proper installation, connections, and operation.
- B. Coordination: Each contractor shall coordinate its construction operations with those of other contractors and entities to ensure efficient and orderly installation of each part of the Work. Each contractor shall coordinate its operations with operations, included in different Sections that depend on each other for proper installation, connection, and operation.
 - 1. Schedule construction operations in sequence required to obtain the best results where installation of one part of the Work depends on installation of other components, before or after its own installation.
 - 2. Coordinate installation of different components with other contractors to ensure maximum accessibility for required maintenance, service, and repair.
 - 3. Make adequate provisions to accommodate items scheduled for later installation.
- C. If necessary, prepare memoranda for distribution to each party involved, outlining special procedures required for coordination. Include such items as required notices, reports, and list of attendees at meetings.
 - 1. Prepare similar memoranda for Owner and separate contractors if coordination of their Work is required.

- D. Administrative Procedures: Coordinate scheduling and timing of required administrative procedures with other construction activities and activities of other contractors to avoid conflicts and to ensure orderly progress of the Work. Such administrative activities include, but are not limited to, the following:
 - 1. Preparation of Contractor's Construction Schedule.
 - 2. Preparation of the Schedule of Values.
 - 3. Installation and removal of temporary facilities and controls.
 - 4. Delivery and processing of submittals.
 - 5. Progress meetings.
 - 6. Pre-installation conference.
 - 7. Project closeout activities.

- E. Conservation: Coordinate construction activities to ensure that operations are carried out with consideration given to conservation of energy, water, and materials.
 - 1. Salvage materials and equipment involved in performance of, but not actually incorporated into, the Work.

1.4 ADMINISTRATIVE AND SUPERVISORY PERSONNEL

- A. General: In addition to Project superintendent, provide other administrative and supervisory personnel as required for proper performance of the Work.
 - 1. Include special personnel required for coordination of operations with other contractors.

END OF SECTION 013100

SECTION 013120 - PROJECT MEETINGS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Scheduling and administration requirements for Progress Meeting.
- B. Administrative requirements for Contractor's Daily Construction Progress Reports.

1.2 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions.
- B. Applicable Sections of the 2006 edition of the City of Baltimore Department of Public Works Specifications ("Green Book").

1.3 RELATED SECTIONS

- A. Division 1 Specification Sections.

1.4 GENERAL

- A. Record all meetings and conferences and issue meeting minutes as indicated.
- B. Issue meeting minutes to Owner, Engineer, Contractor and conference participants through the Contractor.
- C. Distribute copies of all meeting minutes to all Subcontractors.

1.5 PROGRESS MEETING

- A. Schedule and conduct meetings and conferences at Project site.
 - 1. In event Work under this Contract obstructs or impedes passage of work of others, remove such obstructions and impediments expeditiously and make provisions to prevent delay and provide access for others.
- B. Preconstruction Conference: The Owner shall schedule a pre-construction conference before construction begins. The conference shall be held at the project site or another convenient location.
 - 1. Attendees: Authorized representatives of Owner, Engineer, Contractor and its superintendent; major subcontractors; and other concerned parties shall attend the conference. All participants at the conference shall be familiar with Project and authorized to conclude matters relating to the Work.
 - 2. Agenda: Discuss items of significance that could affect progress, including the following:
 - a. Tentative construction schedule.
 - b. Phasing.
 - c. Critical work sequencing.
 - d. Designation of responsible personnel.
 - e. Procedures for processing field decisions and Change Orders.
 - f. Procedures for processing Applications for Payment.

- g. Distribution of the Contract Documents.
 - h. Submittal procedures.
 - i. Preparation of Record Documents.
 - j. Use of the premises.
 - k. Responsibility for temporary facilities and controls.
 - l. Parking availability.
 - m. Office, work, and storage areas.
 - n. Equipment deliveries and priorities.
 - o. First aid.
 - p. Security.
 - q. Progress cleaning.
 - r. Working hours.
- C. Progress Meeting will be held on a mutually agreed upon weekday of every other week for duration of Contract.
- D. Progress Meeting will be held in Contractor's on-site office conference room.
- E. The following individuals and agencies shall attend each Progress Meeting:
1. Owner's Representatives.
 2. Engineer (City PM).
 3. Contractor's Project Manager.
 4. Contractor's Superintendent.
 5. Other members from design team, as needed.
 6. Architect (if needed).
 7. Subcontractors (if needed).
- F. Contractor will administer, record, and distribute Progress Meeting Minutes.
- G. Progress Meeting Minutes will be issued within five days following Progress Meeting.
- H. Agenda:
1. Review of minutes of previous meeting.
 2. Review of Work progress and on-site security.
 3. Review of Contractor's Request for Interpretations.
 4. Field observations, problems, and decisions.
 5. Review of Submittals Schedule and status of Submittals.
 6. Review of off-site fabrication and delivery schedules.
 7. Maintenance of progress schedule.
 8. Corrective measures to regain projected schedules.
 9. Planned progress during succeeding work period.
 10. Coordination of projected progress.
 11. Maintenance of quality and work standards.
 12. Effect of proposed changes on progress schedule and coordination.
 13. Other business relating to Work
- I. Contractor Prepared Documents:
1. The Contractor's Project Manager shall provide documents containing representative information that Contractor shall prepare and distribute to each attendee at the start of each Progress Meeting, to include:
 - a. Prior Progress Meeting minutes.

- b. Schedule Narrative:
 - 1) Description of work by trade or system.
 - 2) Describe past two-week's effort and next four weeks effort.
 - 3) Indicate where four-week scheduled tasks were not accomplished and report on methods to be employed by Contractor to recover schedule slippage.
 - 4) Narrative to include CPM Schedule task identifier, task description, task duration and percent complete (planned and actual) per week.
- c. Look-ahead Schedule: Two-week Look-Back and four-week Look-Ahead Gantt Bar Chart developed from Owner-approved CPM Construction Schedule.
- d. Request for Interpretation Log (RFI).
- e. Approved Change Order Log (ACO).
- f. Shop Drawing and Product Submittal Log.
- g. New Business: Contractor produced itemized list of new items and issues to be discussed.
 - 1) Number each item starting with the current meeting number, followed by a period and sequential item number. Example: 1.01, 1.02, etc.

1.6 DAILY CONSTRUCTION PROGRESS REPORTS

- A. Prepare Daily Construction Progress Reports and distribute copies to Owner on a weekly basis (Monday morning for previous week).
- B. Reports shall be prepared in type written format by Contractor's Superintendent and include the following items as a minimum:
 - 1. Project Title.
 - 2. Contract Number.
 - 3. Date Report Represents.
 - 4. Date Report was prepared.
 - 5. Field Engineer's Name.
 - 6. Work start time and work stop time.
 - 7. Official weather report from the nearest Federal Weather Reporting Station, or as approved by Engineer.
 - 8. Manpower distribution and totals by category of trade and trade skill level.
 - 9. Contractor's project administration manpower by description and total.
 - 10. Summary of manpower tasks scheduled and accomplished during reporting period.
 - 11. Summary of materials and products delivered and quantities used during reporting period.
 - 12. Other information as required.

PART 2 PRODUCTS (Not Used)

PART 3 EXECUTION (Not Used)

END OF SECTION 013120

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SECTION 014000 – QUALITY REQUIREMENTS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Contractor's Quality Control Firm and Quality Control Program.
- B. Quality Control of products and workmanship.
- C. Manufacturer's instructions.
- D. Manufacturer's certificates and field services.

1.2 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions.
- B. Applicable Sections of the 2006 edition of the City of Baltimore Department of Public Works Specifications ("Green Book").

1.3 RELATED SECTIONS

- A. Division 1 Specification Sections.

1.4 DESCRIPTION: PROJECT QUALITY CONTROL and QUALITY ASSURANCE

- A. Coordinate with requirements of Division 1 Specification Sections.
- B. The Contractor shall take note of the following:
 - 1. When the words Quality, Quality Control, and Quality Assurance are used within the Contract Documents the work of providing qualitative control, monitoring and documenting the quality of the contract is the sole responsibility of the Contractor, with the exception of when the words and work of Quality Assurance is described herein and in Section 011000.
- C. The Contractor is fully and wholly responsible for Quality Control of the Project.

1.5 QUALITY CONTROL MANAGER REQUIREMENTS

- A. Contractor's Quality Control Manager shall have a minimum of ten (10) years of construction related experience where the technical and costs requirements are similar to the technical and cost requirements of this project.
 - 1. Identify and submit qualifications of the Contractor's candidate Quality Control Manager at the Preconstruction Conference for Owner's review and approval.
 - a. The Owner reserves the right to reject or accept the candidate QCM at their sole discretion.

1.6 CONTRACTOR'S QUALITY CONTROL PROGRAM

- A. Quality Control (QC) is defined to involve and require related testing and inspection procedures, and refers to collective actions required to ensure that fabricated and installed

materials, equipment, systems comply with Contract Documents and regulations by governing agencies and authorities.

- B. Perform required actions and include specified surveillance, inspection, testing, measuring, reporting, and correction-of-defects.
- C. Completion of required Quality Control actions on a unit of work does not relieve Contractor of responsibility for compliance with other requirements of the Contract Documents.
- D. Specified and identified Quality Control requirements are not intended to limit Contractor's and Contractor's Fabricator's procedures that achieve compliance with the requirements of the Contract Documents; nor are these intended to limit related requirements which may be imposed by other provisions hereof, or by governing agencies and authorities.

1.7 QUALITY CONTROL ORGANIZATION AND SUBMITTALS

- A. Quality Control Plan: Submit the Contractor's Quality Control Plan (QCP) at the Preconstruction Conference.
 - 1. Plan shall indicate the required staff qualifications, personnel assignments, procedures, instructions, record keeping, and forms to be used for implementing and reporting QC requirements.
 - 2. Upon receipt of the Owner's review and acceptance of the Contractor's Quality Control Plan, coordinate and integrate the principal actions and work into the Contractor's Construction Progress Schedule.
 - 3. Include in the QC Plan a complete listing by specification Section of inspections and tests to be performed; and chart how the results will be reported to the Owner and Engineer.
 - a. Submit in QC Plan copy of Contractor's letter of authorization appointing qualifications of the QCM for overall management of the QCP and his authority to act for the Contractor in QC matters. Acceptance of the candidate QCM qualifications is subject to the Owner's review and approval.
 - b. When acceptable to the Owner, schedule and maintain QC staff on Project Site and elsewhere, whenever work is scheduled and performed such that qualified QC staff perform and document the QC work.
 - c. Include in the QC Plan and maintain a current listing of QC staff assignments, indicating names, qualifications, duties, authorizations, and responsibilities.
 - 4. Indicate and include in the OC Plan specifically how the related Sections under Divisions 0 and 1, are to be implemented.
 - 5. Prior to the start of work, meet with the Owner's Representative and review the QC Plan and how the Contractor will implement and integrate the QC Plan with the Construction Progress Schedule.
 - 6. Prepare and distribute detailed minutes of meeting, and subsequent meetings; signed by both the Contractor's PM, QCM and Owner's Representative.
 - a. Do not proceed with work subject to QC requirements until acceptance of QC Plan has been granted by QCM and SFPM.
 - b. Continued acceptance is subject to satisfactory performance of work, including satisfactory execution of QC Plan provisions.
 - c. Do not change accepted QC Plan, except with prior written approval of SFPM and QCM on proposed change.
 - d. Owner reserves the right to require changes in the QC Plan, where required by the SFPM as necessary to assure required qualities and Contract compliance.

1.8 QUALITY CONTROL SERVICES

- A. General: Contractor shall include sample taking, testing, analysis, reporting, and similar activities as part of this contract.
- B. QC Pre-Analysis and Preparation: Prior to start of each unit of work subject to QC inspection and testing, review related Contract Document requirements; and ensure that preliminary actions have been completed, including submittal/approval procedures, procurement of materials/equipment/ services required for the work, installation personnel and equipment available at the site, and inspection and test equipment and agencies are present. Notify SFPM a minimum of 48 hours in advance of each QC pre-analysis inspection procedure, and provide written record of such procedure to the QCM and SFPM.
- C. Where indicated, scheduled and/or identified, engage the QC service to perform inspections associated with or required in connection with QC activities, including written confirmation that materials being used in the work comply with the requirements of the Contract Documents.
- D. For QC services on work to be provided over prepared substrates; engage the related QC service to inspect and test prepared substrates for suitability to receive the superimposed work; and include the results of substrate inspections and testing in related QC reporting.
- E. Proceed with initial QC service related to each element of work as soon as possible after installation of a suitable increment of work has been accomplished. QCM to notify SFPM at least 48 hours in advance of each anticipated QC service, and include anticipated schedule for follow-up services, through installation of remaining increments. Conclude each QC sequence of service for a unit-of-work with a completion set of services, and a summary report for entire QC services on the unit of work.
- F. Provide testing as scheduled, specified, indicated or as otherwise required to ensure accurate determination of quality compliances with requirements of the Contract Documents. Comply with recognized standards of testing for each industry and trade. Use recognized independent testing laboratory services acceptable to the Owner. Provide written report of each QC inspection and test performed, including the following information:
 - 1. Contract Title and Contract Number.
 - 2. Test title, source, and sequence number.
 - 3. Date(s) and location(s) of samples, and dates of tests; related Contract Document Specification Section and Article.
 - 4. Identify the recognized industry/trade test method and specification.
 - 5. Name of testing laboratory, and individual conducting inspection/test procedure.
 - 6. Ambient conditions at time of sample taking, and at time of inspection/test procedure.
 - 7. Inspection/test data, results, interpretations, and analysis of information developed.
 - 8. Test agency's/individual's comments and professional opinions concerning; whether test has "passed", whether work-in-place complies with contract requirements, and whether retesting or other testing is recommended; complete with responsible individual's signature and date.
 - 9. Other data as required/implied, by nature of particular inspection/test procedure being completed, or by provisions in related technical section of these Contract Specifications.
 - 10. Include name of person or agency conducting the inspection/test procedure; to the effect of "certification" that materials/equipment/services incorporated into the work comply with requirements of the Contract Documents; or "expressing" reservations thereto, as observed or determined.

- G. Maintain complete record and log of entire QC actions, ready for SFPM examination at any time. Highlight defects, deficiencies, and noncompliance's found; along with corrective actions/reconstructions completed, to be completed, or recommended for acceptance of SFPM.
- H. Completion Inspection: At the time each unit of work or separate increment thereof is substantially complete, and regardless of whether subjected to specific QC inspection and testing, conduct a completion inspection and develop a "punch list" of deficiencies to be corrected on non-complying elements, and include in QC documentation. Include in report the dates established or estimated for completion of corrections, as required to comply with Construction Progress Schedule and Close-Out Procedures identified elsewhere.

1.9 COINCIDENTAL SERVICES

- A. Provide incidental services needed by engaged QC agency/services, including services performed by SCITF and by its engaged services. Incidental services include, but are not limited to the following:
 - 1. Use of Contractor's QC testing laboratory.
 - 2. Assistance in gaining access to work, and taking of test samples, and subsequent repair of work and substrates.
 - 3. Temporary facilities, as reasonably utilized by quality control/testing services.
 - 4. The handling, curing, storage, and protection of test samples at the Project Site.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 WORKMANSHIP

- A. Comply with industry-referenced standards except where more restrictive tolerances or specified requirements indicate more rigid standards; the more restrictive requirement shall apply.
- B. Provide sufficient quantity of qualified personnel to comply with requirements of specifications for this project.
- C. Secure products in place with positive anchorage devices designed and sized to withstand stresses, vibration, and racking.
- D. Provide finishes to match approved samples and mockups.

3.2 MANUFACTURER'S INSTRUCTIONS

- A. Require compliance with instructions in full detail, including each step in construction sequence.
- B. Should instruction conflict with Contract Documents, request clarification from Engineer before proceeding.

3.3 MANUFACTURER'S CERTIFICATES

- A. When required by Specification Sections, submit manufacturer's certificate in original duplicate, certifying that products meet or exceed specified requirements, executed by responsible officer of the manufacturer.

3.4 MANUFACTURER'S FIELD SERVICES

- A. Provide qualified manufacturer representative when required by Specification Section or as a result of review and evaluation of Contractor's sub-contractor's named list.
- B. Provide qualified manufacturer representative, at no additional cost to Owner, to perform the following:
 - 1. Observe field conditions.
 - 2. Conditions of surfaces and installation.
 - 3. Quality of workmanship.
 - 4. Start-up of equipment.
 - 5. Test, adjust, and balance equipment.
 - 6. Provide written report of observations and recommendations to Contractor within two days of each site visit.
- C. Submit report to Engineer in accordance with Section 013300.

3.5 CORRECTION OF WORK

- A. Defects in Work: Where QC procedures disclose defects in the work provide remedial actions, as agreed upon with SFPM, to upgrade, repair, restore, reconstruct, replace, or otherwise correct defects in the work, so as to provide compliance with requirements of the Contract Documents.
 - 1. Provide reinspection/retesting of corrected work, comparable with that required for initial work, and as directed by the SFPM; repeat until compliances are achieved.
 - 2. Neither the required QC procedure, nor detection of defects, nor correction of defects, nor the reinspection/retesting of corrected work, provides a basis for Contractor's claim for Contract Modification, Additional Compensation, or request for extension of Contract Time.

3.6 RESTORATION AND PROTECTION

- A. General, Final Restoration: Upon completion of inspection, sample taking, testing, and correction-of-defects for the work in place; repair damaged work and substrates, and restore finishes to eliminate deficiencies in visual and performance qualities; comply with SFPM's requests. Restore protection as specified. Comply with provisions of section on cutting and patching.
- B. Continued Protection: As an integral action of the QC Plan, provide continued protection of completed work through remainder of Construction Time, and monitor protective measures in relation to construction activities.

END OF SECTION 01400

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SECTION 014200 - REFERENCES

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Applicability of Reference Standards.
- B. Provision of Reference Standards at Site.
- C. Acronyms used in Contract Documents for Reference Standards.
- D. Source of Reference Standards.

1.2 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions.
- B. Applicable Sections of the 2006 edition of the City of Baltimore Department of Public Works Specifications ("Green Book").

1.3 RELATED SECTIONS

- A. Division 1 Specification Sections.

1.4 QUALITY ASSURANCE

- A. For products or workmanship specified by association, trade, or Federal Standards, comply with requirements of the standard, except when more rigid requirements are specified or are required by applicable codes.
- B. The date of the standard is that in effect as of the date of Owner-Contractor Agreement.
- C. When required by individual Specification Section and/or at the request of the Owner and/or Engineer, obtain copy of standard.
- D. Maintain copy at jobsite during submittals, planning, and progress of the specific work, until Substantial Completion.

1.5 SCHEDULE OF REFERENCES

- AA Aluminum Association
818 Connecticut Avenue, N.W.
Washington, DC 20006
- AABC Associated Air Balance Council
1000 Vermont Avenue, N.W.
Washington, DC 20005

ACI	American Concrete Institute Box 19150 Reford Station Detroit, MI 48219
ADC	Air Diffusion Council 230 North Michigan Avenue Chicago, IL 60601
ADA	Americans with Disabilities Act
AGC	Associated General Contractors of America 1957 E Street, N.W. Washington, DC 20006
AISC	American Institute of Steel Construction 400 North Michigan Avenue Eighth Floor Chicago, IL 60611
AMCA	Air Movement and Control Association 30 West University Drive Arlington Heights, IL 60004
ANSI	American National Standards Institute 1430 Broadway New York, NY 10018
APA	American Plywood Association Box 11700 Tacoma, WA 98411
ARI	Air-Conditioning and Refrigeration Institute 1815 North Fort Myer Drive Arlington, VA 22209
ASHRAE	American Society of Heating, Refrigerating and Air Conditioning Engineers 1791 Tullie Circle, N.E. Atlanta, GA 30329
ASME	American Society of Mechanical Engineers 345 East 47th Street New York, NY 10017
ASTM	American Society for Testing and Materials 1916 Race Street Philadelphia, PA 19103

AWWA	American Water Works Association 6666 West Quincy Avenue Denver, CO 80235
AWS	American Welding Society 550 LeJeune Road Miami, FL 33135
COMAR	Codes for the State of Maryland Division of State Documents 11 Bladen Street Annapolis, MD 21401
CDA	Copper Development Association 57th Floor, Chrysler Building 405 Lexington Avenue New York, NY 10174
EJCDC	Engineers' Joint Contract Documents Committee American Consulting Engineers Council 1050 15th Street, N.W. Washington, DC 20005
FM	Factory Mutual 1151 Boston-Providence Turnpike Norwood, MA 02062
FS	Federal Specification General Services Administration Specifications and Consumer Information Distribution Section (WFSIS) Washington Navy Yard, Bldg. 197 Washington, DC 20407
GA	Gypsum Association 1603 Orrington Avenue Evanston, IL 60201
IEEE	Institute of Electrical and Electronics Engineers 345 East 47th Street New York, NY 10017
IMIAC	International Masonry Industry All-Weather Council International Masonry Institute 815 15th Street, N.W. Washington, DC 20005
ML/SFA	Metal Lath/Steel Framing Association 221 North LaSalle Street Chicago, IL 60601
NEBB	National Environmental Balancing Bureau 8224 Old Courthouse Road Vienna, VA 22180

- NEMA National Electrical Manufacturers' Association
2101 L Street, N.W.
Washington, DC 20037
- NFPA National Fire Protection Association
1 Batterymarch Park
Quincy, MA 02169-7471
- PS Product Standard
U.S. Department of Commerce
Washington, DC 20203
- SDI Steel Door Institute
712 Lakewood Center North
Cleveland, OH 44107
- SMACNA Sheet Metal and Air Conditioning Contractors' National Association
4201 Lafayette Center Drive
Chantilly, VA 20151
- TAS Technical Aid Series
Construction Specifications Institute
601 North Madison Street
Alexandria, VA 22314
- UL Underwriters' Laboratories, Inc.
333 Pfingsten Road
Northbrook, IL 60062

PART 2 PRODUCTS (Not Used)

PART 3 EXECUTION (Not Used)

END OF SECTION 014200

SECTION 015690 - CONSTRUCTION CLEANING

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Cleaning and disposal of Contractor-generated construction waste materials, debris, and rubbish for duration of Contract.
- B. Cleaning and disposal of Contractor- and Owner-generated field office waste materials, debris and rubbish for duration of Contract.

1.2 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions.
- B. Applicable Sections of the 2006 edition of the City of Baltimore Department of Public Works Specifications ("Green Book").

1.3 RELATED SECTIONS

- A. Division 1 Specification Sections.
- B. Green Book Specification Section 2.
- C. Division 230000 and 260000 specifications.

PART 2 PRODUCTS

2.1 EQUIPMENT

- A. Provide covered containers for deposit of waste materials, debris, and rubbish.

PART 3 - EXECUTION

3.1 CLEANING

- A. Maintain project limits free of waste materials, debris, and rubbish on a daily basis.
- B. Maintain project limits in a clean and orderly condition on a daily basis.
- C. Remove debris and rubbish from ductwork, pipes, structures, and other closed or remote spaces, prior to closing the space and/or as instructed by the Owner or the City's Field Project Manager.
- D. Daily clean interior areas to provide suitable conditions for Work.
- E. Broom and wet mop interior areas prior to start of surface finishing, and continue cleaning on an as-needed basis.
- F. Control cleaning operations so that dust and other particles will not adhere to wet or newly coated surfaces.

- G. Remove debris, trash and clean project limits and field offices at the direction of the Owner at no additional cost to the Owner within 24 hours of receiving written direction.

3.2 DISPOSAL

- A. Remove waste materials, debris, and rubbish from site daily and legally dispose of off-site.

END OF SECTION 015690

SECTION 016000 PRODUCT REQUIREMENTS

PART 1 GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and other Division-1 Specification Sections, apply to this Section.
- B. Applicable Sections of the 2006 edition of the City of Baltimore Department of Public Works Specifications ("Green Book").

1.2 SUMMARY

- A. This Section specifies administrative and procedural requirements governing the Contractor's selection of products for use in the Project. Multiple Prime Contracts: Provisions of this Section apply to the construction activities of each prime Contractor.
- B. The Contractor's Construction Schedule and the Schedule of Submittals are included under Section "Submittals."
- C. Standards: Refer to Section "Definitions and Standards" for applicability of industry standards to products specified.
- D. Administrative procedures for handling requests for substitutions made after award of the Contract are included under Section "Product Substitutions."

1.3 DEFINITIONS

- A. Definitions used in this Article are not intended to change the meaning of other terms used in the Contract Documents, such as "specialties," "systems," "structure," "finishes," "accessories," and similar terms. Such terms such are self-explanatory and have well recognized meanings in the construction industry.
 - 1. "Products" are items purchased for incorporation in the Work, whether purchased for the Project or taken from previously purchased stock. The term "product" includes the terms "material," "equipment," "system," and terms of similar intent.
 - a. "Named Products" are items identified by manufacturer's product name, including make or model designation, indicated in the manufacturers published product literature that is current as of the date of the Contract Documents.
 - b. "Foreign Products", as distinguished from "domestic products," are items substantially manufactured (50 percent or more of value) outside of the United States and its possessions; or produced or supplied by entities substantially owned (more than 50 percent) by persons who are not citizens of nor living within the United States and its possessions.
 - 2. "Materials" are products that are substantially shaped, cut, worked, mixed, finished, refined or otherwise fabricated, processed, or installed to form a part of the Work.
 - 3. "Equipment" is a product with operational parts, whether motorized or manually operated, that requires service connections such as wiring or piping.

1.4 SUBMITTALS

- A. Product List Schedule: Prepare a schedule showing products specified in a tabular form acceptable to the Engineer. Include generic names of products required. Include the manufacturer's name and proprietary product names for each item listed.
1. Coordinate the product list schedule with the Contractor's Construction Schedule and the Schedule of Submittals.
 2. Form: Prepare the product listing schedule with information on each item tabulated under the following column headings:
 - a. Related Specification Section number.
 - b. Generic name used in Contract Documents.
 - c. Proprietary name, model number and similar designations.
 - d. Manufacturers and name and address.
 - e. Supplier's name and address.
 - f. Installer's name and address.
 - g. Projected delivery date, or time span of delivery period.
 3. Initial Submittal: Within the time specified in Section 010000, submit 3 copies of an initial product list schedule. Provide a written explanation for omissions of data, and for known variations from Contract requirements. At the Contractor's option, the initial submittal may be limited to product selections and designations that must be established early in the Contract period. Include list of all supervisors and subcontractors, by Pre-Construction Meeting.
 4. Completed Schedule: Within the time specified in Section 010000, submit 3 copies of the completed product list schedule. Provide a written explanation for omissions of data, and for known variations from Contract requirements.
 5. Engineer's Action: The Engineer will respond in writing to the Contractor within 1 week of receipt of the completed product list schedule. The Engineer's response will include the following: A list of unacceptable product selections, containing a brief explanation of reasons for this action.

1.5 QUALITY ASSURANCE

- A. Source Limitations: To the fullest extent possible, provide products of the same kind, from a single source. When specified products are available only from sources that do not or cannot produce a quantity adequate to complete project requirements in a timely manner, consult with the Engineer for a determination of the most important product qualities before proceeding. Qualities may include attributes relating to visual appearance, strength, durability, or compatibility. When a determination has been made, select products from sources that produce products that possess these qualities, to the fullest extent possible.
- B. Compatibility of Options: When the Contractor is given the option of selecting between two or more products for use on the Project, the product selected shall be compatible with products previously selected, even if previously selected products were also options.
1. Each prime Contractor is responsible for providing products and construction methods that are compatible with products and construction methods of other prime or separate Contractors.

2. If a dispute arises between prime Contractors over concurrently selectable, but incompatible products, the Engineer will determine which products shall be retained and which are incompatible and must be replaced.
- C. Foreign Product Limitations: Except under one or more of the following conditions, provide domestic products, not foreign products, for inclusion in the Work:
1. No available domestic product complies with the Contract Documents.
 2. Domestic products that comply with Contract Document are only available at prices or terms that are substantially higher than foreign products that also comply with the Contract Documents.
- D. Nameplates: Except for required labels and operating data, do not attach or imprint manufacturers or producer's nameplates or trademarks on exposed surfaces of products which will be exposed to view in occupied spaces or on the exterior.
1. Labels: Locate required product labels and stamps on a concealed surface or, where required for observation after installation, on an accessible surface that is not conspicuous.
 2. Equipment Nameplates: Provide a permanent nameplate on each item of service-connected or power-operated equipment. Locate on an easily accessible surface which is inconspicuous in occupied spaces. The nameplate shall contain the following information and other essential operating data:
 - a. Name of product and manufacturer.
 - b. Model and serial number.
 - c. Capacity.
 - d. Speed.
 - e. Ratings.

1.6 PRODUCT DELIVERY, STORAGE, AND HANDLING

- A. Deliver, store and handle products in accordance with the manufacturer's recommendations, using means and methods that will prevent damage, deterioration and loss, including theft.
1. Schedule delivery to minimize long-term storage at the site and to prevent overcrowding of construction spaces.
 2. Coordinate delivery with installation time to ensure minimum holding time for items that are flammable, hazardous, easily damaged, or sensitive to deterioration, theft and other losses.
 3. Deliver products to the site in the manufacturer's original sealed container or other packaging system, complete with labels and instructions for handling, storing, unpacking, protecting and installing.
 4. Inspect products upon delivery to ensure compliance with the Contract Documents, and to ensure that products are undamaged and properly protected.
 5. Store products at the site in a manner that will facilitate inspection and measurement of quantity or counting of units.
 6. Store heavy materials away from the Project structure in a manner that will not endanger the supporting construction.

7. Store products subject to damage by the elements above ground, under cover in a weathertight enclosure, with ventilation adequate to prevent condensation. Maintain temperature and humidity within range required by manufacturer's instructions.

PART 2 PRODUCTS

2.1 PRODUCT SELECTION

- A. General Product Requirements: Provide products that comply with the Contract Documents, that are undamaged and, unless otherwise indicated, unused at the time of installation.
 1. Provide products complete with all accessories, trim, finish, safety guards and other devices and details needed for a complete installation and for the intended use and effect.
 2. Standard Products: Where available, provide standard products of types that have been produced and used successfully in similar situations on other projects.
- B. Product Selection Procedures: Product selection is governed by the Contract Documents and governing regulations, not by previous Project experience. Procedures governing product selection include the following:
 1. Proprietary Specification Requirements: Where only a single product or manufacturer is named, provide the product indicated. No substitutions will be permitted.
 2. Semi-Proprietary Specification Requirements: Where two or more products or manufacturers are named, provide one of the products indicated. No substitutions will be permitted. Where products or manufacturers are specified by name, accompanied by the term "or equal," or "or accepted substitute" comply with the Contract Document provisions concerning "substitutions" to obtain approval for use of an unnamed product.
 3. Non-Proprietary Specifications: When the Specifications list products or manufacturers that are available and may be incorporated in the Work, but do not restrict the Contractor to use of these products only, the Contractor may propose any available product that complies with Contract requirements. Comply with Contract Document provisions concerning "substitutions" to obtain approval for use of an unnamed product.
 4. Descriptive Specification Requirements: Where Specifications describe a product or assembly, listing exact characteristics required, with or without use of a brand or trade name, provide a product or assembly that provides the characteristics and otherwise complies with Contract requirements.
 5. Performance Specification Requirements: Where Specifications require compliance with performance requirements, provide products that comply with these requirements, and are recommended by the manufacturer for the application indicated. General overall performance of a product is implied where the product is specified for a specific application. Manufacturer's recommendations may be contained in published product literature, or by the manufacturer's certification of performance.

6. Compliance with Standards, Codes and Regulations: Where the Specifications only require compliance with an imposed code, standard or regulation, select a product that complies with the standards, codes or regulations specified.
7. Visual Matching: Where Specifications require matching an established Sample, the Engineer's decision will be final on whether a proposed product matches satisfactorily. Where no product available within the specified category matches satisfactorily and also complies with other specified requirements, comply with provisions of the Contract Documents concerning "substitutions" for selection of a matching product in another product category, or for noncompliance with specified requirements.
8. Visual Selection: Where specified product requirements include the phrase "...as selected from manufacturer's standard colors, patterns, textures..." or a similar phrase, select a product and manufacturer that complies with other specified requirements. The Engineer will select the color, pattern and texture from the product line selected.

2.2 WARRANTY

- A. Warranties for all equipment shall begin at the time of Substantial Completion.

PART 3 EXECUTION

3.1 INSTALLATION OF PRODUCTS:

- A. Comply with manufacturer's instructions and recommendations for installation of products in the applications indicated. Anchor each product securely in place, accurately located and aligned with other Work. Clean exposed surfaces and protect as necessary to ensure freedom from damage and deterioration at time of Substantial Completion.

END OF SECTION 016000

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SECTION 016500 - TRANSPORTATION AND HANDLING

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Packaging, Transportation.
- B. Delivery and Receiving.
- C. Product Handling.

1.2 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions.
- B. Applicable Sections of the 2006 edition of the City of Baltimore Department of Public Works Specifications ("Green Book").

1.3 RELATED SECTIONS

- A. Division 1 Specification Sections.

PART 2 PRODUCTS (Not Used)

PART 3 EXECUTION

3.1 PACKAGING AND TRANSPORTATION

- A. Require supplier to package finished products in boxes or crates for protection during shipment, handling, and storage.
- B. Protect sensitive products against exposure to elements and moisture.
- C. Protect sensitive equipment and finished against impact, abrasion, and other damage.

3.2 DELIVERY AND RECEIVING

- A. Arrange deliveries of products in accordance with construction progress schedules.
- B. Allow time for inspection prior to installation.
- C. Coordinate deliveries to avoid conflict with Work and conditions at site; limitations on storage space; availability of personnel and handling equipment; and Owner's use of premises.
- D. Deliver products in undamaged, dry condition, in original unopened containers or packaging with identifying labels intact and legible.
- E. Clearly mark partial deliveries of component parts of equipment to identify equipment and contents, to permit easy accumulation of parts, and to facilitate assembly.

- F. Immediately upon delivery, inspect shipment to assure:
 - 1. Product complies with requirement of Contract Documents and reviewed submittals.
 - 2. Quantities are correct.
 - 3. Accessories and installation hardware are correct.
 - 4. Containers and packages are intact and labels legible.
 - 5. Products are protected and undamaged.

3.3 PRODUCT HANDLING

- A. Provide equipment and personnel to handle products, by methods to prevent soiling and damage.
- B. Provide additional protection during handling to prevent marring and otherwise damaging products, packaging, and surrounding surfaces.
- C. Handle product by methods to avoid bending or overstressing.
- D. Lift large and heavy components only at designated lift points.

END OF SECTION 016500

SECTION 016600 - STORAGE AND PROTECTION

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Storage, General.
- B. Enclosed Storage.
- C. Exterior Storage.
- D. Maintenance of Storage.

1.2 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions.
- B. Applicable Sections of the 2006 edition of the City of Baltimore Department of Public Works Specifications ("Green Book").

1.3 RELATED SECTIONS

- A. Division 1 Specification Sections.

PART 2 PRODUCTS

(Not Used)

PART 3 EXECUTION

3.1 GENERAL

- A. Storage facilities are not guaranteed. Minimal on-site storage is preferred.
- B. Store products, immediately upon delivery, in accordance with manufacturer's instructions, with seals and labels intact.
- C. Protect until installed.
- D. Arrange storage in a manner to provide access for maintenance of stored items and for inspection.
- E. Storage of materials to be used for a week's duration may be stored in the secured construction area.
- F. Stored materials must not conflict with work conditions.
- G. On-site storage subject to Owner approval and inspection.

3.2 ENCLOSED STORAGE

- A. Store products, subject to damage by the elements, in substantial weathertight enclosures.
- B. Maintain temperature and humidity within ranges stated in manufacturer's instructions.
- C. Provide humidity control and ventilation for sensitive product, as required by manufacturer's instructions.
- D. Store unpacked and loose products on shelves, in bins, or in neat groups of like items.

3.3 EXTERIOR STORAGE

- A. Provide substantial platforms, blocking, or skids, to support fabricated products above ground; slope to provide drainage.
- B. Protect products from soiling and staining.
- C. For products subject to discoloration or deterioration from exposure to the elements, cover with impervious sheet material.
- D. Provide ventilation to avoid condensation.
- E. Provide surface drainage to prevent erosion and ponding of water.
- F. Prevent mixing of refuse or chemically injurious materials or liquids.

3.4 MAINTENANCE OF STORAGE

- A. Periodically inspect stored products on a schedule basis.
- B. Maintain a log of inspections available to Owner on request.
- C. Verify that storage facilities comply with manufacturer's product storage requirements.
- D. Verify that manufacturer-required environmental conditions are maintained continually.
- E. Verify that surfaces of products exposed to the elements are not adversely affected and that any weathering of finishes is acceptable under requirements of Contract Documents.

3.5 MAINTENANCE OF EQUIPMENT STORAGE

- A. For mechanical and electrical equipment in long-term storage, provide manufacturer's service instructions to accompany each item, with notice of enclosed instructions shown on exterior of package.
- B. Service equipment on a regularly scheduled basis, maintaining a log of services; submit as a Record Document.
- C. Off-site storage unit shall be in bonded warehouse per Green Building Specifications.

END OF SECTION 016600

SECTION 017300 - EXECUTION

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Construction Layout.
- B. Installation of work.
- C. Starting and Adjusting.
- D. Protection of installed construction.

1.2 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions.
- B. Applicable Sections of the 2006 edition of the City of Baltimore Department of Public Works Specifications ("Green Book").

1.3 RELATED SECTIONS

- A. Division 1 Specification Sections

PART 2 PRODUCTS

2.1 MATERIALS

- A. General: Comply with requirements specified in other Sections of these Specifications.
- B. Existing Materials: Use materials identical to existing materials. For exposed surfaces, use materials that visually match existing adjacent surfaces to the fullest extent possible.
 - 1. If identical materials are unavailable or cannot be used, use materials that, when installed, will match the visual and functional performance of existing materials.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Before proceeding with each component of work, examine substrates, areas and conditions for compliance with requirements for installation tolerances and other conditions affecting performance.
 - 1. Examine rough-in for mechanical and electrical systems to verify actual locations of connections before equipment installation.

3.2 PREPARATION

- A. Take field measurements as required and provide coordinated drawings showing installation and routing of equipment, ductwork, piping, etc.

- B. Verify space requirements and dimensions of items shown diagrammatically on Drawings.
- C. Review contract documents and compare with existing field conditions. Immediately contact Architect/Engineer on discovery of areas that need clarification of the Contract Documents caused by differing field conditions outside the control of Contractor.

3.3 INSTALLATION

- A. General: Locate the work and components of the work accurately, in correct alignment and elevation, as indicated.
 - 1. Make vertical work plumb and make horizontal work level.
 - 2. Where space is limited, install components to maximize space available for maintenance and ease of removal and replacement.
 - 3. Conceal pipes, ducts and wiring in finished areas unless otherwise indicated.
 - 4. Maintain minimum headroom clearance of 96 inches in occupied spaces and 90 inches in unoccupied spaces.

3.4 STARTING AND ADJUSTING

- A. Coordinate startup and adjusting of equipment and operating components with Commissioning Agent.
- B. Start equipment and operating components to confirm proper operation. Remove malfunctioning units, replace with new units, and retest.
- C. Adjust equipment for proper operation. Adjust operating components for proper operation without binding.
- D. Test each piece of equipment to verify proper operation. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.

3.5 PROTECTION OF INSTALLED CONSTRUCTION

- A. Provide final protection and maintain conditions that ensure installed work is without damage or deterioration at time of Substantial Completion.
- B. Comply with manufacturer's written instructions for control of space temperature and humidity.

END OF SECTION 017300

SECTION 017310 - CUTTING AND PATCHING

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Procedural requirements for cutting and patching.

1.2 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions.
- B. Applicable Sections of the 2006 edition of the City of Baltimore Department of Public Works Specifications ("Green Book").

1.3 RELATED SECTIONS

- A. Division 1 Specification Sections

1.4 DEFINITIONS

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

1.5 SUBMITTALS

- A. Cutting and Patching Proposal: Submit a proposal describing procedures at least 10 days before the time cutting and patching will be performed, requesting approval to proceed. Include the following information:
 - 1. Extent: Describe cutting and patching, show how they will be performed, and indicate why they cannot be avoided.
 - 2. Changes to Existing Construction: Describe anticipated results. Include changes to structural elements and operating components as well as changes in building's appearance and other significant visual elements.
 - 3. Products: List products to be used and firms or entities that will perform the Work.
 - 4. Dates: Indicate when cutting and patching will be performed.
 - 5. Utilities: List utilities that cutting and patching procedures will disturb or affect. List utilities that will be relocated and those that will be temporarily out of service. Indicate how long service will be disrupted.
 - 6. Structural Elements: Where cutting and patching involve adding reinforcement to structural elements, submit details and engineering calculations showing integration of reinforcement with original structure.
 - 7. Owner's Representative and Engineer's Approval: Obtain approval of cutting and patching proposal before cutting and patching. Approval does not waive right to later require removal and replacement of unsatisfactory work.

1.6 QUALITY ASSURANCE

- A. Structural Elements: Do not cut and patch structural elements in a manner that could change their load-carrying capacity or load-deflection ratio.
- B. Operational Elements: Do not cut and patch operating elements and related components in a manner that results in reducing their capacity to perform as intended or that results in increased maintenance or decreased operational life or safety.
- C. Miscellaneous Elements: Do not cut and patch the following elements or related components in a manner that could change their load-carrying capacity, that results in reducing their capacity to perform as intended, or that results in increased maintenance or decreased operational life or safety.
 - 1. Water, moisture, or vapor barriers.
 - 2. Membranes and flashings.
 - 3. Equipment supports.
 - 4. Piping, ductwork, vessels, and equipment.
 - 5. Noise- and vibration-control elements and systems.
- D. Visual Requirements: Do not cut and patch construction in a manner that results in visual evidence of cutting and patching. Do not cut and patch construction exposed on the exterior or in occupied spaces in a manner that would, in Engineer's opinion, reduce the building's aesthetic qualities. Remove and replace construction that has been cut and patched in a visually unsatisfactory manner.
 - 1. If possible, retain original Installer or fabricator to cut and patch exposed Work listed below. If it is impossible to engage original Installer or fabricator, engage another recognized, experienced, and specialized firm.
 - a. Preformed metal panels.
 - b. Roofing.
 - c. Firestopping.
 - d. Fluid-applied flooring.
 - e. HVAC enclosures, cabinets, or covers.

1.7 WARRANTY

- A. Existing Warranties: Remove, replace, patch, and repair materials and surfaces cut or damaged during cutting and patching operations, by methods and with materials so as not to void existing warranties.

PART 2 PRODUCTS

2.1 MATERIALS

- A. General: Comply with requirements specified in other Sections of these Specifications.
- B. Existing Materials: Use materials identical to existing materials. For exposed surfaces, use materials that visually match existing adjacent surfaces to the fullest extent possible.
 - 1. If identical materials are unavailable or cannot be used, use materials that, when installed, will match the visual and functional performance of existing materials.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Examine surfaces to be cut and patched and conditions under which cutting and patching are to be performed.
 - 1. Compatibility: Before patching, verify compatibility with and suitability of substrates, including compatibility with existing finishes or primers.
 - 2. Proceed with installation only after unsafe or unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Temporary Support: Provide temporary support of Work to be cut.
- B. Protection: Protect existing construction during cutting and patching to prevent damage. Provide protection from adverse weather conditions for portions of Project that might be exposed during cutting and patching operations.
- C. Adjoining Areas: Avoid interference with use of adjoining areas or interruption of free passage to adjoining areas.

3.3 PERFORMANCE

- A. General: Employ skilled workers to perform cutting and patching. Proceed with cutting and patching at the earliest feasible time, and complete without delay.
 - 1. Cut existing construction to provide for installation of other components or performance of other construction, and subsequently patch as required to restore surfaces to their original condition.
- B. Cutting: Cut existing construction by sawing, drilling, breaking, chipping, grinding, and similar operations, including excavation, using methods least likely to damage elements retained or adjoining construction. If possible, review proposed procedures with original Installer; comply with original Installer's written recommendations.
 - 1. In general, use hand or small power tools designed for sawing and grinding, not hammering and chopping. Cut holes and slots as small as possible, neatly to size required, and with minimum disturbance of adjacent surfaces. Temporarily cover openings when not in use.
 - 2. Existing Finished Surfaces: Cut or drill from the exposed or finished side into concealed surfaces.
 - 3. Concrete and masonry: Cut using a cutting machine, such as an abrasive saw or a diamond-core drill.
 - 4. Excavating and Backfilling: Comply with requirements in applicable Division 2 Sections where required by cutting and patching operations.
 - 5. Mechanical and Electrical Services: Cut off pipe or conduit in walls or partitions to be removed. Cap, valve, or plug and seal remaining portion of pipe or conduit to prevent entrance of moisture or other foreign matter after cutting.
 - 6. Proceed with patching after construction operations requiring cutting are complete.

- C. Patching: Patch construction by filling, repairing, refinishing, closing up, and similar operations following performance of other Work. Patch with durable seams that are as invisible as possible. Provide materials and comply with installation requirements specified in other Sections of these Specifications.
1. Inspection: Where feasible, test and inspect patched areas after completion to demonstrate integrity of installation.
 2. Exposed Finishes: Restore exposed finishes of patched areas and extend finish restoration into retained adjoining construction in a manner that will eliminate evidence of patching and refinishing.
 3. Floors and Walls: Where walls or partitions that are removed extend one finished area into another, patch and repair floor and wall surfaces in the new space. Provide an even surface of uniform finish, color, texture, and appearance. Remove existing floor and wall coverings and replace with new materials, if necessary, to achieve uniform color and appearance.
 - a. Where patching occurs in a painted surface, apply primer and intermediate paint coats over the patch and apply final paint coat over entire unbroken surface containing the patch. Provide additional coats until patch blends with adjacent surfaces.
 4. Ceilings: Patch, repair, or rehang existing ceilings as necessary to provide an even-plane surface of uniform appearance.
 5. Exterior Building Enclosure: Patch components in a manner that restores enclosure to a weathertight condition.

END OF SECTION 017310

SECTION 017400 - FINAL CLEANING

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Final cleaning of project.
- B. Site debris not exposed to view.
- C. Perform Final Cleaning at Substantial Completion and Final Completion.

1.2 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions.
- B. Applicable Sections of the 2006 edition of the City of Baltimore Department of Public Works Specifications ("Green Book").

1.3 RELATED SECTIONS

- A. Division 1 Specification Sections.

1.4 DESCRIPTION

- A. Execute and complete cleaning prior to inspection date established for Substantial Completion.

PART 2 PRODUCTS

2.1 CLEANING MATERIALS

- A. Use materials that will not create hazards to health or property and that will not damage surfaces.
- B. Use only materials and methods recommended by manufacturer of material being cleaned.

PART 3 EXECUTION

3.1 CLEANING

- A. In addition to removal of debris and cleaning specified in other Sections, clean interior and exterior exposed-to-view surfaces.
- B. Remove temporary protection and labels not required to remain.
- C. Clean finishes free of dust, stains, films, and other foreign substances.
- D. Clean transparent and glossy materials to a polished condition; remove foreign substances.

- E. Polish reflective surfaces to a clear shine.
- F. Vacuum clean carpet, fabric, and similar soft surfaces.
- G. Clean and damp-mop resilient and hard-surfaced floors as specified, wax and polish if recommended by manufacturer.
- H. Clean surfaces of equipment and remove excess lubrication.
- I. Clean permanent filters of ventilating equipment, and replace disposable filters when units have been operated during construction.
- J. Clean HVAC blowers, and coils when units have been operated during construction.
- K. Clean light fixtures and lamps.
- L. Remove waste, foreign matter, and debris from roofs, gutters, areaways, and drainage systems.
- M. Remove waste, debris, and surplus materials from site.
- N. Clean site; remove stains, spills, and foreign substances from paved areas and sweep clean.
- O. Rake clean other exterior surfaces.
- P. Open all remotely operated door housing covers for final Owner, Engineer and City's Field Project Manager inspection.
 - 1. Close upon acceptance of interior cleanliness.
- Q. Maintain Final Cleaning until Final Completion.

3.2 DEBRIS NOT EXPOSED TO VIEW

- A. Prior to final inspection date for Substantial Completion, scan the entire area of work, accompanied by a representative of the Owner, and remove all items considered a security risk.
- B. Upon completion, submit to the Owner certification that the site has been searched and cleared of any security risk items.

END OF SECTION 017400

SECTION 017700 CLOSEOUT PROCEDURES

PART 1 GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and other Division-1 Specification Sections, apply to this Section.
- B. Applicable Sections of the 2006 edition of the City of Baltimore Department of Public Works Specifications ("Green Book").

1.2 SUMMARY

- A. This Section specifies administrative and procedural requirements for project closeout, including but not limited to:
 - 1. Inspection procedures.
 - 2. Project record document submittal.
 - 3. Operating and maintenance manual submittal.
 - 4. Submittal of warranties.
 - 5. Final cleaning.
- B. Closeout requirements for specific construction activities are included in the appropriate Sections in Division 2 through Division 26.

1.3 SUBSTANTIAL COMPLETION

- A. Preliminary Procedures: Before requesting inspection for certification of Substantial Completion, complete the following. List exceptions in the request.
 - 1. In the Application for Payment that coincides with, or first follows, the date Substantial Completion is claimed, show 100 percent completion for the portion of the Work claimed as substantially complete. Include supporting documentation for completion as indicated in these Contract Documents and a statement showing an accounting of changes to the Contract Sum. If 100 percent completion cannot be shown, include a list of incomplete items, the value of incomplete construction, and reasons the Work is not complete.
 - 2. Advise Owner of pending insurance change-over requirements.
 - 3. Submit specific warranties, workmanship bonds, maintenance agreements, final certifications and similar documents.
 - 4. Obtain and submit releases enabling the Owner unrestricted use of the Work and access to services and utilities; include occupancy permits, operating certificates and similar releases.
 - 5. Submit record drawings, maintenance manuals, final project photographs, damage or settlement survey, property survey, and similar final record information.

6. Deliver tools, spare parts, extra stock, and similar items.
 7. Make final change-over of permanent locks and transmit keys to the Owner. Advise the Owner's personnel of change-over in security provisions.
 8. Complete start-up testing of systems, and instruction of the Owner's operating and maintenance personnel. Discontinue or change over and remove temporary facilities from the site, along with construction tools, mock-ups, and similar elements.
 9. Complete final clean up requirements, including touch-up painting. Touch-up and otherwise repair and restore marred exposed finishes.
- B. Inspection Procedures: On receipt of a request for inspection, the Engineer will either proceed with inspection or advise the Contractor of unfilled requirements. The Engineer will prepare the Certificate of Substantial Completion following inspection, or advise the Contractor of construction that must be completed or corrected before the certificate will be issued.
1. The Engineer will repeat inspection when requested and assured that the Work has been substantially completed.
 2. Results of the completed inspection will form the basis of requirements for final acceptance.

1.4 FINAL ACCEPTANCE

- A. Preliminary Procedures: Before requesting final inspection for certification of final acceptance and final payment, complete the following. List Exceptions in the request.
1. Submit the final payment request with releases and supporting documentation not previously submitted and accepted. Include certificates of insurance for products and completed operations where required.
 2. Submit an updated final statement, accounting for final additional changes to the Contract Sum.
 3. Submit a certified copy of the Engineer's final inspection list of items to be completed or corrected, stating that each item has been completed or otherwise resolved for acceptance, and the list has been endorsed and dated by the Engineer.
 4. Submit final meter readings for utilities, a measured record of stored fuel, and similar data as of the date of Substantial Completion, or when the Owner took possession of and responsibility for corresponding elements of the Work.
 5. Submit consent of surety to final payment.
 6. Submit a final liquidated damages settlement statement.
 7. Submit evidence of final, continuing insurance coverage complying with insurance requirements.
- B. Re-inspection Procedure: The Engineer will re-inspect the Work upon receipt of notice that the Work, including inspection list items from earlier inspections, has been

completed, except items whose completion has been delayed because of circumstances acceptable to the Engineer.

1. Upon completion of re-inspection, the Engineer will prepare a certificate of final acceptance, or advise the Contractor of Work that is incomplete or of obligations that have not been fulfilled but are required for final acceptance.
 2. If necessary, re-inspection will be repeated.
- C. Final Completion: Substantial completion shall be met when the Work or designated portion of the work is sufficiently complete to meet the following conditions and demonstrate to the Owner and Architect/Engineer that the materials, equipment or other appurtenances are:
1. Install as called for in accordance with the Contract Documents.
 2. Inspected by the Architect/Engineer of Record.
 3. Formally accepted for its intended use.
 4. And when the appropriate Authorities Having Jurisdiction have issued final inspections and released the permits for such Work.

1.5 RECORD DOCUMENT SUBMITTALS

- A. General: Do not use record documents for construction purposes; protect from deterioration and loss in a secure, fire-resistive location; provide access to record documents for the Engineer's reference during normal working hours.
- B. Record Drawings: Maintain a clean, undamaged set of blue or black line white-prints of Contract Drawings and Shop Drawings. Mark the set to show the actual installation where the installation varies substantially from the Work as originally shown. Mark whichever drawing is most capable of showing conditions fully and accurately; where Shop Drawings are used, record a cross-reference at the corresponding location on the Contract Drawings. Give particular attention to concealed elements that would be difficult to measure and record at a later date.
1. Mark record sets with red erasable pencil; use other colors to distinguish between variations in separate categories of the Work.
 2. Mark new information that is important to the Owner, but was not shown on Contract Drawings or Shop Drawings.
 3. Note related Change Order numbers where applicable.
 4. Organize record drawing sheets into manageable sets, bind with durable paper cover sheets, and print suitable titles, dates and other identification on the cover of each set.
- C. Record Specifications: Maintain one complete copy of the Project Manual, including addenda, and one copy of other written construction documents such as Change Orders and modifications issued in printed form during construction. Mark these documents to show substantial variations in actual Work performed in comparison with the text of the Specifications and modifications. Give particular attention to substitutions, selection of options and similar information on elements that are concealed or cannot otherwise be readily discerned later by direct observation. Note related record drawing information

and Product Data. Upon completion of the Work, submit record Specifications to the Engineer for the Owner's records.

- D. Record Product Data: Maintain one copy of each Product Data submittal. Mark these documents to show significant variations in actual Work performed in comparison with information submitted. Include variations in products delivered to the site, and from the manufacturer's installation instructions and recommendations. Give particular attention to concealed products and portions of the Work which cannot otherwise be readily discerned later by direct observation. Note related Change Orders and mark-up of record drawings and Specifications. Upon completion of mark-up, submit complete set of record Product Data to the Engineer for the Owner's records.
- E. Record Sample Submitted: Immediately prior to the date or dates of Substantial Completion, the Contractor will meet at the site with the Engineer and the Owner's personnel to determine which of the submitted Samples that have been maintained during progress of the Work are to be transmitted to the Owner for record purposes. Comply with delivery to the Owner's Sample storage area.
- F. Miscellaneous Record Submittals: Refer to other Specification Sections for requirements of miscellaneous record-keeping and submittals in connection with actual performance of the Work. Immediately prior to the date or dates of Substantial Completion, complete miscellaneous records and place in good order, properly identified and bound or filed, ready for continued use and reference. Submit to the Engineer for the Owner's records.
- G. Maintenance Manuals: Organize operating and maintenance data into suitable sets of manageable size. Bind properly indexed data in individual heavy-duty 2-inch, 3-ring vinyl-covered binders, with pocket folders for folded sheet information. Mark appropriate identification on front and spine of each binder. Include the following types of information:
 - 1. Emergency instructions.
 - 2. Spare parts list.
 - 3. Copies of warranties.
 - 4. Wiring diagrams.
 - 5. Recommended "turn around" cycles.
 - 6. Inspection procedures.
 - 7. Shop Drawings and Product Data.

PART 2 PRODUCTS (Not Applicable)

PART 3 EXECUTION

3.1 CLOSEOUT PROCEDURES

- A. Operating and Maintenance Instructions: Arrange for each installer of equipment that requires regular maintenance to meet with the Owner's personnel to provide instruction in proper operation and maintenance. If installers are not experienced in procedures,

provide instruction by Manufacturer's representatives. Include a detailed review of the following items:

1. Maintenance manuals.
 2. Record documents.
 3. Spare parts and materials.
 4. Tools.
 5. Identification systems.
 6. Control sequences.
 7. Hazards.
 8. Cleaning.
 9. Warranties and bonds.
 10. Maintenance agreements and similar continuing commitments.
 11. Balancing and Commissioning Report.
- B. As part of instruction for operating equipment, demonstrate the following procedures:
1. Start-up.
 2. Shutdown.
 3. Emergency operations.
 4. Safety procedures.

3.2 FINAL CLEANING

- A. General: General cleaning during construction is required by the General Conditions.
- B. Cleaning: Employ experienced workers or professional cleaners for final cleaning. Clean each surface or unit to the condition expected in a normal, commercial building cleaning and maintenance program. Comply with Manufacturer's instructions. Complete the following cleaning operations before requesting inspection for Certification of Substantial Completion.
1. Remove labels that are not permanent labels.
 2. Clean exposed exterior and interior hard-surfaced finishes to a dust-free condition, free of stains, films and similar foreign substances. Restore reflective surfaces to their original reflective condition. Leave concrete floors broom clean. Vacuum carpeted surfaces.
 3. Wipe surfaces of mechanical and electrical equipment. Remove excess lubrication and other substances.

4. Clean the site, including landscape development areas, of rubbish, litter and other foreign substances. Sweep paved areas broom clean; remove stains, spills and other foreign deposits. Rake grounds that are neither paved nor planted, to a smooth even-textured surface.
- C. Pest Control: Engage an experienced exterminator to make a final inspection, and rid the Project of rodents, insects and other pests.
- D. Removal of Protection: Remove temporary protection and facilities installed for protection of the Work during construction.
- E. Compliance: Comply with regulations of authorities having jurisdiction and safety standards for cleaning. Do not burn waste materials. Do not bury debris or excess materials on the Owner's property. Do not discharge volatile, harmful or dangerous materials into drainage systems. Remove waste materials from the site and dispose of in a lawful manner. Where extra materials of value remaining after completion of associated Work have become the Owner's property, arrange for disposition of these materials as directed.

END OF SECTION 017700

SECTION 017839 - PROJECT RECORD DOCUMENTS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Maintenance of Record Documents and Samples.
- B. Submittal of Record Documents and Samples.

1.2 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions.
- B. Applicable Sections of the 2006 edition of the City of Baltimore Department of Public Works Specifications ("Green Book").

1.3 RELATED SECTIONS

- A. Division 01 Specification Sections.

1.4 MAINTENANCE OF DOCUMENTS AND SAMPLES

- A. See individual specification Sections for requirements of manufacturer's certificates and certificates of inspection.
- B. In addition to requirements in General Conditions, maintain at the site one record copy of each of the following:
 - 1. Contract Drawings.
 - 2. Specifications.
 - 3. Addenda.
 - 4. Clarifications, Minor Modifications and Supplements.
 - 5. Change Orders and other modifications to the Contract.
 - 6. Reviewed shop drawings, product data, and samples.
 - 7. Field test records.
 - 8. Inspection certificates.
 - 9. Manufacturer's certificates.
- C. Label and file Record Documents and samples in accordance with Section number listings in Table of Contents of this Project Manual.
- D. Label each document "PROJECT RECORD DOCUMENTS" in neat, large, printed letters.
- E. Maintain Record Documents in a clean, dry, and legible condition.
- F. Do not use Record Documents for construction purposes.
- G. Keep Record Documents and samples available for inspection by Owner and Engineer at all times.

1.5 RECORDING

- A. Record information on a set of blue line opaque drawings, provided by Owner.

- B. Provide felt tip marking pens, maintaining separate colors for each major system, for recording information.
- C. Record information concurrently with construction progress.
- D. Do not conceal any Work until required information is recorded.
- E. Contract Drawings and Shop Drawings:
 - 1. Legibly mark each item to record actual construction, including:
 - a. Measured locations of internal utilities and appurtenances concealed in construction, referenced to visible and accessible features of construction.
 - b. Field changes of dimension and detail.
 - c. Changes made by Clarifications, Minor Modifications and Supplements.
 - d. Details not on original Contract Drawings.
 - e. References to related shop drawings and modifications.
 - 2. Specifications:
 - a. Legibly mark each item to record actual construction, including:
 - 1) Manufacturer, trade name, and catalog number of each product actually installed particularly optional items and substitute items.
 - b. Changes made by Addenda and modifications.
 - 3. Other Documents:
 - a. Maintain manufacturer's certifications, inspection certifications, and field test records, as required by individual Specification Section.

1.6 SUBMITTALS

- A. On the day established for Contract closeout, deliver Final Record Documents and Samples under provisions of Section 01781.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 017839

SECTION 017900 – DEMONSTRATION AND TRAINING

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Procedures for demonstration of equipment operation and instruction of Owner's personnel.

1.2 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions.
- B. Applicable Sections of the 2006 edition of the City of Baltimore Department of Public Works Specifications ("Green Book").

1.3 RELATED SECTIONS

- A. Division 1 Specification Sections.

1.4 QUALITY ASSURANCE

- A. When specified in other Sections, require manufacturer to provide manufacturer's authorized technical representative to demonstrate operation of equipment and systems, instruct Owner's personnel, and provide written report that demonstrations and instructions have been completed.
- B. Owner will provide list of personnel to receive instructions and will coordinate their attendance at agreed-upon times through the Owner.

1.5 SUBMITTALS

- A. Submit preliminary schedule for Owner's approval, listing times and dates for demonstration of each item of equipment and each system, 45 days prior to proposed dates.
- B. Submit three (3) copies of each pre-evaluation and site report and proposed video filmed demonstration seven days prior to filming, to ensure that the planned demonstrations and instructions are complete and accurate for the intended purpose.
- C. Submit to Owner time and date of each proposed demonstration, hours devoted to demonstration, and a list of personnel to be present.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION

3.1 PREPARATION

- A. Verify equipment has been inspected, fully functional and operational.
- B. Verify testing, adjusting, and balancing has been performed and equipment and systems are fully operational.
- C. Use copies of completed operation and maintenance manuals and other props on hand

for use in demonstrations and instructions.

3.2 DEMONSTRATION AND INSTRUCTIONS

- A. Demonstrate maintenance of equipment and systems to Owner's personnel one day prior to date of Final Inspection.
- B. For equipment requiring seasonal operation, perform instructions for other seasons at the same time.
- C. Use operation and maintenance manuals as basis of instruction.
- D. Review contents of manual with personnel in detail to explain all aspects of operation and maintenance.
- E. Demonstrate start-up, operation, control, adjustment, trouble-shooting, servicing, maintenance, and shutdown of each item of equipment at scheduled times, at equipment location.
- F. Prepare and insert additional data in operations and maintenance manuals when need for additional data becomes apparent during instructions.

3.3 TIME ALLOCATED FOR INSTRUCTIONS

- A. The amount of time required for instruction on each item of equipment and system is specified in individual Sections, but no less than 120 minutes.

END OF SECTION 017900

SECTION 018000- ELEVATOR MAINTENANCE

PART 1 GENERAL

1.1. SUMMARY

- A. Maintenance services are to begin from date of Contract Notice to Proceed and continue until the end of the warranty period. The warranty period is to be for two (2) years after the acceptance of all modernization work by the City.
- B. Acceptance will occur when all modernization work has been completed, tested, and accepted by the engineer and all deficiency list items have been completed and accepted.

1.2. PREVENTIVE MAINTENANCE

- A. All preventive maintenance performed by the Contractor shall be scheduled unit-by-unit prior to commencement of the contract and subject to final approval of the City. Log books and check charts shall be posted in the machine room or machine space and be on display for review by the City.
- B. The preventive maintenance schedule, as prepared by the Contractor, shall show building name, elevator serial numbers, examination frequency, examination hours and be keyed to a preventive maintenance schedule prepared for the specific equipment covered by this specification.
- C. A code compliant machine room based maintenance control program complete with all code required logs shall be in place and approved by the engineer.
- D. Electronic or website-based records will not be acceptable in place of these jobsite-based records.
- E. EXAMINE (All Elevators):
 - 1. The Contractor shall provide preventive maintenance on the equipment at the intervals set forth in this specification, or more often if job conditions, or original manufacturer's standards, dictate.
 - 2. When, as a result of an examination, corrective action is found to be the responsibility of the Contractor, the Contractor shall proceed immediately to make (or cause to be made) replacements, repairs and corrections. When such work is determined not to be the Contractor's responsibility, a written report, signed by the Contractor, shall be delivered to the City for further action.
 - 3. Items of an emergency nature shall be communicated to the City immediately and followed up in written form. All steps necessary to ensure the safety of passengers and maintenance personnel shall be taken immediately. All steps necessary to prevent damage to the equipment shall be taken.
- F. CLEAN (All Elevators):
 - 1. The Contractor shall clean all of the elevator equipment. Cleaning of the equipment shall occur at regular intervals sufficient in frequency to maintain a professional appearance and preserve the life of equipment.

2. The Contractor shall report to the City the need for cleaning and/or janitorial services for all items not covered by the contract or that are otherwise not the responsibility of the Contractor.

G. PAINT (All Elevators):

1. The Contractor shall paint the elevator equipment and machine room floor at intervals frequent enough to maintain a professional appearance, prevent rusting, and preserve the equipment.
2. All paint shall be suitable for the purpose intended and be of a high quality. Application of the paint shall, in all circumstances, comply with applicable local codes, environmental codes and standards, and/or current ANSI codes.

H. LUBRICATE (All Elevators):

1. The Contractor shall lubricate all moving parts of the equipment. Lubricants shall be applied at intervals recommended by the equipment manufacturer or as directed through use of the equipment. All lubricants shall be suitable for the purpose intended and shall meet or exceed the minimum requirements specified by the manufacturer of the equipment to which the lubricant applies.

I. ADJUST (All Elevators):

1. The Contractor shall adjust the equipment. Adjustments shall be made as necessary and when the operation of the equipment varies from its normal or originally designed performance standards, as a result of normal wear and use.
2. Qualified individuals properly equipped with tools and instruments, employed by the Contractor, shall make adjustments. Adjustments shall be made at regular intervals frequent enough to maintain the elevator in optimum operating condition and to the original manufacturer's specifications.
3. Parts or assemblies which have worn (or otherwise deteriorated) beyond "normal" adjustment limits shall be replaced as provided for under the "Replace" and/or "Repair" sections of the specification.

J. REPLACE:

1. The Contractor shall "replace" all items covered under the contract as required. Replacement of the items shall occur during the course of scheduled preventive maintenance when, in the opinion of the City they are necessary, or when, in the opinion of the Contractor, such replacement will prevent an unscheduled elevator shutdown and/or ensure the continued normal operation of the elevator, or which otherwise will extend the useful life of the equipment. All replacements shall be made using original manufacturer's parts or City approved equals. Contractor shall replace obsolete parts with new parts designed to perform the same function, or modify the elevator to accept new parts designed and manufactured to perform the same function.

K. REPAIRS:

1. Repairs which are the responsibility of the Contractor:
 - a. The Contractor shall make repairs to components covered by the agreement. The Contractor shall make (or cause to be made) all repairs

made necessary due to normal wear and use of the system. The Contractor shall absorb all costs for labor, materials, expenses, and supplies which occur as a result of the stated repair.

- b. Correcting damage caused to the car and hoistway door panel finishes as a result of maintenance-related wear in car and hoistway door operating systems is included as a responsibility of the Contractor.

2. Repairs which are the responsibility of the City:

- a. The Contractor, when authorized by the City, where such repairs are not included in the contract, shall make repairs. The Contractor shall make (or cause to be made) all repairs made necessary for any reason during the term of the contract. The Contractor shall supply all labor, materials and supplies at the Contractors' billing rates quoted as a part of this bid. Upon completion of all repair work, the Contractor shall submit to the City for payment an invoice detailing the nature of the work performed and related charges.
- b. Prior to any repairs being made by the Contractor, the Contractor shall submit a written proposal to the City to obtain formal approval to proceed.

L. PERFORM PERIODIC TESTS (All Elevators):

1. The Contractor shall perform periodic Safety Tests (full-load and no-load) of the system components. The contractor shall also perform monthly tests (with logs) of the Firemen's Emergency Service System. These periodic tests shall be conducted as stated in the latest edition of the ANSI A17.1 Code, the A17.2 Inspector manual, and shall follow the procedures set forth in said Codes. Test results shall be recorded on forms acceptable to the City and the authority having jurisdiction. Certified copies of the completed test forms shall be submitted to the City and the governing code authority. Contractor shall file all paperwork necessary to secure elevator operating licenses and certificates.
2. Periodic inspections, as performed by city, county, state, federal government and/or insurance agencies, or their representatives are not included in this specification as a responsibility of the Contractor. The elevator company is to include the cost for conducting all tests and inspections with the governing inspection division (including all overtime expenses).

M. CALL BACK SERVICE (All Elevators):

1. For the purpose of this specification, a "call back" is a request from the City to the Contractor, requesting the Contractor to go to a specific elevator to correct any problem and/or condition which, in the City's opinion needs attention before the Contractor's next scheduled preventive maintenance visit. When necessary contractor shall provide additional personnel, parts, tools, etc. as needed to return all elevators to service within twenty-four (24) hours.
 - a. Call back service during regular and overtime working hours:
 - b. The Contractor shall, without additional charge to the City, provide "call back" service during the Contractors' regular and overtime working hours. The Contractor shall respond to a "call back" within a maximum of one (1) full hour when on regular time and two (2) hours on overtime. Emergency calls, such as for detained passengers, shall be answered within thirty (30) minutes on regular time and one (1) hour on overtime.

1.3. SCOPE OF MAINTENANCE

- A. Use technical personnel directly employed, trained and supervised by the Contractor.
- B. Regularly and systematically examine, clean, lubricate, adjust and (when conditions warrant) repair or replace the following:
 - 1. Elevator machines, traction and hydraulic, including all component parts.
 - 2. Hoist cables, (hoist ropes), hoist belts, and governor cables (governor ropes).
 - 3. Controllers, selectors, dispatcher & relay panels, and signal components, including control and dispatching systems.
 - 4. Car and hoistway door operating equipment complete.
 - 5. Door operators and all associated components.
 - 6. And all component parts thereof, including but not limited to:
 - a. Bearings, seals and housings.
 - b. Hangers and rollers with bearings and upthrust rollers.
 - c. Interlocks and all associated components.
 - d. Closers and all associated components.
 - e. Gibs.
 - f. Drive blocks and associated components.
 - g. Clutch or vanes and associated parts.
 - h. Door safety edge, infrared edge, or light rays and associated components.
 - i. Gate switch and associated components.
 - j. Brushes, brush holder, commutators, and all associated components.
 - k. Machine armatures and field coils.
 - l. Windings.
 - m. Contacts and relays.
 - n. Solid state boards, including mother boards and all associated components.
 - o. Complete controller components.
 - p. Resistors and transformers.
 - q. Solid-state devices of all types.
 - r. Firemen's service equipment and emergency power equipment.
 - s. Load-weighing bypass equipment.
 - t. Interlocks and door closures, and all associated components.
 - u. Buffers, buffer switches, and all associated components.
 - v. Limit, landing, and slow-down switches and components.
 - w. Door protective devices and alarm bells.
 - x. Push button assemblies.
 - y. Car and corridor hangers, tracks, and door-operating devices.
 - z. All door gibbs.
 - aa. Worm and ring gear and bearings
 - bb. Pump motor and pump assembly
 - cc. Valves and component parts
 - dd. Tank heater
 - ee. Oil cooler
 - ff. Cylinder packing, wiper rings, and head assemblies

- C. Keep guide rail properly lubricated, except where roller guides are used.
- D. Replace guide shoe gibs, rollers, and associated components when conditions warrant, providing smooth and quiet operation. Adjust as necessary to achieve a smooth, quiet ride and door operation.
- E. Repair or replace control cables and wiring when conditions warrant.
- F. Replace drive belts.
- G. Relamp all signals and fixtures and replace all worn or damaged items
- H. Furnish lubricants compounded to the original manufacturer's specifications.
- I. Repair all car and hoistway door panel finishes damaged as a result of maintenance-related wear in the operating components. Including, but not limited to, refinishing panels or replacement of the panels.

1.4. HOURS OF SERVICE

- A. The Contractor will perform all work hereunder during regular working hours of regular working days, except for overtime callbacks which are covered at no additional charge.
- B. Excluding code required testing and inspections, should the City request that examination, cleaning, lubrication, adjustments, repairs, or replacements of equipment be performed during other than regular working hours (except for system adjusting and testing), the Contractor shall absorb the straight time labor charges and the City will compensate the Contractor for the overtime bonus hours at the Contractor's standard billing rates.

1.5. CONDITIONS OF SERVICE (General, all units)

- A. City is to provide the Contractor with full and free access to the equipment to render service thereon.

1.6. WIRING DIAGRAMS, INSTRUCITON MANUALS, ETC.

- A. The Contractor shall provide and maintain in each machine room or maintenance storage space records consistent with the A17.1 code including, a maintenance control program and schedule, an oil usage log, MSDS sheets, and a call back and repair log, and shall make these documents available to City upon request.

1.7. PERFORMANCE

- A. The Contractor agrees, where possible, to maintain the original contract speed in feet per minute ($\pm 5\%$ for traction elevators and 10% for hydraulic elevators), the original performance times, including acceleration and retardation as originally designed and installed, and to perform the necessary adjustments as required, or when directed by the City, to maintain the original ride quality and door opening and closing time, within limits of applicable codes.
- B. On overtime. the Contractor further agrees to check the group dispatching systems no longer than yearly and make necessary tests to ensure that all circuits, load weighing settings, and time settings are properly adjusted, and that the system performs as originally designed and installed.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION

3.1. SCHEDULE OF MAINTENANCE OPERATIONS

- A. The following schedule of inspection and maintenance operations shall be followed in carrying out the performance of this contract. This schedule constitutes the minimum of operations and frequency of performance required. The successful Contractor must recognize that additional services may be required in order to comply with performance evaluation requirements.

3.2. SEMI-MONTHLY SERVICES

- A. Semi-monthly inspections shall be provided. During such inspections, the following operations are to be performed on alternate visits, part one visit, and the remainder the following visit, continuing on this basis throughout the contract period:
1. Ride each car. Check operation of car and hatch doors, also acceleration, deceleration, and floor stops. Make corrections as necessary.
 2. Inspect and wipe clean all motors, machines, oil pans, and machine room equipment. Sweep floor and remove all trash.
 3. Inspect oil level and oil pick up. Make maintenance repairs and adjustments for proper operation. Check for noise and excessive heat. Keep endbells, commutators, and brush rigging clean.
 4. Observe operation of brakes. Inspect drum and shoes. Clean and lubricate pivot points.
 5. In pits, dust all ironwork and empty drip pans. Check runby, buffer switch, and emergency stop switch. Sweep floor and remove all trash.
 6. Observe operation of governors, including tension sheave. Check electrical switch for proper operation. Ensure all inspection seals are in place and not broken. Clean and lubricate pivot points.
 7. Inspect and clean controllers, motor drive units, selectors, and selector drives.
 8. Clean and adjust all controller and selector contacts and renew worn contacts and/or shunts where necessary. Check sequence operation. Make corrections as necessary for proper operation.
 9. Wipe clean all motors and commutators. Clean and check brushes and brush holders. Renew or reseal brushes if necessary.
 10. Inspect worm and gear for bottoming and proper mesh, check backlash, thrust and end play, bearing wear. Check for leaks and empty drip pans
 11. Observe operation of motor and pump, oil lines, tank, controls, plunger, and packing. Make corrections as necessary. Clean and lubricate as necessary.

12. Clean and lubricate direction and accelerating switches.
13. Relamp all fixtures.
14. Clean the drive machine space.
15. Observe the drive motor for signs of overheating.
16. Inspect the controller for loose leads, burned contacts, etc., repair or replace as required.

3.3. QUARTERLY SERVICES

- A. Clean hoistway pits and inspect equipment in them.
- B. Inspect all door-operating equipment, including motor brushes, commutator, belts or chains, contacts, drive vanes, and blocks. Clean, lubricate, and adjust or replace as necessary.
- C. Check clutch operation and make necessary adjustments or corrections.
- D. Examine traveling cables for wear and position. Repair as necessary.
- E. Inspect door monitoring equipment and safety edge units. Clean, lubricate, and adjust or repair as necessary.
- F. Clean and lubricate automatic slow-down and stopping switches on top of cars. Repair as necessary.
- G. Clean car position indicators and repair if necessary.
- H. Inspect, clean, and lubricate car guides.
- I. Inspect printed circuit boards and all other solid state devices for cleanliness, condensation points, and evidence of heating or deterioration. Check to ensure proper operation of all solid state devices. Replace as necessary to ensure proper operation.

3.4. SEMI-ANNUAL SERVICES

- A. Check all bearings for proper operation and wear. Repair as necessary.
- B. Examine machine gear teeth for cutting or noise. Repair as necessary.
- C. While riding on top of cars, physically check condition and operation of door-locking equipment.
- D. Perform electrical test of door interlock circuits. Repair as necessary.
- E. Examine door locks and door-closer equipment. Clean door channels. Repair as necessary.
- F. Examine car guides and fastening. Repair as necessary.
- G. Renew gibs or rollers when necessary.

- H. Clean all switches and buttons. Repair as necessary.
- I. Remove car station cover, blow out; clean or lubricate switches and buttons.
- J. Inspect, clean, lubricate, and properly adjust hoist cables, governor cables, and travelling cables. Check all cable fastenings.
- K. Inspect guide rails and counterweights.
- L. Inspect, clean, and lubricate all sheaves.
- M. On all motors and gearless machines, inspect connections, coils, armatures, and rotor clearances. Adjust or repair as necessary to proper operation and clearances. This to include rewinding armature and coils as well as installation of a new commutator when necessary.

3.5. ANNUAL SERVICES

- A. Examine, clean with proper solution, and repair as necessary the commutator, brushes, and brush holders of all motors.
- B. Thoroughly examine and clean starter and control panels. Check each contactor and relay by hand for wear, cleanliness, and proper adjustment. Clean, readjust, and repair or replace as necessary.
- C. Check, clean, repair, and adjust operation of slowdown, direction, and limit switches.
- D. Examine, repair, clean, and add oil to buffers. If necessary, perform "hand test" of plunger return. Clean all buffer support elements, remove rust and paint with rust inhibitive paint.
- E. Blow out and vacuum clean controller, motors, and motor generator sets.
- F. Clean and lubricate hatch door hangers, track and door arms. Clean all car and hoistway sills.
- G. Clean rails, hatch walls, car top, pit and overhead beams. Check brackets and bolts for tightness.
- H. Completely dismantle brake assembly and clean and inspect for wear. Replace defective parts for proper operation.
- I. Change oil in hoist motors, geared machines, and gear boxes with lubricants as specified by the equipment manufacturer.
- J. Clean, inspect, lubricate, and operate by hand all safety mechanisms.
- K. Lubricate and perform annual work tasks in accordance with manufacturer's recommendations.

3.6. CONTRACT EXCLUSIONS

The Contractor shall not:

- A. Be required to make other safety tests or install new attachments on the elevators when recommended by insurance companies or governmental authorities.

- B. Be required to make any renewals, replacements, or repairs necessitated by negligence, abuse or misuse of the equipment, or by any other cause beyond the Contractor's control except ordinary wear and tear.
- C. Make any alterations to the elevator equipment, including control circuits and software, without prior written approval from the City.
- D. Be responsible for car enclosures damaged by others, removal panels, fixture faceplates, car flooring or sub-flooring, or smoke sensors.
- E. Be responsible for hoistway doors, frames, or sills, except for damage caused by maintenance-related wear in the operating components.

3.7. THIRD PARTY REVIEW OF CONTRACTOR COMPLIANCE

- A. The City may at any time retain a consulting firm to review the Contractor's compliance with the maintenance scope of work. Contractor agrees to correct any deficiencies identified within thirty days at the Contractor's sole expense. Failure to do so will be cause for cancellation of the agreement at the sole discretion of the City.

END OF SECTION 018000

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SECTION 024119 - SELECTIVE DEMOLITION

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Section Includes:

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

1.2 RELATED DOCUMENTS

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

1.3 RELATED SECTIONS

1. Section 011000 "Summary" for restrictions on use of the premises, Owner-occupancy requirements, and phasing requirements.
2. Section 017300 "Execution" for architectural cutting and patching procedures.
3. Section 017310 "Cutting and Patching" for mechanical cutting and patching procedures.

1.4 DEFINITIONS

- A. Remove: Detach items from existing construction and dispose of them off-site unless indicated to be salvaged or reinstalled.
- B. Existing to Remain: Leave existing items that are not to be removed and that are not otherwise indicated to be salvaged or reinstalled.
- C. Dismantle: To remove by disassembling or detaching an item from a surface, using gentle methods and equipment to prevent damage to the item and surfaces; disposing of items unless indicated to be salvaged or reinstalled.

1.5 MATERIALS OWNERSHIP

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

1.6 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For refrigerant recovery technician.
- B. 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. Ensure Owner's building manager's and other tenants' on-site

operations are uninterrupted.

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.
- C. Statement of Refrigerant Recovery: Signed by refrigerant recovery technician responsible for recovering refrigerant, stating that all refrigerant that was present was recovered and that recovery was performed according to EPA regulations. Include name and address of technician and date refrigerant was recovered.
- D. Warranties: Documentation indicating that existing warranties are still in effect after completion of selective demolition.

1.7 CLOSEOUT SUBMITTALS

- A. Inventory: Submit a list of items that have been removed and salvaged.

1.8 QUALITY ASSURANCE

- A. Refrigerant Recovery Technician Qualifications: Certified by an EPA-approved certification program.

1.9 FIELD CONDITIONS

- A. Owner will occupy portions of building immediately adjacent to selective demolition area. Conduct selective demolition so Owner's operations will not be disrupted.
- B. Conditions existing at time of inspection for bidding purpose will be maintained by Owner as far as practical.
1. Before selective demolition, Owner will remove the following items:
 - a. Tenant Property.
- C. Notify Engineer 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. Historic Areas: Demolition and hauling equipment and other materials shall be of sizes that clear surfaces within historic spaces, areas, rooms, and openings, including temporary

protection, by 12 inches (300 mm) or more.

- F. Storage or sale of removed items or materials on-site is not permitted.
- G. Utility Service: Maintain existing utilities indicated to remain in service and protect them against damage during selective demolition operations.
 - 1. Maintain fire-protection facilities in service during selective demolition operations.

1.10 WARRANTY

- A. Existing Warranties: Obtain existing warranty from Owner. Remove, replace, patch, and repair materials and surfaces cut or damaged during selective demolition, by methods and with materials and using approved contractors so as not to void existing warranties. Notify warrantor before proceeding.
- B. Notify warrantor on completion of selective demolition, and obtain documentation verifying that existing system has been inspected and warranty remains in effect. Submit documentation at Project closeout.

1.11 COORDINATION

- A. Arrange selective demolition schedule so as not to interfere with Owner's 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.
- B. Standards: Comply with ASSE A10.6 and NFPA 241.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that utilities have been disconnected and capped before starting selective demolition operations.
- B. Review Project Record Documents of existing construction or other existing condition and hazardous material information provided by Owner. Owner does not guarantee that existing conditions are same as those indicated in Project Record Documents.
- C. Engage a professional engineer to perform an engineering survey of condition of building to determine whether removing any element might result in structural deficiency or unplanned collapse of any portion of structure or adjacent structures during selective building demolition operations.
 - 1. Perform surveys as the Work progresses to detect hazards resulting from selective demolition activities.

- D. Steel Tendons: Locate tensioned steel tendons and include recommendations for de-tensioning.
- E. Verify that hazardous materials have been remediated before proceeding with building demolition operations.
- F. Survey of Existing Conditions: Record existing conditions by use of measured drawings.
 - 1. Before selective demolition or removal of existing building elements that will be reproduced or duplicated in final Work, make permanent record of measurements, materials, and construction details required to make exact reproduction.

3.2 PREPARATION

- A. Refrigerant: Before starting demolition, remove refrigerant from mechanical equipment according to 40 CFR 82 and regulations of authorities having jurisdiction.

3.3 UTILITY SERVICES AND MECHANICAL/ELECTRICAL SYSTEMS

- A. Existing Services/Systems to Remain: Maintain services/systems indicated to remain and protect them against damage.
- B. Existing Services/Systems to Be Removed, Relocated, or Abandoned: Locate, identify, disconnect, and seal or cap off utility services and mechanical/electrical systems serving areas to be selectively demolished.
 - 1. Owner will arrange to shut off indicated services/systems when requested by Contractor.
 - 2. Arrange to shut off utilities with utility companies.
 - 3. If services/systems are required to be removed, relocated, or abandoned, provide temporary services/systems that bypass area of selective demolition and that maintain continuity of services/systems to other parts of building.
 - 4. Disconnect, demolish, and remove fire-suppression systems, plumbing, and HVAC systems, equipment, and components indicated on Drawings to be removed.
 - a. Piping to Be Removed: Remove portion of piping indicated to be removed and cap or plug remaining piping with same or compatible piping material.
 - b. Piping to Be Abandoned in Place: Drain piping and cap or plug piping with same or compatible piping material and leave in place.
 - c. Equipment to Be Removed: Disconnect and cap services and remove equipment.
 - d. Equipment to Be Removed and Reinstalled: Disconnect and cap services and remove, clean, and store equipment; when appropriate, reinstall, reconnect, and make equipment operational.
 - e. Equipment to Be Removed and Salvaged: Disconnect and cap services and remove equipment and deliver to Owner.
 - f. Ducts to Be Removed: Remove portion of ducts indicated to be removed and plug remaining ducts with same or compatible ductwork material.

- g. Ducts to Be Abandoned in Place: Cap or plug ducts with same or compatible ductwork material and leave in place.

3.4 PROTECTION

- A. Temporary Protection: Provide temporary barricades and other protection required to prevent injury to people and damage to adjacent buildings and facilities to remain.
 - 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.
 - 5. Comply with requirements for temporary enclosures, dust control, heating, and cooling specified in Section 015000 "Temporary Facilities and Controls."
- B. Temporary Shoring: Design, provide, and maintain shoring, bracing, and structural supports as required to preserve stability and prevent movement, settlement, or collapse of construction and
- C. finishes to remain, and to prevent unexpected or uncontrolled movement or collapse of construction being demolished.
 - 1. Strengthen or add new supports when required during progress of selective demolition.
- D. Remove temporary barricades and protections where hazards no longer exist.

3.5 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. Proceed with selective demolition systematically, from higher to lower level. Complete selective demolition operations above each floor or tier before disturbing supporting members on the next lower level.
 - 2. Neatly cut openings and holes plumb, square, and true to dimensions required. Use cutting methods least likely to damage construction to remain or adjoining construction. Use hand tools or small power tools designed for sawing or grinding, not hammering and chopping. Temporarily cover openings to remain.
 - 3. Cut or drill from the exposed or finished side into concealed surfaces to avoid marring existing finished surfaces.
 - 4. Do not use cutting torches until work area is cleared of flammable materials. At concealed spaces, such as duct and pipe interiors, verify condition and contents of hidden space before starting flame-cutting operations. Maintain portable fire-

- suppression devices during flame-cutting operations.
 - 5. Maintain fire watch during and for at least 3 hours after flame-cutting operations.
 - 6. Maintain adequate ventilation when using cutting torches.
 - 7. Remove decayed, vermin-infested, or otherwise dangerous or unsuitable materials and promptly dispose of off-site.
 - 8. Remove structural framing members and lower to ground by method suitable to avoid free fall and to prevent ground impact or dust generation.
 - 9. Locate selective demolition equipment and remove debris and materials so as not to impose excessive loads on supporting walls, floors, or framing.
 - 10. Dispose of demolished items and materials promptly.
- B. Site Access and Temporary Controls: Conduct selective demolition and debris-removal operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities.
- C. Existing Items to Remain: Protect construction indicated to remain against damage and soiling during selective demolition. When permitted by Engineer, items may be removed to a suitable, protected storage location during selective demolition and cleaned and reinstalled in their original locations after selective demolition operations are complete.

3.6 SELECTIVE DEMOLITION PROCEDURES FOR SPECIFIC MATERIALS

- A. Concrete: Demolish in sections. Cut concrete full depth at junctures with construction to remain and at regular intervals using power-driven saw, and then remove concrete between saw cuts.
- B. Masonry: Demolish in small sections. Cut masonry at junctures with construction to remain, using power-driven saw, and then remove masonry between saw cuts.
- C. Concrete Slabs-on-Grade: Saw-cut perimeter of area to be demolished, and then break up and remove.

3.7 DISPOSAL OF DEMOLISHED MATERIALS

- A. Remove demolition waste materials from Project site and dispose of them in an EPA-approved construction and demolition waste landfill acceptable to authorities having jurisdiction.
 - 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. Burning: Do not burn demolished materials.

3.8 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.

3.9 SELECTIVE DEMOLITION SCHEDULE

A. Remove:

- 1. Comply with requirements specified in Division 14 and drawing documents. In addition, remove items as follows in coordination with the new work documents:
 - a. Cab Controls
 - b. Hall Call Buttons
 - c. Hall Lanterns
 - d. Hall Position Indicators
 - e. Lobby Panel
 - f. Emergency Signage
 - g. Capacity and No Smoking Signs
 - h. Key Switch Entry Control

- B. Existing to Remain: Elevator shaft walls and associated finishes.

END OF SECTION 024119

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SECTION 078413 PENETRATION FIRESTOPPING

PART 1 GENERAL

1.1 SUMMARY

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.
- B. Section includes:
 - 1. Through-penetration firestopping in fire rated construction.

1.2 REFERENCES

- A. Underwriters Laboratories
 - 1. UL Fire Resistance Directory
 - a. Through-penetration firestop devices (XHCR)
 - b. Fire resistance rating (BXUV)
 - c. Through-penetration firestop systems (XHEZ)
 - d. Fill, void, or cavity material (XHHW)
- B. American Society for Testing and Materials Standards:
 - 1. ASTM E 814-88: Standard Test Method for Fire Tests of Through-Penetration Firestops.

1.3 DEFINITIONS

- A. Assembly: Particular arrangement of materials specific to given type of construction described or detailed in referenced documents.
- B. Barriers: Time-rated fire walls, time-rated ceiling/floor assemblies and structural floors.
- C. Firestopping: Methods and materials applied in penetrations and unprotected openings to limit spread of heat, fire, gasses and smoke.
- D. Penetration: Opening or foreign material passing through or into barrier or structural floor such that full thickness of rated materials is not obtained.
- E. System: Specific products and applications, classified and numbered by Underwriters Laboratories, Inc. to close specific barrier penetrations.
- F. Sleeve: Metal fabrication or pipe section extended through thickness of barrier and used to permanently guard penetration. Sleeves are described as part of penetrating system in other sections and may or may not be required.

1.4 SYSTEM DESCRIPTION

A. Design Requirements

1. Fire-rated construction: Maintain barrier and structural floor fire resistance ratings including resistance to cold smoke at all penetrations.

1.5 SUBMITTALS

A. Submit in accordance with Division 01 Section *Submittal Procedures*, unless otherwise indicated.

B. Product data: Manufacturer's specifications and technical data including the following:

1. Detailed specification of construction and fabrication.
2. Manufacturer's installation instructions.

C. Shop drawings: Indicate dimensions, description of materials and finishes, general construction, specific modifications, component connections, anchorage methods, hardware, and installation procedures, plus the following specific requirements.

1. Details of each proposed assembly identifying intended products and applicable UL system number, or UL classified devices.
2. Manufacturer or manufacturer's representative shall provide qualified engineering judgment and drawings relating to non-standard applications as needed.

D. Quality control submittals:

1. Statement of qualifications.

E. Applicators' qualifications statement:

1. List past projects indicating required experience.

1.6 QUALITY ASSURANCE

A. Installer's qualifications: Fire experienced in installation or application of systems similar in complexity to those required for this project, plus the following:

1. Acceptable to or licensed by manufacturer, State or local authority where applicable.
2. At least 2 years experience with systems.
3. Successfully completed at least 5 comparable scale projects using this system.

- B. Local and State regulatory requirements: Submit forms or acceptance for proposed assemblies not conforming to specific UL Firestop System numbers, or UL classified devices.
- C. Materials shall have been tested to provide fire rating at least equal to that of the construction.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Packing and shipping:
 - 1. Deliver products in original unopened packaging with legible manufacturer's identification.
 - 2. Coordinate delivery with scheduled installation date, allow minimum storage at site.
- B. Storage and protection: Store materials in a clean, dry, ventilated location. Protect from soiling, abuse, moisture and freezing when required. Follow manufacturer's instructions.

1.8 PROJECT CONDITIONS

- A. Existing condition:
 - 1. Verify existing conditions and substrates before starting work. Correct unsatisfactory conditions before proceeding.
 - 2. Proceed with installation only after penetrations of the substrate and supporting brackets have been installed.
- B. Environmental requirements:
 - 1. Furnish adequate ventilation if using solvent.
 - 2. Furnish forced air ventilation during installation if required by manufacturer.
 - 3. Keep flammable materials away from sparks or flame.
 - 4. Provide masking and drop cloths to prevent contamination of adjacent surfaces by firestopping materials.

1.9 WARRANTY

- A. Submit copies of written warranty agreeing to repair or replace joint sealers which fail in joint adhesion, extrusion resistance, migration resistance, or general durability or appear to deteriorate in any other manner not clearly specified by submitted manufacturer's data as an inherent quality of the material for the exposure indicated. The warranty period shall be two (2) years from date of substantial completion unless otherwise noted.

PART 2 PRODUCTS

2.1 THROUGH-PENETRATION FIRESTOPPING OF FIRE-RATED CONSTRUCTION

- A. Systems of devices listed in the UL Fire Resistance Directory under categories XHCR and XHEZ may be used, providing that it conforms to the construction type, penetrant type, annular space requirements and fire rating involved in each separate instance, and that the system be symmetrical for wall applications. Systems or devices must be asbestos-free.
 - 1. Additional requirements: Withstand the passage of cold smoke either as an inherent property of the system, or by the use of a separate product included as a part of the UL system or device, and designed to perform this function.
 - 2. Acceptable manufacturers and products.
 - a. Those listed in the UL Fire Resistance directory for the UL System involved and as further defined in the System and Applications Schedule in Part 3.6 of this section.
 - 3. All firestopping products must be from a single manufacturer. All trades shall use products from the same manufacturer unless otherwise noted.

2.2 ACCESSORIES

- A. Fill, void or cavity materials: As classified under category XHHW in the UL Fire Resistance Directory.
- B. Forming materials: As classified under category XHKU in the UL Fire Resistance Directory.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verification of conditions: Examine areas and conditions under which work is to be performed and identify conditions detrimental to proper or timely completion.
 - 1. Verify barrier penetrations are properly sized and in suitable condition for application of materials.
 - 2. Do not proceed until unsatisfactory conditions have been corrected.
- B. Coordinate an inspection of all Mechanical Firestopping systems with the Fire Marshal prior to installation of ceilings, walls, etc.

3.2 PREPARATION

- A. Clean surfaces to be in contact with penetration seal materials of dirt, grease, oil, loose materials, rust, or other substances that may affect proper fitting, adhesion, or the required fire resistance.

3.3 INSTALLATION

- A. Install penetration seal materials in accordance with printed instructions of the UL Fire Resistance Directory and in accordance with manufacturer's instruction.
- B. Seal holes or voids made by penetrations to ensure an effective fire barrier.
- C. Protect materials from damage on surfaces subject to traffic.
- D. When large openings are created in walls or floors to permit installation of pipes, ducts, or other items, close unused portions of opening with firestopping materials tested for the application. See UL Fire Resistance Directory or Section 3.6 of this document.

3.4 FIELD QUALITY CONTROL

- A. Examine penetration sealed areas to ensure proper installation before concealing or enclosing areas.
- B. Keep areas of work accessible until inspection by applicable code authorities.
- C. Perform under this section patching and repairing of firestopping caused by cutting or penetration by other trades.

3.5 ADJUSTING AND CLEANING

- A. Clean up spills of liquid components.
- B. Neatly cut and trim materials as required.
- C. Remove equipment, materials and debris, leaving area in undamaged, clean condition.

3.6 SYSTEMS AND APPLICATION SCHEDULES* SEE NEXT PAGE

PENETRATING ITEM	CONCRETE	GYPSUM	WOOD FLOOR/CEILING
Metal Pipe	CAJ1001 CP25S/L, CP25N/S CAJ1006 CS-195+, FS-195+ CAJ1007 FS-195+, 1-inch& 2-inch Wide CAJ1009 2000, 2000+, 2003 CAJ1010 2000, 2000+, 2003 CAJ1012 2000, 2000+, 2003 CAJ1013 2000, 2000+, 2003 CAJ1014 2000, 2000+, 2003 CAJ1015 2000, 2000+, 2003 CAJ1017 FD 150 CAJ1021 FD 150 CAJ1027 MPS-2+ CAJ1044 CP 25WB+ CAJ1052 CP 25S/L, CP 25N/S CAJ1058 2000, 2000+, 2003 CAJ1060 2000, 2000+, 2003 CAJ1063 2000, 2000+, 2003 CAJ1066 CP 25N/S,CP 25S/L, CP 25WB+ CAJ1091 CP 25N/S,CP 25S/L, CP 25WB+ CAJ1092 CP 25WB+ CAJ1112 FS-195+ CAJ1160 CP 25S/L, CP 25N/S CAJ1175 CP 25WB+ CAJ1176 CP 25WB+ CAJ1188 2000+ CBJ1020 CS-195+, FS-195+ CBJ1021 CS-195+, MPS-2+ CBJ1031 2001 CBJ1032 2001 FA1002 CP 25WB+ WJ1010 CP25WB+ WJ1023 2001	WL1001 CP 25 WL1002 FS-195+ WL1003 CP 25WB+,CP 25N/S WL1008 2000+ WL1009 2000+ WL1010 2000+ WL1016 CP 25WB+ WL1017 CP 25WB+,CP 25N/S WL1032 CP 25WB+,CP 25N/S WL1036 FD 150 WL1037 CS-195+,FS- 195+ WL1067 CP 25N/S WL1073 CP 25WB+ WL1080 MPS2+ WL1082 2000+	FC1002 CP 25 FC1003 2000,2000+,20003 FC1006 CP 25WB+

PENETRATING ITEM	CONCRETE	GYP SUM	WOOD FLOOR/CEILING
Non-Metallic	CAJ2001 FS-195+, 1-inch & 2-inch WIDE, PPD'S CAJ2002 FS-195+ CAJ2003 CS-195+, FS-195+ CAJ2005 FS-195 CAJ2006 FS-195+ CAJ2013 FS-195+ CAJ2019 2000, 2000+, 2003 CAJ2027 FS-195+, CP 25N/S, CP 25S/L, CP 25WB+ CAJ2028 FS-195, MPS-2+ CAJ2029 FS-195+, PPD'S CAJ2030 CS-195+, FS-195+ CAJ2040 FS-195+, CP 25WB+ CAJ2044 FS-195+, CP 25N/S, CP 25S/L CP 25 WB+ CAJ2090 FS-195+ CAJ2177 FS-195+, PPD'S FA2001 FS-195+, PPD'S FS2002 CS-195+, FS-195+, MPS-2+, PPD'S FA2011 FS-195+ WJ2012 FS-195+ 1-inch WIDE	WL2002 FS-195+, PPD'S WL2003 FS-195+ WL2004 FS-195+ WL2005 FS-195+ 4' WIDE WL2006 FS-195+ WL2013 FS-195+ WL2031 CS-195+, FS- 195+ WL2032 CS-195+, FS- 195+ WL2033 FS-195+ WL2073 FS-195+ 1-inch WIDE	FC2002 FS-195+, PPD'S FC2007 FS-195+, PPD'S FC2008 FS-195+ FC2009 FS-195+, PPD'S FC2024 FS-195 FC2026 FS-195+ FC2028 FS-195, 1' & 2-inch WIDE, PPD'S
Insulated Metallic Pipe	CAJ5001 CP 25N/S, CP 25S/L, CP 25WB+ CAJ5002 FS-195+ CAJ5003 FS-195+ CAJ5005 MPS-2+ CAJ5009 2000+, 2003 CAJ5017 FS-195+, CP 25 CAJ5022 FS-195+ CAJ5024 FS-195+ CAJ5030 CS-195+, FS-195+ CAJ5041 2000, 2000+, 2003 CAJ5060 CP 25WB+ CAJ5074 2000+ CBJ5002 CP 25 CBJ5003 FS-195+ FA5001 FS-195+, CP 25WB+	WL5001 FS-195+ WL5002 FS-195+ WL5009 FS-195+ WL5010 FS-195+ WL5011 CP 25WB+ WL5032 2000+ WL5038 CP 25WB+ WL5039 CP 25WB+ WL5040 CP 25WB+ WL5045 CP 25WB+ WL5053 2000+	FC5002 FS-195+ FC5008 FS-195+

PENETRATING ITEM	CONCRETE	GYPSUM	WOOD FLOOR/CEILING
Miscellaneous Mechanical HVAC Ducts	CAJ7001 CP 25N/S CP 25S/L CAJ7003 CP 25WB+ CAJ7009 DUCT WRAP, BULK PUTTY		FC7001 CP 25S/L, CP 25N/S
Mixed Penetrating Items Combos	CAJ8001 CS-195+ FS-195 CAJ8003 2000, 2000+, 20003 CAJ8004 2000, 2000+, 20003 CAJ8006 2001 CAJ8013 FS-195+, CP 25 CBJ8004 CS-195, FS-195+ CBJ8005 CS-195+, MPS-2+ CBJ8008 2001 FA8001 FS-195+, CP 25WB+	WL8002 CS-195+, FS-195+	

* Underwriter's Laboratories, Inc., Fire Resistance Directory.

END OF SECTION 078413

SECTION 079200 - JOINT SEALANTS

PART 1. GENERAL

1.1 SECTION INCLUDES

- A. Nonsag gunnable joint sealants.
- B. Joint backings and accessories.

1.2 REFERENCE STANDARDS

- A. ASTM C834 - Standard Specification for Latex Sealants 2017.
- B. ASTM C919 - Standard Practice for Use of Sealants in Acoustical Applications 2018.
- C. ASTM C920 - Standard Specification for Elastomeric Joint Sealants 2018.
- D. ASTM C1193 - Standard Guide for Use of Joint Sealants 2016.
- E. ASTM C1248 - Standard Test Method for Staining of Porous Substrate by Joint Sealants 2018.

1.3 SUBMITTALS

- A. Product Data for Sealants: Submit manufacturer's technical data sheets for each product to be used, that includes the following.
 - 1. Physical characteristics, including movement capability, VOC content, hardness, cure time, and color availability.
 - 2. List of backing materials approved for use with the specific product.
 - 3. Substrates that product is known to satisfactorily adhere to and with which it is compatible.
 - 4. Substrates the product should not be used on.
- B. Color Cards for Selection: Where sealant color is not specified, submit manufacturer's color cards showing standard colors available for selection.
- C. Installer's Qualification Statement.

1.4 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.
- B. Installer Qualifications: Company specializing in performing the work of this section and with at least three years of documented experience.

1.5 WARRANTY

- A. See Section 017700 - Closeout Procedures, for additional warranty requirements.
- B. Correct defective work within a five (5) year period after Date of Substantial Completion.
- C. Warranty: Include coverage for installed sealants and accessories that fail to achieve watertight seal, exhibit loss of adhesion or cohesion, or do not cure.

PART 2. PRODUCTS

2.1 MANUFACTURERS

- A. Non-Sag Sealants: Permits application in joints on vertical surfaces without sagging or slumping.
1. Dow; Dow Corning 791 Silicone Weatherproof Sealant: www.dow.com/#sle.
 2. Hilti, Inc;CFS : www.us.hilti.com/#sle.
 3. Pecora Corporation; 890 FTS: www.pecora.com/#sle.
 4. Sika Corporation; Sikasil GP www.usa-sika.com/#sle.
 5. Tremco Commercial Sealants & Waterproofing; Spectrum 2: www.tremcosealants.com/#sle.

2.2 JOINT SEALANT APPLICATIONS

- A. Scope:
1. Interior Joints: Do not seal interior joints unless specifically indicated to be sealed. Interior joints to be sealed include, but are not limited to, the following items.
 - a. Joints between door, window, and other frames and adjacent construction.
 - b. In sound-rated wall and ceiling assemblies, gaps at electrical outlets, wiring devices, piping, and other openings; between wall/ceiling and other construction; and other flanking sound paths.
 - c. Other joints indicated below.
- B. Type 1 - Interior Joints: Use non-sag polyurethane sealant, unless otherwise indicated.
1. Type 2 - Joints between Fixtures in Wet Areas and Floors, Walls, and Ceilings: Mildew-resistant silicone sealant; white.
 2. Type 3 - In Sound-Rated Assemblies: Acrylic emulsion latex sealant.
- C. Sound-Rated Assemblies: Walls and ceilings identified as "STC-rated", "sound-rated", or "acoustical".

2.3 JOINT SEALANTS - GENERAL

- A. Sealants and Primers: Provide products with levels of volatile organic compound (VOC) content as indicated in Section 016116.
- B. Colors: To be selected by Architect from Manufacturers full range of colors.

2.4 NONSAG JOINT SEALANTS

- A. Non-Staining Silicone Sealant: ASTM C920, Grade NS, Uses M and A; not expected to withstand continuous water immersion or traffic.
1. Movement Capability: Plus and minus 25 percent, minimum.
 2. Non-Staining To Porous Stone: Non-staining to light-colored natural stone when tested in accordance with ASTM C1248.
 3. Dirt Pick-Up: Reduced dirt pick-up compared to other silicone sealants.

- B. Type 2 - Mildew-Resistant Silicone Sealant: ASTM C920, Grade NS, Uses M and A; single component, mildew resistant; not expected to withstand continuous water immersion or traffic.
 - 1. Color: White.
- C. Type 1 - Polyurethane Sealant: ASTM C920, Grade NS, Uses M and A; single or multi-component; not expected to withstand continuous water immersion or traffic.
 - 1. Movement Capability: Plus and minus 25% percent, minimum.
- D. Type 3 - Acrylic Emulsion Latex: Water-based; ASTM C834, single component, non-staining, non-bleeding, non-sagging; not intended for exterior use.

2.5 ACCESSORIES

- A. Backer Rod: Cylindrical cellular foam rod with surface that sealant will not adhere to, compatible with specific sealant used, and recommended by backing and sealant manufacturers for specific application.
 - 1. Open Cell: 40 to 50 percent larger in diameter than joint width.
 - 2. Manufacturers:
 - a. ADFAST Corporation; ADSEAL BR-2600 (Backer Rod): www.adfastcorp.com/#sle.
 - b. Nomaco, Inc; SOF ROD: www.nomaco.com/#sle.

PART 3. EXECUTION

3.1 EXAMINATION

- A. Verify that joints are ready to receive work.
- B. Verify that backing materials are compatible with sealants.
- C. Verify that backer rods are of the correct size.

3.2 PREPARATION

- A. Remove loose materials and foreign matter that could impair adhesion of sealant.
- B. Clean joints, and prime as necessary, in accordance with manufacturer's instructions.
- C. Perform preparation in accordance with manufacturer's instructions and ASTM C1193.
- D. Mask elements and surfaces adjacent to joints from damage and disfigurement due to sealant work; be aware that sealant drips and smears may not be completely removable.

3.3 INSTALLATION

- A. Perform work in accordance with sealant manufacturer's requirements for preparation of surfaces and material installation instructions.
- B. Perform installation in accordance with ASTM C1193.
- C. Perform acoustical sealant application work in accordance with ASTM C919.

- D. Install sealant free of air pockets, foreign embedded matter, ridges, and sags, and without getting sealant on adjacent surfaces.
- E. Do not install sealant when ambient temperature is outside manufacturer's recommended temperature range, or will be outside that range during the entire curing period, unless manufacturer's approval is obtained and instructions are followed.
- F. Nonsag Sealants: Tool surface concave, unless otherwise indicated; remove masking tape immediately after tooling sealant surface.

3.4 FIELD QUALITY CONTROL

- A. Perform field quality control inspection/testing as specified in PART 1 under QUALITY ASSURANCE article.
- B. Remove and replace failed portions of sealants using same materials and procedures as indicated for original installation.

END OF SECTION 079200

SECTION 099123 - INTERIOR PAINTING

PART 1. GENERAL

1.1 SECTION INCLUDES

- A. Surface preparation.
- B. Field application of paints.
- C. Scope: Finish interior surfaces exposed to view, unless fully factory-finished and unless otherwise indicated.
- D. Do Not Paint or Finish the Following Items:
 - 1. Items factory-finished unless otherwise indicated; materials and products having factory-applied primers are not considered factory finished.
 - 2. Items indicated to receive other finishes.
 - 3. Items indicated to remain unfinished.
 - 4. Fire rating labels, equipment serial number and capacity labels, bar code labels, and operating parts of equipment.
 - 5. Floors, unless specifically indicated.
 - 6. Glass.
 - 7. Concealed pipes, ducts, and conduits.

1.2 RELATED REQUIREMENTS

- A. Section 016116 - Volatile Organic Compound (VOC) Content Restrictions.

1.3 DEFINITIONS

- A. Comply with ASTM D16 for interpretation of terms used in this section.

1.4 REFERENCE STANDARDS

- A. 40 CFR 59, Subpart D - National Volatile Organic Compound Emission Standards for Architectural Coatings; U.S. Environmental Protection Agency current edition.
- B. ASTM D16 - Standard Terminology for Paint, Related Coatings, Materials, and Applications 2016.
- C. ASTM D4258 - Standard Practice for Surface Cleaning Concrete for Coating 2005 (Reapproved 2017).
- D. ASTM D4442 - Standard Test Methods for Direct Moisture Content Measurement of Wood and Wood-Based Materials 2020.
- E. MPI (APSM) - Master Painters Institute Architectural Painting Specification Manual Current Edition.
- F. SCAQMD 1113 - Architectural Coatings 1977 (Amended 2016).
- G. SSPC V1 (PM1) - Good Painting Practice: Painting Manual, Volume 1 2016.

- H. SSPC-SP 1 - Solvent Cleaning 2015, with Editorial Revision (2016).
- I. SSPC-SP 6 - Commercial Blast Cleaning 2007.
- J. SSPC-SP 13 - Surface Preparation of Concrete 1997 (Reaffirmed 2003).

1.5 SUBMITTALS

- A. Product Data: Provide complete list of products to be used, with the following information for each:
 - 1. Manufacturer's name, product name and/or catalog number, and general product category (e.g., "alkyd enamel").
 - 2. MPI product number (e.g., MPI #47).
 - 3. Cross-reference to specified paint system(s) product is to be used in; include description of each system.
- B. Samples: Submit three paper "draw down" samples, 8-1/2 by 11 inches (216 by 279 mm) in size, illustrating range of colors available for each finishing product specified.
 - 1. Where sheen is specified, submit samples in only that sheen.
- C. Manufacturer's Instructions: Indicate special surface preparation procedures.
- D. Maintenance Data: Submit data including finish schedule showing where each product/color/finish was used, product technical data sheets, material safety data sheets (MSDS), care and cleaning instructions, touch-up procedures, repair of painted and finished surfaces, and color samples of each color and finish used.
- E. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
 - 1. See Section 016000 - Product Requirements, for additional provisions.
 - 2. Extra Paint and Finish Materials: 1 gallon (4 L) of each color; from the same product run, store where directed.
 - 3. Label each container with color in addition to the manufacturer's label.

1.6 QUALITY ASSURANCE

- A. Applicator Qualifications: Company specializing in performing the type of work specified with minimum 3 years experience, and approved by manufacturer.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Deliver products to site in sealed and labeled containers; inspect to verify acceptability.
- B. Container Label: Include manufacturer's name, type of paint, brand name, lot number, brand code, coverage, surface preparation, drying time, cleanup requirements, color designation, and instructions for mixing and reducing.
- C. Paint Materials: Store at minimum ambient temperature of 45 degrees F (7 degrees C) and a maximum of 90 degrees F (32 degrees C), in ventilated area, and as required by manufacturer's instructions.

1.8 FIELD CONDITIONS

- A. Do not apply materials when surface and ambient temperatures are outside the temperature ranges required by the paint product manufacturer.
- B. Follow manufacturer's recommended procedures for producing best results, including testing of substrates, moisture in substrates, and humidity and temperature limitations.
- C. Do not apply materials when relative humidity exceeds 85 percent, at temperatures less than 5 degrees F (3 degrees C) above the dew point, or to damp or wet surfaces.
- D. Provide lighting level of 80 ft candles (860 lx) measured mid-height at substrate surface.

PART 2. PRODUCTS

2.1 MANUFACTURERS

- A. Provide paints and finishes from the same manufacturer to the greatest extent possible.
- B. Paints:
 - 1. Behr Process Corporation: www.behr.com/#sle.
 - 2. PPG Paints: www.ppgpaints.com/#sle.
 - 3. Sherwin-Williams Company: www.sherwin-williams.com/#sle.
- C. Primer Sealers: Same manufacturer as top coats.

2.2 PAINTS AND FINISHES - GENERAL

- A. Paints and Finishes: Ready-mixed, unless intended to be a field-catalyzed paint.
 - 1. Provide paints and finishes of a soft paste consistency, capable of being readily and uniformly dispersed to a homogeneous coating, with good flow and brushing properties, and capable of drying or curing free of streaks or sags.
 - 2. Provide materials that are compatible with one another and the substrates indicated under conditions of service and application, as demonstrated by manufacturer based on testing and field experience.
 - 3. Supply each paint material in quantity required to complete entire project's work from a single production run.
 - 4. Do not reduce, thin, or dilute paint or finishes or add materials unless such procedure is specifically described in manufacturer's product instructions.
- B. Volatile Organic Compound (VOC) Content:
 - 1. Provide paints and finishes that comply with the most stringent requirements specified in the following:
 - a. 40 CFR 59, Subpart D--National Volatile Organic Compound Emission Standards for Architectural Coatings.
 - b. SCAQMD 1113 Rule.

2. Determination of VOC Content: Testing and calculation in accordance with 40 CFR 59, Subpart D (EPA Method 24), exclusive of colorants added to a tint base and water added at project site; or other method acceptable to authorities having jurisdiction.
- C. Flammability: Comply with applicable code for surface burning characteristics.
- D. Sheens: Provide the sheens specified; where sheen is not specified, sheen will be selected later by Architect from the manufacturer's full line.
- E. Colors: To be selected from manufacturer's full range of available colors.
 1. Selection to be made by Architect after award of contract.

2.3 PAINT SYSTEMS - INTERIOR

- A. Paint I-OP - Interior Surfaces to be Painted, Unless Otherwise Indicated: Including gypsum board, concrete, concrete masonry units, brick, wood, plaster, uncoated steel, shop primed steel, galvanized steel, aluminum, and acoustical ceilings.
 1. Two top coats and one coat primer.
 2. Top Coat(s): High Performance Architectural Interior Latex; MPI #138, 139, 140, or 141.
 3. Top Coat(s): Institutional Low Odor/VOC Interior Latex; MPI #143, 144, 145, 146, 147, or 148.
 - a. Products:
 - 1) Behr Premium Plus Interior Eggshell Enamel [No. 2050]. (MPI #145)
 - 2) PPG Paints Speedhide Zero Interior Latex, 6-4310XI Series, Eggshell.
 - 3) Sherwin-Williams ProMar 200 HP Series, Eg-Shel. (MPI #145)

2.4 PRIMERS

- A. Primers: Provide the following unless other primer is required or recommended by manufacturer of top coats.
 1. Alkali Resistant Water Based Primer; MPI #3.
 - a. Products:
 - 1) Behr Concrete and Masonry Bonding Primer [No. 880].
 - 2) Behr Premium Plus Interior/Exterior Multi-Surface Primer and Sealer [No. 436]. (MPI #3)
 - 3) PPG Paints Perma-Crete Interior/Exterior Alkali Resistant Primer, 4-603XI. (MPI #3)
 - 4) PPG Paints Seal Grip Interior/Exterior Acrylic Universal Primer/Sealer, 17-921XI Series. (MPI #3)
 - 5) Sherwin-Williams Loxon Concrete and Masonry Primer Sealer, LX02W50. (MPI #3)
 - 6) Sherwin-Williams Loxon Water Blocking Primer/Finish.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Do not begin application of paints and finishes until substrates have been adequately prepared.

- B. Verify that surfaces are ready to receive work as instructed by the product manufacturer.
- C. Examine surfaces scheduled to be finished prior to commencement of work. Report any condition that may potentially affect proper application.
- D. Test shop-applied primer for compatibility with subsequent cover materials.
- E. Measure moisture content of surfaces using an electronic moisture meter. Do not apply finishes unless moisture content of surfaces is below the following maximums:
 - 1. Gypsum Wallboard: 12 percent.
 - 2. Plaster and Stucco: 12 percent.
 - 3. Masonry, Concrete, and Concrete Masonry Units: 12 percent.
 - 4. Interior Wood: 15 percent, measured in accordance with ASTM D4442.

3.2 PREPARATION

- A. Clean surfaces thoroughly and correct defects prior to application.
- B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.
- C. Remove or repair existing paints or finishes that exhibit surface defects.
- D. Remove or mask surface appurtenances, including electrical plates, hardware, light fixture trim, escutcheons, and fittings, prior to preparing surfaces or finishing.
- E. Seal surfaces that might cause bleed through or staining of topcoat.
- F. Remove mildew from impervious surfaces by scrubbing with solution of tetra-sodium phosphate and bleach. Rinse with clean water and allow surface to dry.
- G. Concrete:
 - 1. Prepare surface as recommended by top coat manufacturer and according to SSPC-SP 13.
- H. Masonry:
 - 1. Remove efflorescence and chalk. Do not coat surfaces if moisture content, alkalinity of surfaces, or if alkalinity of mortar joints exceed that permitted in manufacturer's written instructions. Allow to dry.
 - 2. Prepare surface as recommended by top coat manufacturer.
- I. Gypsum Board: Fill minor defects with filler compound. Spot prime defects after repair.
- J. Plaster: Fill hairline cracks, small holes, and imperfections with latex patching plaster. Make smooth and flush with adjacent surfaces. Wash and neutralize high alkali surfaces.
- K. Aluminum: Remove surface contamination and oils and wash with solvent according to SSPC-SP 1.
- L. Galvanized Surfaces:

M. Ferrous Metal:

1. Solvent clean according to SSPC-SP 1.
2. Shop-Primed Surfaces: Sand and scrape to remove loose primer and rust. Feather edges to make touch-up patches inconspicuous. Clean surfaces with solvent. Prime bare steel surfaces. Re-prime entire shop-primed item.
3. Remove rust, loose mill scale, and other foreign substances using methods recommended in writing by paint manufacturer and blast cleaning according to SSPC-SP 6 "Commercial Blast Cleaning". Protect from corrosion until coated.

N. Wood Surfaces to Receive Opaque Finish: Wipe off dust and grit prior to priming. Seal knots, pitch streaks, and sappy sections with sealer. Fill nail holes and cracks after primer has dried; sand between coats. Back prime concealed surfaces before installation.

3.3 APPLICATION

- A. Apply products in accordance with manufacturer's written instructions and recommendations in "MPI Architectural Painting Specification Manual".
- B. Where adjacent sealant is to be painted, do not apply finish coats until sealant is applied.
- C. Do not apply finishes to surfaces that are not dry. Allow applied coats to dry before next coat is applied.
- D. Apply each coat to uniform appearance in thicknesses specified by manufacturer.
- E. Sand wood and metal surfaces lightly between coats to achieve required finish.
- F. Vacuum clean surfaces of loose particles. Use tack cloth to remove dust and particles just prior to applying next coat.
- G. Reinstall electrical cover plates, hardware, light fixture trim, escutcheons, and fittings removed prior to finishing.

3.4 FIELD QUALITY CONTROL

- A. See Section 014000 - Quality Requirements, for general requirements for field inspection.
- B. Owner will provide field inspection.

3.5 CLEANING

- A. Collect waste material that could constitute a fire hazard, place in closed metal containers, and remove daily from site.

3.6 PROTECTION

- A. Protect finishes until completion of project.

END OF SECTION 099123

SECTION 142100 - ELECTRIC TRACTION ELEVATORS CONTROLS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Elevator call buttons, position indicator, and directional indicator devices.

1.2 REFERENCE STANDARDS

- A. AAMA 611 - Voluntary Specification for Anodized Architectural Aluminum 2014 (2015 Errata).
- B. ADA Standards - Americans with Disabilities Act (ADA) Standards for Accessible Design 2010.
- C. ASME A17.1 - Safety Code for Elevators and Escalators 2019.
- D. AWS D1.1/D1.1M - Structural Welding Code - Steel 2020.
- E. NFPA 70 - National Electrical Code Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

1.3 ADMINISTRATIVE REQUIREMENTS

- A. Coordination:
 - 1. Coordinate work with other installers to provide necessary conduits for proper installation of wiring, including but not limited to, the following:
 - a. Elevator equipment devices remote from elevator machine room or hoistway.

1.4 SUBMITTALS

- A. See Section 013000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Submit data on following items:
 - 1. Signal and operating fixtures, operating panels, and indicators.
- C. Shop Drawings: Include appropriate plans, elevations, sections, diagrams, and details on following items:
- D. Warranty Documentation: Submit manufacturer warranty and ensure that forms have been completed in Owner's name and registered with manufacturer.

1.5 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section with minimum ten years documented experience.

1.6 WARRANTY

- A. Provide manufacturer's warranty for elevator operating equipment and devices for one year from Date of Substantial Completion.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Basis of Design - Innovation Inc.
- B. Other Acceptable Manufacturers - E
 - 1. G.A.L.
 - 2. Adams
 - 3. EPCO
 - 4. Monitor
 - 5. E-Motive USA
 - 6. C.E. Electronics
 - 7. PTL
 - 8. MAD
 - 9. National
- C. Products other than Basis of Design are subject to compliance with specified requirements and prior approval of Architect. By using products other than Basis of Design, the Contractor accepts responsibility for costs associated with any necessary modifications to related work, including any design fees.
- D. Source Limitations: Provide elevator and associated equipment and components produced by the same manufacturer as the other elevator equipment used for this project and obtained from a single supplier.

2.2 PERFORMANCE REQUIREMENTS

- A. Regulatory Requirements: Comply with ASME A17.1, applicable local codes, and authorities having jurisdiction (AHJ).
- B. Accessibility Requirements: Comply with ADA Standards.
- C. Perform electrical work in accordance with NFPA 70.

2.3 OPERATION CONTROLS

- A. Elevator Controls: Provide landing operating panels, landing indicator panels, and directional indicator panels.
 - 1. Landing Operating Panels: Metallic type, one for originating "Up" and one for originating "Down" calls, one button only at terminating landings; with illuminating indicators.
 - 2. Landing Indicator Panels: Illuminating.
 - 3. Directional Indicator Panels: Illuminating.
 - 4. Comply with ADA Standards for elevator controls.

2.4 OPERATION CONTROL TYPE

2.5 MATERIALS

- A. Extruded Aluminum: ASTM B221 (ASTM B221M), finish: match existing in place plates..

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify existing conditions before starting this work.
- B. Verify that hoistway, pit, machine room, and elevator entry floor levels are ready for work of this section.
- C. Verify hoistway shaft and openings are of correct size and within tolerance.
- D. Verify location and size of machine foundation and position of machine foundation bolts.
- E. Verify that electrical power is available and of correct characteristics.

3.2 INSTALLATION

- A. Coordinate this work with renovation of elevators.
- B. Wood Surfaces not Exposed to Public View: Finish with one coat primer; one coat enamel.
- C. Adjust equipment for smooth and quiet operation.

3.3 CLEANING

- A. Remove protective coverings from finished surfaces.
- B. Clean surfaces and components in accordance with manufacturers written instructions.

3.4 PROTECTION

- A. Protect installed products until Date of Substantial Completion.
- B. Touch-up, repair, or replace damaged products and materials before Date of Substantial Completion.

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SECTION 14 21 13
ELECTRIC GEARED TRACTION FREIGHT ELEVATOR

PART 1 - GENERAL

1.1 SUMMARY AND DEFINITIONS

A. Related Documents

1. Contract Documents

B. Intent

1. The following specifications provide for the modernization of one (1) geared traction freight elevator (elevator No.5) located at the Baltimore Convention Center, One West Pratt Street in Baltimore, MD.
2. All work shall be performed during regular time working hours and of regular working days (Monday – Friday, 6:00 a.m. to 5:00 p.m.) except designated holidays and where otherwise specified.
3. Modernization of freight elevator No.5 is the base bid. Only one (1) elevator can be taken out of service at any one time should alternate No.1 for the modernization of service elevator No.4 and/or alternate No.2 for the modernization of service elevator No.6 be selected.
4. Related equipment shall be designed, constructed, installed and adjusted to produce the highest results with respect to smooth, quiet, convenient and efficient operation, durability, economy of maintenance, and the highest standard of safety.
5. It is not the intent of these specifications to detail the construction and design of all parts of the equipment, but it is expected that the type, materials, design, quality of work and construction of each part shall be adequate for the service required, durable, properly coordinated with all other parts, and in accordance with the best commercial standards applicable and of the highest commercial efficiency possible.
6. Electric and magnetic circuits and related parts shall be of proper size, design and material to avoid heating and arcing, and all other objectionable effects which may reduce the efficiency of operation, economy of maintenance and/or net-useful life of the apparatus.
7. Minimum requirements for design, materials, etc., are for certain parts of the equipment. Equivalent requirements approved by the Consultant shall apply to such parts as are of special design, construction or material and to which the specified requirements are not directly applicable. These minimum requirements as a whole shall be considered as establishing proportionate general minimum standards for all parts of the equipment.
8. General requirements for design, materials and construction are intended primarily to apply to the heavy-duty and important parts of the equipment specifically mentioned and to other parts of similar duty and importance. Less important and light-duty parts may be of the standard design, materials and construction provided that, in the opinion of the Consultant, such standards are in accordance with the best commercial practice and are fully adequate for the purpose of use. All such variations shall be made only on the Consultant's written approval.
9. All equipment and component parts installed, supplied or provided under this contract shall be manufactured and distributed by a third-party, non-installer company servicing the vertical transportation industry.

- a. Apparatus shall conform to the design and construction standards referenced herein, and shall be rated the best commercial grade suitable for this application.
 - b. Equipment and component systems shall not employ any experimental devices or proprietary designs that could hamper and/or otherwise prohibit subsequent maintenance repairs or adjustments by all qualified contractors.
 - c. Manufacturers of the apparatus shall provide technical support and parts replacements for their equipment and component systems for a minimum of twenty (20) years and issue such guarantee of support to the purchaser with written certification naming the final Owner of their product(s) to ensure the apparatus or systems remain maintainable regardless of who may be selected for future service.
10. All equipment provided shall be factory and field tested with a history of design reliability and net-useful life established.
- a. Contractor must be able to demonstrate the apparatus to be installed has been used successfully in a substantially similar manner under comparable conditions.
 - b. If the apparatus proposed differs substantially in construction, material composition, design, size, capacity, duty or other such rating from the equipment previously used for the same purpose by the manufacturer, the Consultant may reject the apparatus or require the vendor test and demonstrate the adequacy and suitability for this particular situation. Any necessary tests shall be performed at the sole expense of the Contractor with no prior guarantee of acceptance after the testing procedure.
11. The Contractor shall not use as part of the permanent equipment any experimental devices, proprietary design, components, construction of materials which have not been fully tried out in at least substantially similar or under comparable service, except as may be especially approved by the Consultant. If any important equipment or devices to be used on this installation differ substantially in construction, materials, design, size, capacity or duty from corresponding items previously used for the same purpose by the manufacturer, they shall pass such tests as the Consultant may require to fully show their adequacy and suitability. These tests shall be in addition to tests herein specified and shall be made at the expense of the Contractor.
12. Certain design limitations, tests, etc., are herein specified as a partial check of the adequacy of design, construction and materials used. These requirements do not cover all features necessary to ensure satisfactory and approved operation, etc., of the equipment.
13. It is understood, the entire system shall be designed, fabricated, modified and/or upgraded in full compliance with applicable local laws and code standards. The absence of a particular item or requirement shall not relieve the Contractor of the full and sole responsibility for such equipment, features and/or procedures.
14. With the exception of only those items specifically identified as being performed by others, the Specifications are intended to include all engineering, material, labor, testing, and inspections needed to achieve work specified by the Contract Documents. Inasmuch as it is understood that any incidental work necessary to complete the project is also covered by the Specifications, bidders are cautioned to familiarize themselves with the existing job site conditions. Additional charges for material or labor shall not be permitted subsequent to execution of the Contract.
15. Bidders must report discrepancies or ambiguities occurring in the Specifications to the Consultant for resolution prior to the bidding deadline, otherwise the Specifications shall be deemed acceptable in their existing form.

C. Termination of Existing Agreements

1. By submitting a bid, the existing maintenance provider agrees that any service contracts in effect shall be terminated by the Owner should the project be awarded to another vendor upon thirty (30)-day written notice to the Contractor by the Owner.
 - a. The contracts shall be terminated with no penalty to the Owner or Contractor.
 - b. Owner will be responsible for money owed the Contractor for services provided and work performed up until the date of cancellation.

D. Abbreviations and Symbols

1. The following abbreviations, Associations, Institutions, and Societies may appear in the Project Manual or Contract Documents:

AHJ	Authority Having Jurisdiction
AIA	American Institute of Architects
ANSI	American National Standards Institute
ASME	American Society of Mechanical Engineers
ASTM	American Society for Testing and Materials
AWS	American Welding Society
IBC	International Building Code
IEEE	Institute of Electrical and Electronics Engineers
NEC	National Electrical Code
NEMA	National Electrical Manufacturers Association
NFPA	National Fire Protection Agency
OSHA	Occupational Safety and Health Act

E. Codes and Ordinances / Regulatory Agencies

1. Work specified by the Contract Documents shall be performed in compliance with applicable Federal, State, and municipal codes and ordinances in effect at the time of Contract execution. Regulations of the Authority Having Jurisdiction shall be fulfilled by the Contractor and Subcontractors. The entire installation, when completed, shall conform with all applicable regulations set forth in the latest editions of:
 - a. Local and/or State laws applicable for logistical area of project work.
 - b. Building Code applicable to the AHJ.
 - c. Elevator Code applicable to the AHJ.
 - d. Safety Code for Elevators and Escalators, ASME A17.1 and all supplements as modified and adopted by the AHJ.
 - e. Safety Code for Elevators and Escalators, A17.1S supplement to A17.1 as modified and adopted by the AHJ for Machine Room Less installations (MRL).
 - f. Guide for Inspection of Elevators, Escalators, and Moving Walks, ASME A17.2.
 - g. Safety Code for Existing Elevators and Escalators, ASME A17.3 as modified and adopted by the AHJ.
 - h. Guide for emergency evacuation of passengers from elevators, ASME A17.4.
 - i. National Electrical Code (ANSI/NFPA 70).
 - j. American with Disabilities Act - Accessibility Guidelines for Building and Facilities and/or A117.1 Accessibility as may be applicable to the AHJ.
 - k. ASME A17.5/CSA-B44.1 - Elevator and escalator electrical equipment.

1. ECC (Energy Conservation Code) as may be applicable to the AHJ.
2. The Contractor shall advise the Owner's Representative of pending code changes that could be applicable to this project and provide quotations for compliance with related costs.

F. Definitions

1. Defective Work: Operation or control system failure, including excessive malfunctions; performances below specified ratings; excessive wear; unusual deterioration or aging of materials or finishes; unsafe conditions; need for excessive maintenance; abnormal noise or vibration; and similar unusual, unexpected, and unsatisfactory conditions.
2. Provide: Where used in this document, provide shall mean to install new device, apparatus, system, equipment or feature as specified in this document.
3. Definitions in ASME A17.1 as amended or modified by the AHJ apply to work of this Section.

1.2 PERMITS AND SUBMITTALS

A. Permits

1. Comply with the requirements of the contract documents.
2. Prior to commencing work specified by the Contract Documents, the Contractor shall, at its own expense, obtain all permits or variances as may be required by the AHJ and provide satisfactory evidence of having obtained said permits and variances to both the Owner's Representative and Consultant.
3. File necessary drawings for approval of all Authorities Having Jurisdiction.
4. The Elevator Contractor shall undertake the necessary review and search procedure to identify open applications and/or outstanding violations for this property; and, close-out such applications and/or expunge such violations relative to the project scope as required for final acceptance by the AHJ.
 - a. Outstanding applications and violations must be indicated on the request for permit filing for this procedure to ensure such applications and/or violations are dismissed accordingly.
 - b. All relative costs shall be included in the base bid proposal with the understanding that corrective actions are covered under the specified scope of work.

B. Submittals

1. Prior to beginning the work, the Contractor shall submit and have approved copies of layout drawings, shop drawings and standard cuts.
2. The Consultant and the Owner's Representative shall pass on the submittals with reasonable promptness and the Contractor shall be responsible to ensure that there will be no delay in their work or that of any other trade involved.
3. Approved filing and submittal requirements must be completed before equipment and related materials are ordered.
4. Copies of Department of Buildings' permits and/or governing authority's documents will be posted at the job site with copies issued to the Owner's Agent, Owner's Representative and Consultant.

5. Samples of wood, metal, plastic, paint or other architectural finish material applicable to this project shall be submitted for approval by the Owner's designee.
6. It shall be understood that approval of the drawings and cuts by Owner's designee, Architect and/or Consultant shall be for general arrangement only and does not include measurements which are the Contractor's responsibility or approval of variations from the contract documents required by the AHJ.
7. The Contractor shall prepare a record log and maintain all submittals, shop drawings, catalog cuts and samples.

C. Measurements and Drawings

1. Drawings or measurements included with the bidding material shall be for the convenience of the bidders only and full responsibility for detailed dimensions lies with the Contractor.
2. In the execution of the work on the job, the Contractor shall verify all dimensions with the actual conditions.
3. Where the work of the Elevator Contractor is to join other trades, the shop drawings shall show the actual dimensions and the method of joining the work of the various trades.

D. Keys

1. Upon the initial acceptance of work specified by the Contract Documents on each unit, the Contractor shall deliver to the Owner, six (6) keys for each general key-operated device that is provided under these specifications in accordance with ASME A17.1, Part 8 standards as may be adopted and modified by the AHJ.
2. All other keying of access or operation of equipment shall be provided in accordance with ASME A17.1 Part 8 as may be adopted and modified by the AHJ.

E. Diagnostic Tools

1. Prior to seeking final acceptance of the project, the Contractor shall deliver to the Owner any specialized tools required to perform diagnostic evaluations, adjustments, and/or programming changes on any microprocessor-based control equipment installed by the Contractor. All such tools shall become the property of the Owner.
 - a. Owner's diagnostic tools shall be configured to perform all levels of diagnostics, systems adjustment and software program changes which are available to the Contractor.
 - b. Owner's diagnostic tools that require periodic re-calibration and/or re-initiation shall be performed by the Contractor at no additional cost to the Owner for a period equal to the term of the maintenance agreement from the date of final acceptance of the project.
 - c. The Contractor shall provide a temporary replacement, at no additional cost to the Owner, during those intervals in which the Owner might find it necessary to surrender a diagnostic tool for re-calibration, re-initiation or repair.
2. Contractor shall deliver to the Owner, printed instructions, access codes, passwords or other proprietary information necessary to interface with the microprocessor-control equipment.

F. Service Support Requirements / Spare Parts

1. Software / Firmware Updates

- a. During the life of the equipment and subject to the term of the maintenance agreement, where revisions to firmware and/or software are issued by the control manufacturer or manufacturer of solid state and microprocessor based subsystems subsequent to the beneficial use of the equipment, updates shall be provided so that the installation and spare circuit boards are current with respect to software and firmware versions.

G. Wiring Diagrams, Operating Manuals and Maintenance Data

1. Comply with the requirements of Division 01.
2. Deliver to the Owner, four (4) identical volumes of printed information organized into neatly bound manuals prior to seeking final acceptance of the project.
3. The manuals shall also be submitted in electronic format on non-volatile media, incorporating raw 'CAD' and/or Acrobat 'PDF' file formats.
4. Manuals, as well as electronic copies, shall contain the following:
 - a. Step-by-step adjusting, programming and troubleshooting procedures that pertain to the solid-state microprocessor-control and motor drive equipment.
 - b. Passwords or identification codes required to gain access to each software program in order to perform diagnostics or program changes.
 - c. A composite listing of the individual settings chosen for variable software parameters stored in the software programs of both the motion and dispatch controllers.
 - d. Method of control and operation.
5. Provide four (4) sets of "AS INSTALLED" straight-line wiring diagrams in both hard and electronic format in accordance with the following requirements:
 - a. Displaying name and symbol of each relay, switch or other electrical component utilized including identification of each wiring terminal.
 - b. Electrical circuits depicted shall include all those which are hard wired in both the machine room and hoistway.
 - c. Supplemental wiring changes performed in the field shall be incorporated into the diagrams in order to accurately replicate the completed installation.
6. Furnish four (4) bound instructions and recommendations for maintenance, with special reference to lubrication and lubricants.
7. Manuals or photographs showing controller repair parts with part numbers listed.

H. Training

1. Prior to seeking final acceptance of the project, the Contractor shall conduct a one (1) hour training program on-site with building personnel selected by the Owner.
2. The focus of the session shall include:
 - a. Instructions on proper safety procedures and who to contact for the purpose of assisting passengers that may become entrapped inside an elevator car.

- b. Explain each control feature and its correct sequence of operation.
3. Control features covered shall include but, not be limited to:
 - a. Independent Service Operation.
 - b. Emergency Fire Recall Operation - Phase I.
 - c. Emergency In-car Operation - Phase II.
 - d. Emergency Communications Equipment.
 - e. Security Operating Features.

I. Advertising

1. Advertising privileges shall be retained by the Owner.
2. It shall be the responsibility of the Contractor to keep the job site free of posters, signs, and/or decorations.
3. Contractor's logo shall not appear on faceplates or entrance sills without the approval of the Owner.

1.3 QUALITY ASSURANCE

A. Materials and Quality of Work

1. All materials are to be new and of the best quality of the kind specified.
2. Installation of such materials shall be accomplished in a neat manner and be of the highest quality.
 - a. Should the Contractor receive written notification from the Owner stating the presence of inferior, improper, or unsound materials or quality of installation, the Contractor shall, within twenty-four (24) hours, remove such work or materials and make good all other work or materials damaged.
 - b. Should the Owner permit said work or materials to remain, the Owner shall be allowed the difference in value or shall, at its election, have the right to have said work or materials repaired or replaced as well as the damage caused thereby, at the expense of the Contractor, at any time within one (1) year after the completion of the work; and neither payment made to the Contractor, nor any other acts of the Owner shall be construed as evidence of acceptance and waiver.

B. Mechanical Design Requirements (General)

1. The following typical requirements shall apply to all parts of the work where applicable and are supplementary to other requirements noted under the respective headings.
 - a. All bearings, pivots, guides, guide shoes, gearing, door hanger sheaves, door hanger tracks and similar elements subject to friction or rolling wear in the entire elevator installation shall be accurately and smoothly finished and shall be arranged and equipped for adequate and convenient lubrication. Means shall be provided for flushing and draining the larger bearings and gear case. All oiling holes shall have dustproof, self-cleaning caps.

- b. Bearings of governor and governor sheaves and important supporting bearings of other parts in motion when the elevator is traveling shall, unless otherwise specified or approved, be of ball or roller bearing type.
- c. Bearings for brake levers and similar uses where the amount of movement under load is light and the wear negligible may be unlined.
- d. All plain bearings shall be liberally sized in accordance with the best commercial elevator usages which have proved entirely satisfactory on heavy-duty installations.
- e. Bearings of motors shall be arranged and equipped for adequate automatic lubrication. Ring or chain oilers, spring-fed grease cups and equivalent devices properly used in accordance with the best commercial elevator practice will be acceptable. Approved means shall be provided for visibly checking the amount of lubricant contained and for flushing and draining. Means shall also be provided for preventing leakage of lubricant when the reservoirs or grease cups are filled to proper levels.
- f. Ball and roller bearings shall be of liberal size and of a type and make which have been extensively and successfully used on other similar, heavy-duty elevator installations. They shall be fully enclosed. Loading, lubrication, support and all other conditions of use shall be in accordance with the recommendations of the bearing manufacturer based on previous extensive and satisfactory elevator usage.
- g. All armature spiders and similar items intended to rotate with their shafts shall be keyed and/or firm press or shrunk fit on the shafts. Set screw fastening will be permitted only for minor items not subject to hoisting loads and where means for field adjustment is required.
- h. All bolts used to connect moving parts, bolts carrying hoisting stresses and all other bolts, except guide rail bolts, subject to vibration or shock shall be fitted with adequate means to prevent loosening of the nuts and bolts. Bolts transmitting important shearing stresses between machine parts shall have tight body fit in drilling holes.
- i. All machine work, assembling and installing shall be done by skilled and experienced mechanics using first-class, modern equipment and tools. All work shall be thoroughly high grade in every respect. All parts will be manufactured to high precision standards so that wearing parts will be readily interchangeable with stock repair parts with a minimum of field fitting.
- j. All bearing and sliding surfaces of shafts, pins, bearings, bushings, guides, etc., shall be smoothly and accurately finished. They shall be assembled and installed in accurate alignment and with working clearance most suitable for the load, speed, lubrication and other conditions of use.
- k. Structural steel used for supporting and securing equipment and for the construction of car slings, etc., shall conform to the A.S.T.M. specification for Structural Steel for Buildings. Design stresses shall not exceed those specified in the local Building Code.
- l. Castings of motor frames, sheaves, gear casings, etc., shall be of the best quality metallurgically controlled, hard, close grained gray machinery cast iron, free from blow holes, sand holes, or shrinkage cracks, ground to remove overruns, sanded and machined so as to leave a finish suitable for its particular application. Surfaces of sheaves and brake drums shall be entirely free from defects and shall show a hardness of not less than 220 Brinell.

C. Electrical Design Requirements (General)

1. The following typical requirements shall apply to all parts of the work and are supplementary to other requirements noted under the respective headings.
 - a. The design and construction of the motors shall conform to the requirements of these specifications and to the ASME Standards for Rotating Electrical Machinery with revisions issued to the first day when the work of this Contract was advertised.
 - 1) Motors shall operate successfully under all loads and speeds and during acceleration and deceleration.
 - 2) Motors shall be designed for quiet operation without excessive heat.
 - 3) Insulation on motor coils and windings and on all insulated switch, relay, brake and other coils shall conform to the requirements of minimum Class "F" insulation, as defined in ANSI Standards for Rotating Electrical Machinery. All motors shall be impregnated twice.
 - 4) Switches, relays, etc., on controller, starter and signal panels and similar items on other parts of the equipment shall be the latest improved type for the condition of use. They shall function properly in full accordance with the requirements of the machines controlled and with the specified operating requirements of the elevator. Any of these parts showing wear or other injurious effects during the guarantee period to the extent that abnormal maintenance is required or indicated shall be replaced with proper and adequate parts by the Contractor.
 - 5) Contacts in elevator motor circuits which are intended to be opened by governors or other safety devices shall be copper to carbon or other approved non-fusing type.
 - 6) Where required, controllers and other component parts of the installation shall be labeled in accordance with the latest codes and standards as adopted and/or otherwise modified by the AHJ.
 - 7) Electrical equipment, motors, controllers, etc., installed under this contract shall have necessary CSA/US or UL/US listing as may be required by the AHJ. Equipment shall be labeled or tagged accordingly.

D. Energy Conservation Code

1. The Contractor shall comply with the requirements set forth in the Energy Conservation Code as may be applicable to the AHJ.
2. Except for equipment or systems under the purview of other disciplines, elevator and escalator equipment provided by the Contractor requiring compliance shall include, but not be limited to:
 - a. Gear ratio efficiencies in geared machines.
 - b. Energy efficiencies of geared and gearless motors.
 - c. Absorption of regenerated power for elevators and escalators.
 - d. Energy efficiencies of car interior lighting and ventilation.
 - e. Automatic operation of car interior lighting and ventilation through the individual car controller.

E. Materials, Painting and Finishes

1. Two (2) coats of rust inhibiting machinery enamel shall be applied to exposed ferrous metal surfaces in the pit that do not have a galvanized, anodized, baked enamel, or special architectural finishes.
2. Two (2) coats of rust inhibiting enamel paint to the machinery located within the machine room and secondary level (where applicable) as well as to the machine room floors.
3. Architectural metal surfaces of bronze or similar non-ferrous materials which are specified to be refinished, re clad and/or provided new, shall be sufficiently clear coated so as to resist tarnishing during normal usage for a period of not less than twelve (12) months after final acceptance by the Owner.
4. Identify all equipment including buffers, crosshead, safety plank, machine, controller, drive, governor, disconnect switch, etc., by 4" high numerals which shall contrast with the background to which it is applied. The identification shall be either decalcomania or stencil type.
5. Paint or provide decal-type floor designation not less than six (6) inches high on hoistway doors (hoistway side), fascias and/or walls as required by Code at intervals not exceeding 7'-0". The color of paint used shall contrast with the color of the surface to which it is applied.

F. Accessibility Requirements

1. Locate the alarm button and emergency stop switch at 35", and floor and control buttons not more than 48" above the finished floor. The alarm button shall illuminate when pressed for visual acknowledgement to user.
2. Provide raised markings in the panel to the left of the car call and other control buttons. Letters and numbers shall be a minimum of 5/8" and raised .03" and shall be in contrasting color to the call buttons and cover plate.
3. The centerline of new hall push button shall be 42" above the finished floor.
4. The hall arrival lanterns or cab direction lantern provided shall sound once for the "up" direction and twice for the "down" direction. Design and locate fixtures per Federal standards.
5. Provide floor designations at each entrance on both sides of jamb at a height of 60" above the floor.
6. Provide an audible signal within the elevator to tell passenger that the car is stopping or passing a floor served by the elevator.
7. Where elevators operate at a speed greater than 200 fpm, provide a verbal annunciator to announce the floor at which the elevator is stopping where required by the AHJ or specifications.
8. Provide signal control timing for passenger entry/exit transitions per Federal and/or Local standards.
9. Ensure sill-to-sill running clearances do not exceed 1-1/4" at all landings served.
10. Provide visual call acknowledgment signal for car emergency intercommunication device.

1.4 DELIVERY / STORAGE / HANDLING / COORDINATION

A. Delivery and Storage of Material and Tools

1. Comply with the requirements of the contract documents.
2. Delivery, Storage and Handling:

- a. Deliver materials to the site ready for use in the accepted manufacturer's original and unopened containers and packaging, bearing labels as to type of material, brand name and manufacturer's name. Delivered materials shall be identical to accepted samples.
 - b. Store materials under cover in a dry and clean location, off the ground.
 - c. Remove delivered materials which are damaged or otherwise not suitable for installation from the job site and replace with acceptable materials.
3. The Owner shall bear no responsibility for the materials, equipment or tools of the Contractor and shall not be liable for any loss thereof or damage thereto.
 4. The Contractor shall confine storage of materials on the job site to the limits and locations designated by the Owner and shall not unnecessarily encumber the premises or overload any portion with materials to a greater extent than the structural design load of the Facility.
- B. Work with Other Trades / Coordination
1. Coordinate installation of sleeves, block outs, equipment with integral anchors, and other items that are embedded in concrete or masonry for the applicable equipment. Furnish templates, sleeves, equipment with integral anchors, and installation instructions and deliver to Project site in time for installation.
 2. Coordinate sequence of installation with other work to avoid delaying the Work.
 3. Coordinate locations and dimensions of other work relating to the equipment scheduled for installation including pit ladders, sumps, and floor drains in pits; entrance subsills; machine beams; and electrical service, electrical outlets, lights, and switches in pits and machine rooms, secondary levels, overhead sheave rooms and hoistways as it relates to the specific equipment.
- C. Removal of Rubbish and Existing Equipment
1. On a scheduled basis, the Contractor shall remove all rubbish generated in performing work specified in the Contract Documents from the job site.
 2. Any component of the existing elevator plant that is not reused under the scope of work specified in the Contract Documents shall become property of the Contractor and, as such, shall be removed from the premises at the Contractor's sole expense.
 3. The Contractor agrees to dispose of the aforementioned equipment and rubbish in accordance with any and all applicable Federal, State, and municipal environmental regulations, and further accepts all liability that may result from handling and/or disposing of said material.
- D. Protection of Work and Property
1. The Contractor shall continuously maintain adequate protection of all their work from damage and shall protect the Owner's property from injury or loss arising out of this contract.
 2. The Contractor shall make good any such damages, injury or loss, except such as may be directly caused by agents or employees of the Owner.
 3. The Contractor shall provide all barricades required to protect open hoistways or shafts per OSHA regulations. Such protection shall include any necessary guards or other barricades for employee protections during and after the modernization procedure.

1.5 RELATED WORK

A. Related building work to be Included in Base Bid per the Contract Documents.

1. Related building work shall include all work necessary to return elevators to automatic operation with local Code authority approval. Related building work requirements shall be applicable based on prevailing conditions at the site of work and/or mandated modifications for code compliance.

1.6 WARRANTY / MAINTENANCE SERVICES

A. Contract Close-Out, Guarantee and Warranties

1. The Contractor agrees to certify that work performed in accordance with the Contract Documents shall remain free of defects in materials and quality of work for a period of two (2) years after final acceptance of the completed project, or acceptance thereof by beneficial use on a unit by unit basis, whichever occurs first.
2. The sole duty of the Contractor under this warranty is to correct any non-conformance or defect and all damages caused by such defect without any additional cost to the Owner and within fifteen (15) days of notification.
3. The express warranty contained herein is in lieu of all other warranties, express or implied, including any warranty of merchantability or fitness for a particular purpose.
4. In the event the Contractor fails to fulfill its obligations defined herein, the Owner shall have the express right to perform the Contractor's obligations and to charge the Contractor the cost of such performance or deduct an equal amount from any monies due the Contractor.

1.7 ALTERNATES

The following alternatives are elective upgrades which constitute changes to the base scope of work specified. Pricing for each alternate upgrade is requested from the bidder with costs indicated in the appropriate space in the Request for Proposal (RFP). Contractor shall take into consideration, as part of the alternative pricing, alternate work that is required either in lieu of, or in addition to, work specified in the base scope and shall not duplicate costs.

A. Alternate No. 3 - VVVF Emergency Return/Auxiliary Power System (New) Elevator No.5:

1. In the appropriate space on the Bid Form, provide an "add" for material and labor necessary to perform the following.
2. Provide a system that will make back-up power available to the elevator when commercial power fails.
3. The unit shall safely move the elevator to a landing and provide power to the door operator to allow passengers to exit.
4. Movement of the car may be load dependent utilizing dynamic braking to control car speed.
5. The unit shall include:
 - a. On board controller.
 - b. UPS status monitor capable of notifying building management system.
 - c. Restart input from the car door open button.

- d. Test button to simulate power failure.
 - e. UPS bypass control.
 - f. Monitoring of the disconnect switch.
 - g. Lockable shut-off switch.
 - h. Three-phase, 208/460 VAC input.
 - i. Battery level LED indicator.
 - j. Necessary fusing for batteries, outputs, logic circuitry and charger.
6. Provide new main line disconnects with auxiliary contacts to enable controls to distinguish between power failure and routine removal of power via the disconnect.

PART 2 - PRODUCTS

2.1 SUMMARY AND DEFINITIONS

A. Related Documents

1. Contract Documents

2.2 GENERAL DESCRIPTION

A. Geared Traction Freight Elevator No. 5

1.	Quantity	One (1)
2.	Type	Geared Traction Freight – Class C2
3.	Capacity (lbs.)	13,000
4.	Speed (fpm)	150
5.	Travel in Feet	65'- 0" (Field Verify)
6.	Roping/Ropes	2:1
	a. Hoist	New
	b. Governor	New
7.	Number of Landings	Five (5)
8.	Number of Openings	Six (6)
9.	Front Openings	Two (2) *100, 200
10.	Rear Openings	Four (4) 100, 300, 350, 400
11.	Operation	Simplex Selective Collective / New
12.	Control	Microprocessor / New
13.	Power Drive	VVVF / New
14.	Fireman's Control	Phase I and II / New
15.	Machine Type	Geared / New
16.	Machine Deflector Sheaves	New
17.	Motor	AC / New
18.	Machine Location	Adjacent Side (level 350)
19.	Governor	New
20.	Car Platform / Sling	Reuse / Refurbish
21.	Safety	Reuse / Refurbish
22.	Counterweight	Reuse / Refurbish

23.	Counterweight Deflector Sheave	Reuse / Refurbish
24.	Hoistway Deflector Sheaves	Reuse / Refurbish
25.	Car / Counterweight Guide Rails	Reuse / Refurbish
26.	Car / Counterweight Slide Guides	Reuse / Refurbish
27.	Buffers	Reuse / Refurbish
28.	Car Door Size	10' - 0" Wide x 10' - 0" High
29.	Hoistway Door Size	Same as Car Door
30.	Door Operation	Power Bi-Parting
31.	Hoistway Entrance Jambs	Reuse / Refurbish
32.	Entrance Sills	Reuse / Refurbish
33.	Car/Hoistway Door Operator Motors	New
34.	Car Gate, Guide Shoes, Rails, Chains, Contacts, Gear/Sheave, Limits	New
35.	Retiring Cam	New
36.	Hoistway Door Panels, Guide Shoes, Tension Latches, Rails, Chains, Rods, Interlocks, Gears/Sheaves, Limits	New
37.	Emergency Exits	Reuse / Refurbish
38.	Power Supply	480 (Field Verify)
39.	Wiring and Traveling Cables	New
40.	Security/Card Reader Provisions	New / Card Readers by Others
41.	CCTV Provisions	New / CCTV by Others
42.	Number of Push Button Risers	One (1) per Elevator
43.	Hall Operating Fixtures	New
44.	Car Operating Fixtures	New
45.	Communication	New
46.	Door Protective Device	New / 3D Infrared Light Curtain Type
47.	Emergency Cab Lighting	New
48.	Cab Enclosure / Interiors	New / As Specified Herein

2.3 MANUFACTURERS

A. Pre-Approved Equipment Manufacturers

1. The following manufacturer's equipment and materials have been pre-approved for use on this project.
2. Other equipment not specifically mentioned shall be considered for approval on an individual basis.
 - a. Controller - GAL (GALaxy), Motion Control Engineering, Elevator Controls Corporation, Elevator Systems, Inc., Smartrise.
 - b. Fixtures - G.A.L., Adams, EPCO, Monitor, E-Motive USA, C.E. Electronics, Innovation, PTL, MAD, National.
 - c. Door Protective Device - Janus, Adams, G.A.L., T.L. Jones, Tri-Tronics.
 - d. Machines - Hollister-Whitney, Titan, Imperial, Torin.
 - e. Motors - Imperial Electric, General Electric, Baldor, Reuland Electric.
 - f. VVVF Power Drives - Mitsubishi, MagneTek, Yaskawa, TorqMax.
 - g. VVVF Emergency Power Systems - MCE, Reynolds & Reynolds Electronics.

- h. Electrical Traveling Cables - Draka, James Monroe.
- i. Freight Doors and Systems - Courion, EMS Group, Peelle.
- j. Guide Shoes – ELSCO, G.A.L.
- k. Wire Ropes - Paulsen, Bethlehem, Wayland, Draka.
- l. Intercommunications/Telephones - Webb Electronics, K-Tec, Ring, Wurtec, Janus, approved equal.

2.4 CONTROL FEATURES / OPERATION

A. Motion Control (New)

- 1. Smooth stepless acceleration and deceleration of the elevator car shall be provided in either direction of travel during both single and multiple floor runs.
- 2. Use digital logic to calculate optimum acceleration and deceleration patterns during each run.
- 3. Acceleration, deceleration, jerk, maximum velocity, leveling accuracy and elapsed flight time, for a typical elevator one floor run, shall not exceed values as further specified.

B. Simplex Selective Collective Operation (New)

- 1. Provide simplex selective collective operation from a riser of hall push button stations.
- 2. The registration of one or more car calls shall dispatch the car to the selected floors.
 - a. The car shall also respond to registered hall calls in the same direction of travel.
 - b. Car and hall calls shall be canceled when answered.
- 3. Stops in response to calls that are registered in either the car or hall push button stations shall occur in the natural order of progression in which the floors are encountered, depending on the direction of car travel, and irrespective of the order in which calls are registered.
- 4. When the car has responded to the highest or lowest call, and calls are registered for the opposite direction, the car shall reverse direction automatically and respond to those registered calls.
- 5. When the car arrives at its last stop and reverses direction of travel, all previously registered car calls shall be automatically cancelled.
- 6. When the car arrives at a landing where both up and down hall calls are registered, it will answer the call in the direction of travel.
 - a. After a pre-determined delay, if no car call is registered, the car shall respond to calls registered for the opposite direction. Car doors shall close immediately, re-open and respond to the call for the opposite direction.
 - b. Hall lantern operation shall always correspond to direction of service.
- 7. When an empty car reverses direction at a landing with no hall calls, the doors shall not open and the hall lantern shall not operate.
- 8. If the car has no car calls registered and arrives at a floor where both up and down hall calls have been registered, the car shall respond to the hall call corresponding to the last direction of car travel. If, after making its stop, a car call is not registered and no other hall calls exist ahead of the car corresponding to its original direction of travel, the doors shall close and immediately reopen in response to the hall call for the opposite direction.

9. The car shall maintain its original direction at each stop until the doors are fully closed to permit a passenger to register a car call before the car reverses its direction of travel.

C. Independent Service Operation (New)

1. The car operating station shall be equipped with a key-operated switch labeled "IND SER".
2. Locate the switch in the locked service compartment.
3. When placed in the "on" position the following shall occur:
 - a. Group elevator - the elevator shall bypass corridor calls and travel directly to any floor chosen by registration of a car call. Hall calls shall remain registered for service by another elevator in the group.
 - b. Simplex elevator - existing hall call registrations shall extinguish and hall buttons shall remain inoperative as an indication to passengers that there is no elevator service.
4. During Independent Service Operation, the elevator doors shall remain open at any landing until the door close or a car call push button is pressed and maintained until the doors are fully closed.
5. If more than one (1) car call is registered, all registered car calls shall extinguish when the elevator stops in response to the first call.
6. Fire Emergency Recall shall automatically override Independent Service Operation and engage Phase I - Fire Emergency Recall Operation following a period of approximately forty-five (45) seconds.

D. Inspection Service Operation (New)

1. The car shall move at a speed not to exceed 150 feet per minute (0.75 meters per second) as per code with both the hall and car door panels in the closed and locked position.
2. The top of the elevator car shall be equipped with a control for limited operation of the car during repairs, maintenance and inspection conducted in the hoistway. The transfer of control to the top of car operating device shall cause that device to be the sole means of control for the elevator.
 - a. Visual and audible indication shall be provided on the top of the car when Firefighters' Emergency Operation is initiated.
3. Power door operating equipment shall be rendered inoperative while the car is being operated in the Inspection Service mode with the exception of power closing of the door. The control system shall maintain closing power on the door while the elevator is moving under Inspection Service Operation.
4. Machine Room Inspection Operation and Inspection Operation with open door circuits shall be provided in accordance with A17.1 Safety Code, as modified and adopted, where required or allowed by the AHJ.

E. Hoistway Access Operation (New)

1. Provisions shall be made to allow access to the hoistway through the use of hoistway access switches.

2. Operating the access switch shall permit the car to move at a speed not to exceed 150 feet per minute (0.75 meters per second) as per code with the hall and car doors in the open position to obtain access to the top of the car or climb-in pit.
3. The car shall automatically stop motion when the car top is level with the hoistway door sill for access to top of car.
4. The access key switch(es) shall be keyed differently than other typical keys used in the operation of the elevator. Keying shall be in accordance with Security Group Classifications as required by applicable code.
5. Access operation shall be disabled when top of car inspection operation is in effect.

F. Load Weighing Operation (New)

1. A positive means shall be provided to continuously monitor the amount of load being transported by the elevator car.
2. The system shall be used to:
 - a. Preload static motor drives.
 - b. Activate control features that include:
 - 1) anti-nuisance operation.
 - 2) load dispatch operation.
 - 3) load dependent non-stop operation where applicable.
3. The anti-nuisance feature shall operate at loads not exceeding 200 lbs., whereas load dispatch and load non-stop shall be set to function at 65% of the rated loading capacity for the initial set up and adjustment procedure.

G. Anti-Nuisance Operation (New)

1. In the event car loading is not commensurate with the number of car calls registered, all car calls shall be canceled.
 - a. The system shall monitor the door protection device to determine if passenger transfer has occurred.
 - b. If after the third (3rd) stop a passenger transfer has not occurred, the system shall cancel all remaining registered car calls and respond to assigned hall call demand.
 - c. The number of calls registered with no passenger transfer that will trigger anti-nuisance shall be adjustable and initially set to three (3) calls.

H. Firefighters' Emergency Operation (New)

1. Phase I Emergency Recall Operation shall be provided for each car in accordance with ASME A17.1 code as modified under the applicable local or State law.
2. Each main or auxiliary car operating station shall be provided with an indicator light and warning buzzer, each of which shall become activated whenever Phase I Operation is engaged.
 - a. The warning buzzer shall cease to function once the car has completed the recall sequence and is positioned at the designated recall landing.
 - b. The indicator light shall remain illuminated as long as Phase I Operation is activated.

3. A three-position, key-operated switch shall be provided on the designated recall landing to manually activate Phase I Operation.
 - a. When activated, Phase I Operation shall be arranged so that in order to reset normal service, all cars must first be returned to the designated recall landing, after which the Phase I key-switch must be turned to the "OFF" position.
4. A standardized Fire Recall Key shall be used where required by the codes and standards applicable to the AHJ.
5. Phase II Emergency Recall In-Car Operation shall be provided for each car in accordance with ASME A17.1 code as modified under local or State law.
6. Locate controls required for Phase II In-Car Operation in a locked access cabinet in the main car operating panel.
 - a. The cover of the locked access panel shall be engraved as required by local or State law.
 - b. The locked access panel shall contain:
 - 1) Phase II key switch.
 - 2) Fire indicator light.
 - 3) Call cancel push button.
 - 4) Door open push button.
 - 5) Door close push button.
 - 6) Run/Stop switch.
 - 7) Other devices as may be required by local law.
 - c. Engrave the Firefighters' Service operating Instructions on the inside of the locked cabinet door.

I, Alternate No. 3 - VVVF Emergency Return/Auxiliary Power System (New) Elevator No.5

1. In the appropriate space on the Bid Form, provide an "add" for material and labor necessary to perform the following.
2. Provide a system that will make back-up power available to the elevator when commercial power fails.
3. The unit shall safely move the elevator to a landing and provide power to the door operator to allow passengers to exit.
4. Movement of the car may be load dependent utilizing dynamic braking to control car speed.
5. The unit shall include:
 - a. On board controller.
 - b. UPS status monitor capable of notifying building management system.
 - c. Restart input from the car door open button.
 - d. Test button to simulate power failure.
 - e. UPS bypass control.
 - f. Monitoring of the disconnect switch.
 - g. Lockable shut-off switch.
 - h. Three-phase, 208/460 VAC input.
 - i. Battery level LED indicator.
 - j. Necessary fusing for batteries, outputs, logic circuitry and charger.

6. provide new main line disconnects with auxiliary contacts to enable controls to distinguish between power failure and routine removal of power via the disconnect.
- J. Floor Lockout Feature / Keyed Security Control / Car Only (New)
1. Provide a car call floor lockout feature which will prevent registration of car calls to level 350.
 - a. Provide a two (2) position “on-off” key switch located in the car station adjacent to the level 350 car call button.
 - b. Turning the key switch to the “off” (lockout) position shall prevent the registration of a call when the corresponding car call button is pressed>
 - c. The key switch shall be individually keyed with a master.
 2. Activation of the floor lockout key switch shall no effect on the operation of the hall call station, i.e., the car can be called to the floor from the hall call button that is locked out in the car station.
 3. The “floor lockout” key switch shall be in a material and finish to match the car operating panel cover plate.
 4. Fire Service shall override the car call lockout feature.
- K. Floor Lockout Feature / Keyless - Card Reader Control / Wiring Provisions (New)
1. Wiring: Provide six (6) pair of 20 gauge two (2) flexible conductor low voltage cables with an overall braided shield in the traveling cable of all elevators for card reader interface.
 - a. The cables shall extend from the security interface terminal cabinet in the elevator machine room to behind the elevator return panel above the space allotted for the card reader.
 - b. Terminate the cable to dual screw barrier terminal strips on each end.
 2. Card Reader Space: Allocate card reader space in each main car station as directed by the consultant. Provide a flush Lexan lens and mounting provisions for the card reader unit which is provided by others.
 3. Interface: For floor programmable card access control in all elevators, provide a pair of terminals for all floors such that application of a momentary dry (no voltage present) contact closure across those terminals by the security system shall enable the selection of the corresponding floor from the floor selector button in the elevator cab.
 - a. Locate the terminals inside an interface terminal cabinet in the elevator machine room.
 - b. Provide all relays required to interface the elevator control system to the momentary dry contact closures provided for under another section of these specifications.
 - c. If applicable, the card reader shall be operable and compatible with the issued card keys used building wide.
 - d. Coordinate system requirements with the manufacturer of the issued card key system.
 4. Card Reader "Secure/Bypass" Switch: Provide separate card reader control bypass key switches for each elevator.

- a. The bypass key switches shall be located in the car operating panel service cabinet.
 - b. The bypass key switches shall be a maintained contact type key switch with the key removable in the secure or bypass position.
 - 1) When the key switch is in the secure position, the card reader control mode shall be initiated.
 - 2) When in the bypass position, the card reader control mode shall be bypassed and the elevator shall return to normal operation, permitting free access to any floor.
5. The card reader operation shall bypass floor cut-out switches.
 6. Firefighters' Service Operation shall override Floor Lockout Feature.
- L. CCTV Camera / Wiring Provisions (New)
1. Wiring: Provide two (2) RG-59U stranded center conductor coax cables and two (2) conductor 20 gauge stranded, low voltage cables with an overall braided in the traveling cable of all elevators for CCTV Camera interface.
 - a. The cables for the CCTV camera shall extend from the elevator / security interface terminal cabinet in the elevator machine room to the top of the elevator cab. Provide an excess loop of 10 feet of cable at each end.
 - b. Provide one (1) 120V duplex unswitched outlet dedicated to security on top of each elevator equipped with CCTV camera.
- M. Car to Lobby Operation (New)
1. Provide a key-operated Car-to-Lobby feature.
 - a. Provide a three-position key-operated switch for each elevator in the main landing hall call station to activate the Car-to-Lobby operating feature.
 2. When engaged, this feature shall:
 - a. Cause the affected elevator to return non-stop to the lobby after it has discharged all registered car calls.
 - b. Open the door upon arriving at the lobby for approximately ten (10) seconds, after which the elevator shall park out of service with the door closed.
 - c. Maintain door open button function during the interval in which the car is out of service.
 3. Returning the key-operated switch in the lobby panel to the "on" position shall restore the car to normal operation.
 4. Override the Priority Service feature with Firefighters' Service in accordance with code and local law.
- N. Door Operation / Automatic Freight Door / Car Gate (New)
1. Provide automatic sequential power operation of car gate and door system.
 2. Upon arrival at a selected floor landing, the hoistway doors shall open automatically approximately 2/3 or more before the car gate is opened with the elevator level sill to sill.

- a. Both the car gate and hoistway doors shall remain open for an adjustable period of time from zero to sixty (60) seconds before an automatic sequence of closing functions are initiated.
 - b. A manual load switch (push/pull type) shall be provided in the car operating panel to override the automatic power closing of the car gate and hoistway doors.
 - 1) Note: At the Owner's option, the push-pull load switch may be replaced with a key-operated switch or supplemented with a two-position keyed switch where the key is removable in the "off" position only.
 - 2) Where required by Code, manual load switch shall be overridden when on Firefighters' Emergency Operation.
 - c. Provide non-contact sensor beam door protection device(s) to monitor the opening. Locate the device(s) on the elevator so that the entire opening is protected.
3. Automatic power closing of the car gate and hoistway doors shall employ visual and audible signaling prior to commencement of the sequential closing procedure.
- a. A minimum of five (5) seconds before the closing cycle is initiated automatically, a buzzer shall sound momentarily and a red flashing strobe light shall be illuminated.
 - b. Subsequent to the timing cycle with audible and visual signals activated, the car gate shall commence closing providing the non-contact sensor beam(s) protecting the car gate opening are clear of all obstructions.
 - 1) Any interference in the gate closing path prior to or during the closing cycle shall automatically stop and reopen the gate/doors until the closing path is cleared.
 - c. During the close operation, the car gate shall be closed 2/3 or more before the hoistway doors start to close.
 - d. If the sequence of closing operation is interrupted and the gate/doors are reopened, the entire timing, signaling and sequential operation shall be repeated.
4. Activation of the door open or door close push buttons located in the car operating panel shall override preliminary timing controls relative to the door open non-interference dwell timing period; and, reopen doors/gate when activated during the automatic door closing sequence of operation.
5. Firefighters' Emergency Operation shall be provided in accordance with governing authority requirements and applicable Codes.
- O. Door Operation / Selective (New)
1. Selective door operation shall be provided at floors where both front and rear openings occur.
 - a. Provide a floor button for each opening, clearly identified for front and rear in the car operating panel. A hall call station shall be provided for each hoistway entrance.
 - b. The front doors shall only open in response to a front car call and the rear doors only shall open in response to rear car call.
 - c. The front and rear doors shall open simultaneously in response to a front and rear call registered for the same floor.

- d. The front doors only shall open in response to front hall call and the rear door shall open in response to a rear hall call providing the registered hall call is for the same direction of travel.
 - 1) If the front and rear hall calls are registered at the same floor for the direction of travel, both front and rear doors shall open simultaneously contingent on applicable fire codes of the AHJ.
 - 2) If front and rear hall calls are registered at the same floor for opposite directions, only the front rear doors shall open in response to the registered hall call which corresponds to the direction of travel.
- e. A registered hall call for the direction opposite of the car travel shall not be cancelled and will be answered by the car traveling in the opposite direction.
- f. Front and rear open buttons shall be provided in the car operating panel, the pressing of which shall stop and closing of the corresponding doors and return them to their fully open position.
- g. An elevator responding to Phase I Firefighters' Emergency Recall Operation shall return non-stop to the designated recall landing and shall only open to the side that has the Firefighters' Emergency Operation controls.

2.5 MACHINE ROOM / SECONDARY EQUIPMENT

A. Control Equipment (New)

- 1. The elevators shall have microprocessor-based controller/dispatchers.
- 2. Digital logic shall calculate optimum acceleration, deceleration and velocity patterns for the car to follow during each run.
- 3. Closed-loop distance and velocity feedback shall monitor the actual performance of the elevator car with the desired speed profile.
- 4. System operating software shall be stored in non-volatile memory.
- 5. Elevator control relays, contactors, switches, capacitors, resistors, fuses, circuit breakers, overload relays, power supplies, electronic circuit boards, microprocessors, static motor drive units, wiring terminal blocks and related components shall be totally enclosed inside a free-standing metal cabinet with hinged access doors.
 - a. Provide natural or mechanical ventilation for the controller cabinets.
 - b. Equip the vent openings and exhaust fans with filters.
- 6. Mount equipment to moisture-resistant, noncombustible panels supported from the steel frame.
- 7. Provide "noise filter" between hoistway wiring and controller/dispatchers to eliminate interference.
- 8. Optically isolate communication cables between components.
- 9. Wiring: Wiring on the units, whether factory or field wiring, shall be done in neat order, and all connections shall be made to studs and/or terminals by means of grommets, solderless lugs or similar connections. All wiring shall be copper.
- 10. Terminal Blocks: Provide terminal blocks with identifying studs on units for connection of board wiring and external wiring.
- 11. Marking: Identifying symbols or letters shall be permanently marked on or adjacent to each device on the unit, and the marking shall be identical with marking used on the wiring

- diagrams. In addition to the identifying marks, the ampere rating shall be marked adjacent to all fuse holders.
12. A 17" flat-panel LCD monitor shall be provided inside the elevator machine room for diagnostic purposes. The monitor shall be permanently mounted in a cabinet, on a shelf immediately adjacent or attached to or in a control cabinet of at least one car of a group. By means of graphic depiction, information available on the screen shall include:
 - a. An overview of car and corridor calls currently existing within the system.
 - b. Elevator operating status.
 - c. Elevator position, direction of travel and velocity.
 - d. The open/close status of elevator door.
 - e. The current operational status of each CPU input and output.
 - f. A sequential history of faults detected within the control system over the previous thirty (30) days.
 13. The manufacturer's standard on-board "LCD" display shall be incorporated on the main processor board and/or otherwise incorporated in the controller cabinet. The "LCD" shall be capable of providing alpha-numeric characters to view the operational status of the elevator and/or group functions depending on the application. The display shall provide the user with necessary information for troubleshooting and reprogramming of the basic system parameters.
 - a. Where the "LCD" is not an integral part of the controller and troubleshooting/reprogramming requires the use of a separate tool, the tool shall be maintained in the machine room and accessible to service personnel. This tool, along with all technical documentation for the correct use of the tool, shall remain the property of the Owner.
 - b. Password protection of critical programming features is required to prevent accidental changes to life-safety and other non-typical control settings.
 - c. Where a separate dispatch or group control panel is provided, a separate "LCD" display shall be provided to view group functions.
 14. In the event diagnostics and monitoring is accomplished via Field Service Tools, provide the required Field Service Tools with related control system appurtenances for diagnostic evaluations, system monitoring and field adjustments.
 - a. Provide instructions for proper use of such diagnostic tools and/or equipment with all coding and other operational requirements.
 - b. Maintain and calibrate the diagnostic tools and update the associated instructions and other related documents under the service agreement.
 - 1) Should the agreement be cancelled for any reason by either party, maintenance and updating of diagnostic tools shall be provided to the Owner at the Contractor's cost without the need to purchase or lease additional diagnostic devices, special tools or instructions from the original equipment provider.
 - 2) The Owner may request field and technical instructions be provided by the original installation contractor or manufacturer for proper servicing by other qualified elevator company personnel.

- 3) The established cost-plus profit, as previously specified, shall be applicable for the life of the system.
- 4) If the equipment for fault diagnosis is not completely self-contained within the controllers but requires a separate detachable device, that device shall be furnished to the Owner as part of this installation.
- 5) Such device shall be in possession of and become property of the Owner.

15. Microprocessor Documentation

- a. Provide and/or obtain complete information on systems' design, component parts, installation and/or modification procedures, adjusting procedures and associated computer conceptual logic circuitry and field connection.

B. Power Bi-Parting Door Control (New)

1. Suitable control panels shall be furnished to electrically energize door motors. Controllers shall be mounted within the machine room adjacent to the elevator controller.
2. Power doors and gates shall be arranged to open automatically as the elevator arrives at a floor and to close by continuous pressure push button operation or by Auto Close if activated. Auto Close-System is user selectable (on/off). Doors shall re-open automatically if not closed to the full closed position.
3. The door controller shall be capable of working both a Slave to the elevator controller or independently as a Stand-Alone system operating the doors and appropriately signaling the elevator controller of the door positions.
4. The Stand-Alone control shall provide Automatic Time Closing of the doors after a set time period (adjustable 15–300 seconds) and Firefighter Emergency Operation. A close warning buzzer shall be provided.
5. Power operated doors are to be provided with Sequence Operation between landing door and car gate. The landing doors and car gates should be arranged so that in closing the car gate is closed at least two-thirds of its travel before the landing door can start to close.
6. A non-proprietary Programmable Logic Controller (PLC) is to be provided for all door logic and interface functions. The PLC shall be equipped with input/output indicators and functional diagnostic LEDs.
7. Variable Voltage, Variable Frequency (VVVF) drives shall be provided for door,
8. car gate and retiring cam motor operation.
9. Each landing door and car gate shall be provided with interdependent control slaves designed to provide serial communication back to the PLC. The slaves shall be mounted in a junction box and equipped with input/output indicators and functional diagnostic LEDs.
10. The power operators and electric controls shall be designed to prevent electrical overload should an obstruction prevent the landing doors or car gate from moving with power applied. After removing the obstruction, the equipment shall be capable of being returned to service immediately.

C. Machine Beams (New / Existing)

1. Provide additional support beams, angles, plates, bearing plates, blocking steel members, etc., to support new machine, governors, dead end hitches, deflector and overhead sheaves from existing machine beams where applicable.
2. Contractor shall verify adequacy of all existing supports scheduled to be reused.

D. Geared Traction Machine / Sheaves / Brake (New)

1. Provide a worm-gear traction machine with a direct current brake and demountable drive sheave, mounted in proper alignment on a common bedplate.
2. The worm shall be accurately machined from steel and provided with a single end, double race ball bearing thrust.
3. The worm gear shall be made from a phosphor bronze rim, accurately cut, fitted and bolted to a cast iron spider.
4. The drive sheave shall be a demountable casting from the best grade of metal with a Brinell hardness of 215 to 230, and shall be machined with grooves, providing maximum traction with a minimum of rope and sheave wear.
 - a. Roping requirements and type of steel rope used as suspension means shall be engineered by the contractor and manufacturer of the equipment for maximum life of ropes and sheave.
5. Provide means for lubricating the machine.
6. The gear housing shall have a gasketed hole to inspect the gear.
7. Provide machine with an electro-mechanical brake.
 - a. The brake shall be spring applied and electrically released where drum or disk-type brakes are employed.
 - b. Design the brake electro-magnet for quick release and application of the brake.
 - c. The brake lining material shall be non-asbestos.
 - d. The brake pulley or disk shall act as the coupling between the drive motor shaft and the worm shaft.
8. Provide sheave guards to prevent ropes from jumping off of the sheave grooves.
9. Provide hoist cable guards at the car and counterweight-drop side of the machine sheave.
 - a. Guards shall cover cables from the point of slab penetration to the point where the hoist cables contact the sheave.
 - b. Guards shall prevent access to cables at pinch points.
10. Provide hoisting machine based on freight elevator cab enclosure weight.

E. Deflector Sheaves Hoisting Machine (New)

1. Provide hoisting machine wire rope deflector sheaves with related apparatus and structural mounting supports.
 - a. Locate and size new sheave to maximize use of available clearances maintaining the present car and counterweight hitch drops.
 - b. New support bearings shall be of a roller type designed for a minimum of twice the total load calculation.
 - c. The sheaves shall be equipped with suitable lubrication devices.
 - d. The deflector sheave shall be provided with means to guard the hoist ropes so they do not jump out of their respective grooves during a slack rope condition.
 - e. Required new mounting beams and structural supports shall be interfaced with existing building structures as may be modified under the terms of this contract for the new design rated loading where applicable.

F. Deflector Sheaves Car/Counterweight/Overhead/Hoistway (Reuse)

1. The existing car, counterweight, overhead and hoistway sheave assemblies shall be refurbished and reused.
 - a. The sheave assemblies shall be washed clean of accumulated oil and grease and examined for any indication of bearing failure or leakage.
 - b. Bearings which are worn or found to emit unusual noises, excessive heat or other unfavorable characteristics shall be renewed or re-babbitted per OEM standards.
2. Overhead and hoistway sheave fastenings and beams shall be inspected to verify the structural integrity of the attachment.
3. Sheave alignment with the hoist ropes shall be checked and reset as necessary.
4. Remove rust, oil, dirt and impurities on existing hoistway, overhead and car sheaves and paint with a rust inhibitive paint to all exposed surfaces of sheaves, beams and fastenings/supports.

G. AC Drive Motor / Geared Applications (New)

1. Provide a vector duty, variable speed, reversible alternating current induction motor with high starting torque and low starting current, rated for 50° C (122° F) during continuous operation, designed for this particular elevator application.
 - a. Provide adequate ventilation of internal stator windings and rotating element to prevent overheating. (Constant velocity fan for constant cooling.)
 - b. Provide thermal overload protection of the stator windings.
2. The hoist motor housing shall have a rigid cast iron stator frame.
 - a. Core plate stator laminations shall be press fit into frame and properly secured.
 - b. Minimum class "F" (or approved equal) insulation shall be used to ensure long-term reliability.
3. The rotating element shall be fabricated from drawn bars machined and fitted in slots with end rings brazed together and shall be dynamically balanced for vibration-free operation. The motor shaft shall be manufactured from high-strength alloy steel for maximum strength.
4. Provide a motor coupling machined for proper fit on motor shaft with slotted keyway and key to properly secure same for standard NEMA mounted construction (foot or footless).
5. Properly align the hoisting motor to the hoisting machine for vibration-free operation.
6. The motor shall have proper labeling in accordance with the requirements of the AHJ.

H. VVVF AC Drive (New)

1. Provide a solid-state, variable voltage, variable frequency (VVVF), 3-phase AC hoist motor drive system as part of the microprocessor-based equipment.
 - a. VVVF drive system shall be a low-noise, flux-vector inverter device.
 - b. Include a digital LED readout and touch-key pad to facilitate software parameter adjustments, monitor system operation and display fault codes.

2. The drive shall utilize a 3-phase, full wave rectifier and capacitor bank to provide direct current power for solid-state inversion.
3. The inverter shall utilize IGBT power semiconductors and duty cycle modulation fundamental frequency of not less than one kilohertz to synthesize 3-phase, variable voltage variable frequency output.
4. The system shall be designed and configured with the following countermeasures for noise generated by the pulse-width modulated (PWM) inverters.
 - a. Control of radiated noise via inverter and/or motor cables.
 - b. Conducted noise through power lines.
 - c. Induction noise and ground noise.
5. Inverter shall be encased in metal and independently grounded.
6. A noise filter for the input power line shall be provided to prevent penetration into radios, wireless equipment and smoke detectors.
7. A 3% three-phase line reactor shall be provided on the power system rated at the utility voltage input to the drive and sized for the rated drive current.
8. The drive shall:
 - a. Be configured as a complete digital drive system.
 - b. Be totally software configurable.
 - c. Interface with external equipment/signals via either discrete local I/O connections or high speed Local Area Network (LAN).
 - d. Be located within the limits of the control cabinet (where system size allows) or separately mounted in an appropriate chassis with hinged swing-out doors with clearances equal to the cabinet width dimensions.
 - e. Provide programmable linear or S-curve acceleration.
 - f. Provide free run or programmable linear or S-curve deceleration.
 - g. Have controlled reversing.
9. Operating and Environmental Conditions:
 - a. Have a service factor of 1.0.
 - b. Rated for continuous duty.
 - c. Humidity - 90% rated humidity non-condensing.
 - d. Cooling - forced air when required.
 - e. Digital display for:
 - 1) Running - output frequency, motor RPM, output current, voltage.
 - 2) Setting - Parameters values for setup and review.
 - 3) Trip - separate message for each trip, last thirty (30) trips to be retained in memory.
10. Protective Features:
 - a. Motor overspeed.
 - b. Adjustable current limit.
 - c. Isolated control circuitry.
 - d. Digital display for fault conditions.
 - e. Selectable automatic restart at momentary power loss.
 - f. Manual restart.

- g. Over/Under Voltage.
- h. Line to line and line to ground faults.
- i. Over-temperature.

I. VVVF AC Drive - Regenerative Module (New)

- 1. The system shall provide full regenerative capabilities to control overhauling motor speed and reduce hoist motor deceleration time by allowing overhaul power to be discharged back into the power lines.
 - a. The regenerative section may be an integral part of the drive or a stand-alone unit mounted in a separate cabinet with proper ventilation as required by the manufacturer.

J. Overspeed Governor (New)

- 1. Provide a speed governor, located overhead, to operate the car safety.
 - a. Maintain the proper tension in the governor rope with a weighted tension sheave located in the pit.
 - 1) Springs used to develop the tension are not acceptable.
 - b. Provide rope grip jaws, designed to clamp the governor rope to actuate the car safety upon a predetermined overspeed downward.
 - 1) The centrifugal type governor shall trip and set rope jaws within 60 degrees of governor sheave rotation after reaching rated tripping speed.
 - c. Design the governor rope tripping device so that no appreciable damage to or deformation of the governor rope shall result from the stopping action of the device in operating the car safety.
 - d. Provide an electrical governor overspeed protective device which shall remove power from the driving machine motor and brake before or at the application of the safety.
 - 1) The setting for the overspeed switch shall be as prescribed in the ASME A17.1 Safety Code.
 - 2) Locate and enclose the switch to ensure that excess lubrication will not enter the switch enclosure.
 - 3) Overspeed switch shall operate in both direction of travel on systems employing a static power drive unit.
 - e. Seal and tag the governor with the running speed, tripping speed and date last tested.
 - f. Design the governor to prevent false tripping due to conditions caused by rope dynamics.

K. Equipment Isolation (New)

1. Provide sound reducing vibration isolation elements at all support points of elevator controller, solid-state motor drives, isolation transformers, reactance units, hoisting motors and machines.
2. The elements for controllers, solid-state motor drives and isolation transformers shall be similar to double deflection neoprene-in-shear mounts, as manufactured by Mason Industries, Type ND, with 0.35" static deflection under design load ratings.
3. Elements between the hoisting machine unitized base and machine support beams shall be similar to triple layer ribbed neoprene pads, separated by appropriate steel shims as manufactured by Mason Industries, Type W pads, at 50 durometer, loaded for 40 psi or approved equal.
4. All bolts through isolation elements, where necessary, are to incorporate resilient washers and bushings.
5. Isolation of existing hoisting machine and motor is contingent on the OEM design of the apparatus.
 - a. Existing isolation pads shall be replaced with new.

L. Emergency Brake (New)

1. Ascending Car Overspeed Protection Device
 - a. Provide a device designed to prevent an ascending elevator from striking the hoistway overhead structure.
 - b. The device shall decelerate the car with any load up to the rated capacity by applying an emergency brake.
 - 1) The device shall detect an ascending car overspeed condition of not greater than 10% higher than the speed that the car governor is set to trip.
 - 2) The device, when activated, shall prevent operation of the car until the device is manually reset.
 - 3) The device shall meet the requirements of the ASME A17.1 Safety Code as may be modified by the AHJ.
2. Unintended Car Movement Protection Device
 - a. Provide a device to prevent unintended car movement away from the landing when the car and hoistway doors are not closed and locked.
 - 1) The device shall prevent such movement in the event of failure of:
 - a) The electric driving machine motor.
 - b) The brake.
 - c) The machine shaft or shaft coupling.
 - d) Machine gearing.
 - e) Control system.
 - f) Any component upon which the speed of the car depends.
 - g) Suspension ropes and the drive sheave of the traction machine are excluded.

- 2) The device shall prevent operation of the car until the device is manually reset.
 - 3) The device shall meet the requirements of the ASME A17.1 Safety Code as may be modified by the AHJ.
3. Where the installation of the Emergency Brake involves the raising of existing hoisting machines or modifications to the machine room slab, the contractor shall provide necessary engineering data, structural review and drawings as part of the submittal process.

M. Hoisting Machine Brake Inspection Platforms and Ladders (New)

1. Provide platforms, grating, handrails, ladders and required accessories to service and maintain the hoisting machine brake assemblies where their height above the floor exceeds that mandated by the AHJ.
2. The design, fabrication and installation shall be by the Elevator Contractor and shall be in compliance with all applicable Codes.
3. Submit drawings showing details for the assembly for approval by the Owner and structural engineer.
4. Apply two (2) coats of rust inhibiting paint to exposed ferrous metal surfaces.

2.6 HOISTWAY EQUIPMENT

A. Guide Rails / Inserts / Brackets (Reuse)

1. Car and counterweight guide rails, fishplates, rail brackets, backing support and related attachments shall be inspected to determine if unfavorable conditions exist that diminish the structural integrity of any component.
 - a. In the event substandard conditions are disclosed by means of this inspection, the Contractor shall immediately inform the Consultant as to the exact nature of said problems and then undertake whatever repairs and/or replacements the Consultant may deem appropriate to remedy the situation.
2. Each stack of guide rails shall be individually examined to determine if excessive compression has occurred from building settlement.
 - a. In the event such conditions are found to exist, each affected stack shall be cut off enough to relieve pressure.
 - b. Jacking bolts shall be provided underneath each stack of both car and counterweight guide rails.
3. Each stack of guide rails shall be realigned so that total deviation from plumb in any direction does not exceed 1/8" over the entire length of the hoistway and that DBG measurements never vary more than .030".
4. As required, car guide rails joints shall be individually filled, filed and sanded in order to eliminate minor variations in adjoining machined surfaces.

B. Counterweight Assembly (Reuse)

1. The existing counterweight assembly shall be refurbished to as new condition and reused.

2. Individual counterweight frame members shall be inspected for any indication of damage and to determine if the overall assembly is twisted, racked, or otherwise distorted.
 - a. All fastenings between counterweight frame members shall be individually examined, tightened and if necessary renewed.
 - b. In case any of these conditions are found to exist, the Contractor shall immediately inform the Consultant about the exact nature of the problem and undertake whatever corrective action the Consultant may deem appropriate to remedy the situation.
3. The amount of filler weight placed within the counterweight frame shall be adjusted so the weight of the entire counterweight assembly is equal to that of the renovated elevator car, plus forty to forty-two percent (40-42%) of its rated loading capacity unless otherwise required by a manufacturer where new hoisting machinery is employed.
 - a. Filler weights shall be held securely in place at all times with tie rods passing through holes in both the weights and the counterweight frame with tie rods secured on each end with double lock nut and a cotter pin arrangement.
4. The existing 2:1 rope sheave mounted to the counterweight frame shall be washed clean of accumulated grease and oil, then examined for any indication of bearing or bearing seal failure.
 - a. Bearings which are found to be worn or emit unusual noises, vibration, heat, or other unfavorable characteristics shall be replaced.
 - b. Defective grease retention seals shall be replaced.
 - c. Provide means to ensure that hoist ropes cannot jump out of their respective grooves in case of a slacken-rope condition.

C. Slide Guides (Reuse)

1. Existing sliding type guide shoes shall be rebuilt and securely bolted to the car and counterweight frame at top and bottom.
2. Provide new guide insert and insert retention hardware at all guide assemblies.
3. Contractor may provide new guide shoe assemblies, in lieu of rebuilding the existing, as part of the base bid work. Costs associated with new guides shall be included in the base bid cost.

D. Hoist Ropes (New)

1. Pre-formed traction steel wire rope, specifically constructed for elevator applications, shall be provided for suspension of the elevator car and counterweight assembly.
 - a. Fastenings shall be accomplished by use of individual tapered rope sockets (wedge clamp) with adjustable shackles.
 - b. General design requirements for rope shackles and the method of securing wire rope shall conform with ASME A17.1 elevator safety code as modified by, and/or in addition to codes and standards accepted by the AHJ.
2. Broken rope shackle springs shall be replaced on an as needed basis.
3. New rope shackles shall be provided.

4. Existing hitch plates shall be inspected for wear. Hitch plates with elongated holes or other conditions that may damage shackles shall be replaced with new.
 5. Provide anti-spinout as required by applicable code at all shackles where applicable.
- E. Governor Rope (New)
1. Pre-formed wire rope specifically constructed for elevator applications, shall be provided for governor ropes.
 - a. Rope shall be traction steel or iron in accordance with OEM design requirements.
 - b. Rope diameter and method of fastening shall be in accordance with ASME A17.1 Safety Code as adopted and/or otherwise modified by the AHJ.
- F. Electrical Conduit / Wiring / Traveling Cable (New)
1. Electrical wiring shall be provided.
 - a. All wiring shall be stranded copper conductors, manufactured in compliance with ANSI/ASTM B174-71 and UL 62 requirements, and polyvinyl chloride insulation complying with ETT requirements of UL 62 and Article 400 of the National Electric Code.
 - b. Electrical wiring provided for hoistway interlock shall be of a flame retardant type, capable of withstanding temperatures of at least 392 degrees Fahrenheit. Conductors shall be Type SF or equivalent.
 - c. Each run of electrical conduit or duct shall contain no less than 10% spare wires and, in any case, no fewer than two (2) spare wires.
 - d. Crimp-on type wire terminals shall be used where possible.
 2. Traveling cable shall be provided.
 - a. Each traveling cable shall be provided with a flame and water resistant polyvinyl chloride jacket.
 - b. Electrical wiring shall consist of stranded copper conductors, manufactured in compliance with ANSI/ASTM B174-71 and UL 62 requirements, and polyvinyl chloride insulation complying with ETT requirements of UL 62 and Article 400 of the National Electric Code.
 - c. Each traveling cable shall contain no less than 10% spare wires.
 - d. Traveling cable exceeding 100' in length shall be provided with a steel wire rope support strand from which the cable shall be suspended.
 - e. Traveling cable must be contained within an approved electrical conduit to within 6' of the final suspension point in the hoistway.
 - f. Each traveling cable shall be arranged to provide no fewer than six (6) individually shielded pairs of 20 gauge wire and arranged to contain no less than one (1) coaxial cable for CCTV remote monitoring.
 - g. Traveling cable conductors that terminate at a hoistway center box shall be connected to stud blocks provided for that purpose.
 - 1) Each wiring terminal shall be clearly identified by its nomenclature as shown on the "as built" wiring diagrams and solderless, crimp-on type wire terminals shall be used where possible.

2.7 PIT EQUIPMENT

A. Car and Counterweight Buffer (Reuse)

1. Existing car and counterweight buffers shall be reused.
 - a. Pit channels, related supports and fastenings shall be inspected for damage and to determine if the structural integrity of any component is diminished by the effects of rust or other unfavorable conditions.
 - 1) In the event defects are found, the Contractor shall immediately inform the Consultant and undertake whatever repair and/or replacement the Consultant may deem appropriate.
 - b. Surface rust shall be removed from all reused components.
 - c. Apply two (2) coats of rust inhibitive primer/paint to pit channels and buffer springs.
 - d. Provide a permanent buffer marking plate which indicates the manufacturer's name, identification number, rated impact speed and stroke.
 - e. Provide a permanent data plate in the vicinity of the counterweight buffer indicating the maximum designed counterweight runby in accordance with ASME A17.1 as may be modified by, and/or in addition to codes and standards accepted by the AHJ.
 - f. The buffer shall undergo testing in accordance with ASME A17.1 Code as modified by, and/or in addition to codes and standards accepted by the AHJ.

B. Ladders, Screens and Guards (New)

1. Provide the following secondary metal work in the pit, hoistway and in elevator machine room in accordance with bid documents.
 - a. Counterweight shall be guarded by means of a fixed screen from the pit floor to a position of at least 2450 mm (96") above pit floor.
 - b. Guard around adjacent mounted hoist machine and hoistway.
 - c. Pit access ladders.
 - d. Guard around machine, ropes and rope holes.
2. The pit ladder shall have continuous steel flat bar side rails 12 mm (1/2") x 75 mm (3"), with eased edges, spaced a minimum of 400 mm (16") apart. Rungs shall be steel bars 18 mm (3/4") in diameter, spaced 300 mm (12") apart with top to have a non-slip surface. Rungs shall be located along centerline of side rails, located not less than 180 mm (7") from the nearest permanent object or structure. Plug weld and grind smooth on outer rails faces. Support each ladder at top and bottom and at intermediate points spaced not more than 1500 mm (60"). Extend side rails 1200 mm (48") above top rung.
3. Prime paint and apply two (2) coats of rust inhibiting machinery enamel to metal work specified above as approved by the Consultant.

C. Governor Rope Tension Assembly (New)

1. Provide a governor rope tension assembly.
 - a. Maintain the proper tension in the governor rope with a weighted tension sheave located in the pit.

- 1) Springs used to develop the tension are not acceptable.
- b. The sheave shall be of proper diameter and set directly plumb with the governor rope drop to prevent the rope from pulling off of the sheave at an angle.
- c. Lubrication fittings shall be provided on the assembly.
- d. The assembly shall have necessary rope guards to prevent accidental contact of the rope/sheave by service personnel and to prevent the governor rope from jumping off of the sheave.

D. Pit Stop Switch (New)

1. Where climb-in pit depth exceeds 67", each pit shall be provided with two (2) push/pull or toggle switches conspicuously designated "EMERGENCY STOP".
 - a. Both of these stop switches, shall be located immediately adjacent to the pit access ladder.
 - 1) Place one stop switch approximately 47" above the pit floor.
 - 2) Place the second stop switch 18" above the hoistway entrance sill on the lowest landing served.
 - 3) These switches shall be arranged so as to prevent the application of power to the hoist motor or machine brake when either one is placed in the "OFF" position.

2.8 HOISTWAY ENTRANCES

A. Hoistway Entrance Frames (Reuse)

1. Hoistway entrance sills, sill supports and entrance frames shall be reused and refurbished.
 - a. Hoistway entrances that have become distorted or bent shall be straightened, plumbed, reset to the proper width dimension and reinforced as necessary.
 - b. Provide 14-gauge steel fascia plates that extend at least the full width of the door and be secured at hanger support and sill with oval head machine screws.
 - 1) Reinforce fascia to allow not more than 1/2" of deflection.
 - 2) Provide fascia plates where the clearance between the edge of the loading side of the platform and the inside face of the hoistway enclosure exceeds the code allowed clearance.
 - c. Provide 14-gauge steel toe guards that extend 12" below any sill not protected by fascia.
 - 1) The toe guards shall extend the full width of the door and shall return to the hoistway wall at a 15-degree angle and be firmly fastened.
 - d. Remove oil, dirt and impurities on new and existing apparatus and give a factory coat of rust inhibitive paint to all exposed surfaces, covers, fascias, toe guards and other ferrous metal.

- e. Existing hoistway entrance frames shall be painted in color as selected by Owner's representative / Architect.

B. Vertical Bi-Parting Hoistway Entrance Door Equipment and Panels (New)

1. Furnish and install horizontally divided, power operated, bi-parting counterbalanced doors at each landing.
2. The door panel shall be of the steel plate type.
 - a. Door panel shall consist of sheet steel, properly reinforced on the hoistway side.
 - b. The landing side of panels shall give the appearance of a substantially flush surface.
 - c. Securely weld the door panel into the door panel frames.
 - d. Equip the upper section of each door with a clear wire glass vision panel, located on the side of the door nearest to the car operating panel.
3. The door panel finish shall be as follows:
 - a. New hoistway door panels shall be painted in color to match existing hoistway entrance frames as selected by Owner's representative / Architect.
4. Build up the door panel frame with steel angles and other suitable steel sections, not less than 3/16 inch in thickness.
5. Match and fully weld the door panel frame at corners.
6. Provide the lower edge of upper door panel frame with an approved fire resistive safety edge with non-shearing and non-crushing properties.
7. Provide suitable rubber bumpers on the lower edge of upper panel frame, near each jamb, mounted to provide the necessary spacing between rigid frame members required to provide safety edge action as specified.
 - a. Safety edge and rubber bumper shall be easily replaceable with fastening of screw type or equivalent.
8. Provide the upper edge of the lower door panel with a truckable sill, fabricated of steel members of sufficient size and adequate strength to withstand the loads imposed by the specified class of elevator loading.
 - a. Extend the truckable sill the full width of door opening.
 - b. When supported by stops attached to door guide rails, the sill shall extend at least six (6) inches beyond opening on one side.
 - c. Support the truckable sill level with the elevator car platform by means of approved non-frictional adjustable stops, resting on the floor sill or attached to the door guide rails.
9. Equip each door frame with four (4) fixed or adjustable steel or malleable iron milled grooved shoes, having proper depth and a vertical side contact of not less than two and one-half (2-1/2) inches on each side of rail.
 - a. Attach fixed shoes to structural members, which are either an integral part of the vertical door frame members or are rigidly secured thereto.

- b. Space the shoes to the maximum possible width and construct them as to relieve the door and guide shoe supporting members of all frictional contact with the door guide rails.
10. The door guide rails shall consist of suitable continuous steel structural shapes for each section of doors securely fastened to door frame and hoistway construction.
 - a. Install the guide rails in accurate alignment so that doors will operate freely upon the guide rails.
11. The door at each opening shall be connected to each other with rods (at least 1/2 inch square or 5/8 inch diameter), adjustable turn-buckles (or rods may be adjustable), shackles and flexible cable chains, each half exactly balancing the other half.
12. Chains shall run over a roller bearing or double race ball bearing machined sheaves of ample size.
13. Sheaves shall be malleable iron and set in a suitable malleable metal housing fastened to guide rails.
14. Fastening to upper half shall be made of an approved malleable iron or steel chain fastener, and to the lower half the connection shall be made to the truckable sill or chain rod arm with an approved connection.
 - a. Fit the upper door panel of each door with a heavy web pull strap on the car side.
 - b. Provide a suitable retaining clip on the car side of upper panel to hold the free end of pull strap.
 - c. The bottom of the strap shall not be more than 6'-6" above the landing sill when the upper panel is in its fully open position.
15. Each landing door assembly shall be equipped with an approved interlock according to the requirements of ASME A17.1, CSA B44, EN81.
16. Each hoistway door interlock assembly shall be provided with an emergency release mechanism utilizing a keyed pull chain fixture.
17. A motor-operated retiring cam (ramp) shall be provided on the interlock side of the car for each line of landing door interlocks. The retiring cam and interlock shall work in conjunction with the elevator control to prevent normal operation of the elevator/lift unless all doors are closed and locked.
18. Power operation of the retiring cam motor shall be by the door/gate controller and should provide a smooth, quiet lift and drop, operated by solid state electronic control. No air checks or mechanical damping devices are to be used.
19. Each door shall be electrically operated with two motorized door operators designed for variable voltage, variable frequency control.
20. Door travel shall be determined by proximity sensor actuation from a car mounted non-contact master limit arrangement.
21. Motor speed shall be controlled by VVVF drives for smooth door opening and closing and shall be designed to ensure full opening and full closing without slamming or rebounding.
22. An automatic stay-open feature (ASO) shall be provided to ensure that the door panels stay fully open.
23. All operating mechanisms shall be entirely within the elevator hoistway.
24. Manual operation shall be available in the event of a power failure.
25. The doors shall be Peelle or approved equal and given a heavy coat of rust inhibitive primer at the factory and finished painted subsequent to installation.

26. Provide pass type door where floor to floor heights do not allow an unimpeded slide of the door.

2.9 CAR EQUIPMENT / FRAME

A. Car Frame (Reuse)

1. The existing car frame assembly shall be refurbished to as new condition and reused.
2. Individual car frame members, platform isolation framework, door operator support structure, related bracing and hardware shall be inspected for any indication of damage or distortion.
 - a. Where damage is detected, the Contractor shall immediately inform the Consultant and then undertake corrective action deemed appropriate by the Consultant to remedy the condition.
3. Provide new elastomer isolation pads for all existing platforms where pads are presently installed.
4. The car frame, door operator support and related bracing shall be modified or reconfigured as necessary in order to accommodate new cab enclosure and/or master door operating equipment specified herein.
5. The elevator car shall undergo static balancing upon substantial completion of all work described in the project specifications and subsequent to any car interior refinishing or cab replacement work performed in conjunction with the project.
6. The 2:1 rope sheaves shall be refurbished:
 - a. The sheaves shall be washed clean of accumulated grease and oil.
 - b. Bearings which are found worn or to emit unusual noises, appreciable vibration, excessive heat, or other unfavorable characteristics shall be replaced.
 - c. Defective grease retention seals shall be replaced as needed.
 - d. Provide means to ensure that hoist ropes cannot jump out of their respective grooves in case of a slack rope condition.

B. Car Platform (Reuse)

1. The existing platform shall be modified to accommodate the new apparatus specified herein.
 - a. Where necessary, the underside of platform shall be refurbished and treated with fire-rated material.
 - b. Top of platform shall be refurbished with a marine grade plywood set to receive new finished floor covering as selected by Owner.

C. Car Safety (Reuse)

1. The existing governor actuated car safety device shall be retained, overhauled and upgraded for current code compliance.
2. Readjust safety for proper operation in accordance with current ASME A17.1 design standards.

3. Check the existing safety operated switch (plank-switch) for proper adjustment and operation.
 - a. Provide a new plank-switch where none currently exists.
4. A new safety shall be provided where the existing is not suitable for reuse due to overall condition or in conjunction with an increase in the elevator speed or full load capacity.

D. Automatic Leveling / Releveling / Positioning Device (New)

1. Equip the elevator with a floor leveling device which shall automatically bring the car to a stop within 1/4" of any floor for which a stop has been initiated regardless of load or direction of travel.
2. This device shall also provide for releveling which shall be arranged to automatically return the elevator to the floor in the event the elevator should move below or above floor level in excess of 1/4".
3. This device shall be operative at all floors served and whether the hoistway or car door is open or closed provided there is no interruption of power to the elevator.
4. A positioning device shall be part of the controller microprocessor systems.
 - a. Position determination in the hoistway may be through fixed tape in the hoistway or by sensors fitted on each driving machine to encode and store car movement.
 - b. Design the mechanical features and electrical circuits to permit accurate control and rapid acceleration and retardation without discomfort.
5. Where there are consecutive floors/stops that are short stops, the system shall be capable of distinguishing between the two landing zones without error.
6. All equipment and logic required for leveling system to properly function with short stops shall be included.

E. Top-of-Car Inspection Operating Station (New)

1. An inspection operating station shall be provided on top of the elevator car.
2. This station shall be installed so that the controls are plainly visible and readily accessible from the hoistway entrance without stepping on the car.
3. When the station is operational, all operating devices in the car shall be inoperative.
4. Provide the following control devices and features:
 - a. A push/pull or toggle switch designated "EMERGENCY STOP" shall be arranged so as to prevent the application of power to the hoist motor or machine brake when in the "off" position.
 - b. A toggle switch designated "INSPECTION" and "NORMAL" to activate the top of car Inspection Service Operation.
 - c. Push button designated "Up", "Down" and "Enable" to operate the elevator on Inspection Service (the "Enable" button shall be arranged to operate in conjunction with either the "Up" or "Down" button).
 - d. An indicator light and warning buzzer that are subject to activation under Phase I - Fire Emergency Recall Operation.

F. Load Weighing Device (New)

1. Provide means to measure the load in the car within an accuracy of $\pm 4\%$ of the elevator capacity.
2. Provide one of the following types of devices:
 - a. A device consisting of four (4) strain gauge load cells located at each corner of the car platform and supporting a free floating car platform and cab with summing circuits to calculate the actual load under varying conditions of eccentric loading.
 - b. A strain gauge device located on the crosshead, arranged to measure the deflection of the crosshead and thus determine the load in the car.
 - c. A device consisting of four (4) strain gauge load cells, supporting the weight of the elevator machine with summing circuits to calculate the actual load under varying conditions of load.
 - d. A device to measure the tension in the elevator hoist ropes and thus determine the load in the car.
3. Arrange that the output signal from the load weighing device be connected as an input to the signal and motor control systems to pre-torque of the hoisting machine motors where applicable.
4. Provide audible and visual signals in connection with the load weighing device when used as an "overload" device.

G. Car Enclosure Work Light / Receptacle (New)

1. The top and bottom of each car shall be provided with a permanent lighting fixture and 110 volt GFI receptacle.
2. Light control switches shall be located for easy accessibility from the hoistway entrance.
3. Where sufficient overhead clearance exists, the car top lighting fixture shall be extended no less than 24" above the crosshead member of the car frame.
4. Light bulbs shall be guarded so as to prevent breakage or accidental contact.

H. Car Door Operation / Gate (New)

1. Each car gate shall be electrically operated by a motorized gate operator designed for variable voltage, variable frequency control.
2. Car gate travel shall be determined by proximity sensor actuation from a car mounted non-contact proximity sensor arrangement.
3. Motor speed shall be controlled by VVVF drives for smooth gate opening and closing and shall be designed to ensure full opening and full closing without slamming or rebounding.
5. A light curtain re-opening device shall be provided on each car gate comprised of
6. a multi-beam transmitter/receiver grid designed to cover the full opening width.
7. Manual operation shall be available in the event of a power failure.
8. Car gates shall be counterweighted vertical single-section, two-section or tree-section type as specified.
9. The gate shall be constructed of steel tube framing with 3mm diameter, round
10. wire mesh panels, with stiffeners on vertical centers.
11. Each gate shall be provided with precision groove guide shoes, shoe angle and guide rails.
12. Gate panels and counterweight shall be connected to each other using suitable roller chains arranged to ensure balanced vertical motion with adjustable connectors. At least two

independent suspension means shall be provided so that the failure of one suspension means will not allow the gate to fall.

13. Each gate shall have a positively guided counterweight arranged to ensure balance vertical motion and an approved electric gate closed contact.

2.10 FINISH / MATERIALS / SIGNAGE

A. Material, Finishes and Painting

1. General

- a. Cold-rolled Sheet Steel Sections: ASTM A366, commercial steel, Type B
- b. Rolled Steel Floor Plate: ASTM A786
- c. Steel Supports and Reinforcement: ASTM A36
- d. Aluminum-alloy Rolled Tread Plate: ASTM B632
- e. Aluminum Plate: ASTM B209
- f. Stainless Steel: ASTM A167 Type 302, 304 or 316
- g. Stainless Steel Bars and Shapes: ASTM A276
- h. Stainless Steel Tubes: ASTM A269
- i. Aluminum Extrusions: ASTM B221
- j. Nickel Silver Extrusions: ASTM B155
- k. Structural Tubing: ASTM A500
- l. Bolts, Nuts and Washers: ASTM A325 and A490
- m. Laminated / Safety Tempered Glass: ANSI Z97.1

2. Finishes

- a. Stainless Steel
 - 1) Satin Finish: No. 4 satin, long grain.
- b. Sheet Steel:
 - 1) Shop Prime: Factory-applied baked on coat of mineral filler and primer.
 - 2) Finish Paint: Two (2) coats of low sheen baked enamel, color as selected by the Owner's representative/Architect.
 - 3) Steel Equipment: Two (2) coats of manufacturer's standard rust-inhibiting paint to exposed ferrous metal surfaces in both the hoistway and pit that do not have galvanized, anodized, baked enamel, or special architectural finishes.

3. Painting

- a. Apply two (2) coats of paint to the machine room floor.
- b. Apply two (2) coats of rust inhibitive primer/paint to pit channels, buffer springs, platforms, overhead and hoistway beams, sheave supports, sheaves and fascia.
- c. Identify all equipment including buffers, car apron, crosshead, safety plank, machine, controller, drive, governor, disconnect switch, etc., by 4" high numerals which shall contrast with the background to which it is applied. The identification shall be either decalomania or stencil type.

- d. Paint or provide decal-type floor designation not less than four (4) inches high on hoistway doors (hoistway side), fascias and/or walls as required by A17.1 as may be adopted and/or modified by the AHJ. The color of paint used shall contrast with the color of the surface to which it is applied.

B. Hoistway Entrances

1. Entrance Frames:

- a. Existing hoistway entrance frames shall be painted in color as selected by Owner's representative / Architect.

2. Door Panels:

- a. New hoistway entrance door panels shall be painted in color as selected by Owner's representative / Architect.

C. Car Interior Finishes

1. Contractor shall provide samples of finishes as required for approval prior to fabrication.
2. Refer to specifications for other design requirements where provided.
3. Special attention shall be given to flooring materials and suitability for intended duty.

D. Designation and Data Plates, Labeling and Signage.

1. Provide an elevator identification plate on or adjacent to each entrance frame where required by the AHJ.
2. Provide floor designation cast plates at each elevator entrance, on both sides of the jamb at a height of sixty (60) inches to the baseline of floor indication.
 - a. Floor number designations and Braille shall be 2" high, 0.03" raised.
3. Identify the designated medical emergency services elevator with 3" high international symbol at each elevator entrance on both sides of the jamb.
4. Provide raised designations and Braille markings to the left of the car call and control buttons of the car operating panel(s).
 - a. Designations shall be a minimum of 5/8" high, 0.03" raised and stud mounted.
5. Provide elevators with data and marking plates, labels, signages and refuge space markings complying with A17.1 Elevator Safety Code as may be adopted and/or otherwise modified by the AHJ.

2.11 FIXTURES / SIGNAL EQUIPMENT

A. General - Design and Finish

1. The design and location of the hall and car operating and signaling fixtures shall comply with the ADAAG and local requirements of the AHJ.
2. The operating fixtures shall be selected from the manufacturer's premium line of fixtures.

3. Custom designed operating and signaling fixtures shall be as shown on the drawings or as approved by the Owner's representative/consultant.
4. The layout of the fixtures including all associated signage and engraving shall be as approved by the Owner's representative/consultant.
5. The pushbuttons shall be as follows:
 - a. Stainless steel vandal resistant type as selected by the Owner's representative/consultant from the manufacturer's premium line of push buttons.
 - b. The button shall have a round indicator on the button with LED call registered light.
6. The faceplates shall be as follows:
 - a. Freight elevator
 - 1) All Floors - 1/8" thick stainless steel with No. 4 finish and tamperproof screws.
7. Mount service elevator fixtures with tamperproof screws. The screw/fastener and key switch cylinder finishes shall match faceplate finish.
8. Where key-operated switch and or key operated cylinder locks are furnished in conjunction with any component of the installation, four (4) keys for each individual switch or lock shall be furnished, stamped or permanently tagged to indicate function.
9. All caution signs, pictographs, code mandated instructions and directives shall be engraved and filled with epoxy in code required colors.

B. Main Car Operating Panel (New)

1. Provide a main car operating push button panel in the side wall where there are no return panels in elevators utilizing bi-parting doors.
2. Car operating panel shall be flush mounted with swing type, one-piece faceplate with heavy-duty concealed hinges.
 - a. Mount all key switches that are required to operate and maintain the elevators exposed on the car station except those specified within a locked service cabinet.
3. The push buttons shall become individually illuminated as they are pressed and shall extinguish as the calls are answered.
4. The operating panel shall include:
 - a. A call button for each floor served, located not more than 48" above the cab floor.
 - b. An "on-off" floor lockout key switch located in the car station adjacent to the level 350 car call button.
 - c. "Door open" / "Door close" / "Door Hold" buttons.
 - d. "Alarm" button, interfaced with emergency alarm. The alarm button shall illuminate when pressed.
 - e. Push/Pull "Emergency Stop" switch per local law located at 35" above the cab floor.
 - f. Self-dialing, hands-free emergency communication system actuation button with call acknowledging feature and ASME A17.1. design provisions.
5. Locked Firemen's Service cabinet, keyed in accordance with local Code, containing required devices and signals in accordance with ASME A17.1 Standards.

6. Provide a Firefighter's telephone jack per existing and/or local code requirements
7. Provide a locked service cabinet flush mounted and containing the key switches required to operate and maintain the elevator, including, but not limited to:
 - a. Independent service switch.
 - b. Light switch.
 - c. Fan switch.
 - d. On/Off switch
 - e. Card reader on/off switch
 - f. G. F. I. duplex receptacle.
 - g. Emergency light test button and indicator.
 - h. Inspection Service Operation key switch.
 - i. Dimmer for cab interior lighting.
8. Equip the car operating panel with proximity card reader provisions.
 - a. Provide a 3" x 5" cut-out with smoked gray Plexiglas lens in the car operating panel.
 - b. Security system shall be overridden by Phase II Firefighter's Emergency Operations in accordance with code.
9. Car operating panel shall incorporate:
 - a. An integral (no separate faceplate) digital L.E.D. floor position indicator.
 - b. Emergency light fixture (without a separate faceplate) and black-filled engraved unit I.D. number or other nomenclature, as approved by Owner.
 - c. A "No Smoking" advisory as required by the AHJ.
 - d. The rated passenger load capacity in pounds.
 - e. State of Maryland "warning in event of fire" instructions.
10. Post Inspection Certificate behind an opening in the car operating panel that is fitted with a flush-mounted clear Plexiglas without a frame.

C. Auxiliary Car Operating Panel (New)

1. Provide an auxiliary car operating panel that contains the following:
 - a. Car call registration buttons.
 - b. Door open and close buttons.
 - c. Door hold button.
 - d. Key switches.
 - e. Illuminated alarm button.
 - f. Push/Pull "Emergency Stop" switch
2. Operating devices shall be of the same design, material and finish as the main operating panel.
3. Design this station so as to duplicate the layout of the main operating panel.
4. Provide a digital position indicator, emergency light unit, elevator ID and engraving to match the main car operating panel.

D. Car Position Indicator (New)

1. The position of the car in the hoistway shall be indicated by the illumination of the position indicator numeral corresponding to the floor at which the car has stopped or is passing.
 - a. Provide 2" high, 10-segment LED type position indicator with direction arrows, integral with the car operating panel.
 - b. Provide Lexan cover lens with hidden support frame behind fixture plate to protect the indicator readout.
 - c. Provide audible floor passing signal per ADA standards where not provided by the elevator signal control.
 - d. Flush mount fixture with cover to match selected car front or car operating panel finish as directed by the Owner.

E. Voice Annunciator (New)

1. Provide a voice annunciator in each elevator.
2. The device features shall comply with the requirements of ADAAG and local accessibility requirements.
3. Coordinate size, shape and design with Designer and other trades.
4. The system shall include, but not limited to:
 - a. Solid state digital speech annunciator.
 - b. A recording feature for customized messages.
 - c. Playback option.
 - d. Built-in voice amplifier.
 - e. Master volume control.
 - f. Audible indication for selected floor, floor status or position, direction of travel, floor stop, seismic operation, firefighter service and nudging.
5. Locate all associated equipment in a single, clearly labeled enclosure located either in the machine room and/or on car top.

F. Corridor Push Button Stations / Riser (New)

1. Push button signal fixtures shall be provided on each landing.
2. Provide one (1) riser of buttons with 1/8" thick satin stainless-steel No. 4 faceplates and tamperproof screws. Faceplates shall be sized to cover existing and/or new fixture cut-outs and existing faceplate dimensions.
3. Each signal fixture shall consist of:
 - a. Up and down illuminating push buttons measuring 3/4" at their smallest dimension as selected by the Owner.
 - b. Door Open and close buttons.
 - c. A recessed mounting box, electrical conduit and wiring.
4. Intermediate landings shall be provided with fixtures containing two (2) push buttons while terminal landings shall be provided with fixtures containing a single push button.
5. Include firefighter key switch, car to lobby key switch and elevator communications failure code requirements in the main lobby level station or other designated recall landing.
6. Where existing fixtures are located greater than 48" above the floor:

- a. The existing back boxes shall be removed.
 - b. New back boxes shall be installed to provide a new centerline to buttons of 42" above the floor.
 - c. Standardize the new centerline on each floor.
7. All cutting, patching, grouting, plastering of masonry walls resulting from the removal or installation of corridor fixtures shall be performed by the Contractor so as to maintain the fire rating of the hoistway.
 - a. Finished painting or decorating of wall surfaces shall be by Others.
 8. Provide a digital floor position indicator with 1" high numerals at all typical landings served.
- G. Floor Position Indicator (New)
1. Provide a digital LED type floor position indicator at the main lobby only.
 2. Indicator shall include 2" high numerals with integral direction arrows that will indicate the direction in which the elevator is traveling.
 3. Provide Lexan cover lens with hidden support frame behind fixture plate to protect the indicator readout.
 4. Indicator shall be located adjacent to the hoistway entrance frames.
- H. Hall Direction Lanterns (New)
1. Provide a visual and audible signal at each entrance to indicate the direction of travel and, where applicable, which car shall stop in response to the hall call.
 - a. Design the lantern with vandal resistant up and down indication at intermediate landings and a single indication at terminal landings.
 - b. Lanterns shall sound once for the up direction and twice for the down direction.
 - 1) Provide an electronic chime with adjustable sound volume.
 - c. Provide adjustable signal time (three [3] to ten [10] seconds, with one [1] second increments) to notify passengers which car shall answer the hall call and preset per ADAAG notification standards.
 2. Locate the lantern adjacent to the corridor entrance.
- I. Hoistway Access Switch (New)
1. Provide a visual and audible signal at each entrance to indicate the direction of travel and, where applicable, which car shall stop in response to the hall call.
 - a. Design the lantern with up and down indication at intermediate landings and a single indication at terminal landings.
 - b. Lanterns shall sound once for the up direction and twice for the down direction.
 - 1) Provide an electronic chime with adjustable sound volume.

- c. Provide adjustable signal time (three [3] to ten [10] seconds, with one [1] second increments) to notify passengers which car shall answer the hall call and preset per ADAAG notification standards.
2. Locate the lantern adjacent to the corridor entrance.

2.12 CAR ENCLOSURES

A. Elevator Car Enclosure(s) and the Five Percent (5%) Rule:

1. In accordance with A17.1, Section 8.7, as adopted and/or modified by the AHJ, entitled "Alterations", where a new or remodeled elevator car enclosure is included in the base scope of work, the Contractor shall, within thirty (30) days after execution of the contract, weigh the elevator, or one (1) elevator of each group of elevators included in the base scope of work, to determine the present deadweight of the platform/sling/cab assembly.
2. The Contractor shall, when necessary, weigh the interior materials of a single cab to better estimate the total existing weight of existing materials being removed as part of the alteration.
3. The Contractor shall make every effort to provide accurate weight measurements while taking into consideration all weights that may present themselves at the time the measurement is taken such as compensation, compensating sheave, hoist ropes and traveling cables that may affect the measurement of the assembly itself.
4. The Contractor shall evaluate the actual counterbalance percentage for each sample elevator to identify prevailing conditions.
5. Measurements of actual cab weight shall be compared to the original deadweight of the car as stamped on the crosshead data tag.
6. Where no data tag exists, the Contractor shall make every effort to determine the original weight of the platform/sling/cab through calculations based on the current weight of the counterweight assembly and the verified percent of full load counterbalance.
7. The amount of weight that may be added to the car, so as to remain within the limits of the "5% Rule", shall be calculated based on the following:
 - a. $(\text{Original Deadweight} + \text{Capacity}) \times (0.05) = \text{Maximum Additional Weight Allowed}$
8. The Contractor shall document and notify the Owner and Consultant of the results of the measurements taken and what weight, if any, can be added or needs to be removed from the cab in order to maintain compliance with the 5% Rule.
9. The Contractor shall work diligently with the Owner and/or Owner's Representative and/or Architect as well as the manufacturer of the car enclosure to minimize additional weights of the new or remodeled car enclosure so as to maintain compliance with the 5% Rule.
10. Contractor shall be responsible for proper adjustment of the counterbalance of the system, including the static balance of the platform/sling/car enclosure, upon completion of the car interior work.
11. Costs associated with this work shall be included in the base modernization price.
12. Provide a new data tag on the crosshead of the elevator indicating the new deadweight, the current percent counterbalance and the date of the alteration.

B. Freight Elevator Cab (Refurbish / Remodel)

1. Car Shell/Cab – Side wall Panels and Dome/ceiling: Sand and fill scratches smooth. Paint in color as selected by Owner's representative / Architect.
2. Lighting: Provide a minimum of four (4) new LED T8 light fixtures with a minimum of two (2) LED T8 lights in each fixture. Provide 1/8" thick acrylic lenses with stainless steel protective frame.
3. Flooring: Provide new 1/4" thick aluminum checkered plate, mounted with flat head stainless steel screws (countersunk) not over 12" on centers, removable from within the car without dismantling wall and gate tracks.
4. Guard Rails: Provide new double row of flat 1 1/2" x 12" hardwood guard rails at 12" and 32" above floor on each side wall to match existing. Bevel ends at each end. Guard rails shall be removable from within the cab. All bolts shall be counter-bored below the face of the guard rail. Suitably reinforce cab panel to provide for secure guard rail mounting.
5. Car Gate: Provide new vertically sliding car gates consisting of either wire mesh (not less than 1:1 gauge wire woven to a 1" (diamond mesh) or expanded metal having equivalent strength, set in a rigidly braced and reinforced steel frame.
 - a. Gate shall be 6'-0" high and shall be in two (2) sections.
 - b. Suitable rubber bumper secured by machine screws tapped into gate frame or held in suitable retainers, shall be provided on the bottom gate.
 - c. Gate shall be equipped with adjustable, replaceable guide shoes running on vertical steel guides.
 - d. Gate shall be connected with No. 60 or heavier steel chains.
 - e. The counterweight shall equally balance the gate and shall run in a metal runway on a metal guide and the bottom of runway or guides shall be designed to withstand impact of falling counterweight.
 - f. Gate when fully raised, shall not project down into clear hoistway entrance opening.
 - g. The gate track shall be supported from the rear and protected in the front from dragging or deflecting blows

2.13 EMERGENCY LIGHTING / COMMUNICATIONS / SIGNALING

A. Battery Back Up Emergency Lighting Fixture and Alarm (New)

1. Provide a self-powered emergency light unit.
 - a. The light fixture shall contain a minimum of two (2) LED lamps. Flush mount the light fixture in the main car station. The fixture shall have a milk white lens.
2. Provide a car-mounted battery unit including solid-state charger and testing means enclosed in common metal container.
 - a. The battery shall be rechargeable nickel cadmium with a ten (10)-year minimum life expectancy. Mount the power pack on the top of the car.
 - b. Provide a 6" diameter alarm bell mounted directly to the battery/charger unit and connected to sound when any alarm push button or stop switch in the car enclosure is operated.

- c. The bell shall be configured to operate from power supplied by the building emergency power generator. The bell shall produce a sound output of between 80-90 dBa (measured from a distance of 10') mounted on top of the elevator car.
 - 1) Activation of this bell shall be controlled by the stop switch and alarm button in the car operating station.
 - 2) The alarm button shall illuminate when pressed.
 3. Where required by Code for the specific application, the unit shall provide mechanical ventilation for at least one (1) hour.
 4. The operation shall be completely automatic upon failure of normal power supply.
 5. Unit shall be connected to normal power supply for car lights and arranged to be energized at all times so it automatically recharges battery after use.
- B. Common Alarm Bell (New)
1. Provide a common alarm bell located in the elevator pit.
 - a. The bell shall be configured to operate when the alarm or stop switch of any elevator is activated, during both normal and battery back-up power conditions.
 - b. Existing common alarm bells may be rehabilitated and reused providing they meet the intent of this section and applicable codes.
- C. Emergency Voice Communication / Telephone (New)
1. A hands-free emergency voice communication system shall be furnished in each car mounted as an integral part of the car operating panel.
 - a. Necessary wires shall be included in the car traveling cable and shall consist of a minimum of one shielded pair of 20AWG conductors.
 - b. 120V power shall be provided to power the hands-free device.
 2. The telephone shall be equipped with an auto-dialer and illuminating indicator which shall illuminate when a call has been placed and begin to flash when the call has been answered.
 - a. Engraving shall be provided next to the indicator which says "When lit help is on the way".
 3. In addition to the standard "Alarm" button, a separate activation button shall be provided on the car operating panel to initiate the emergency telephone and place a call.
 - a. The telephone must not shut off if the activating button is pushed more than once.
 - b. The telephone shall transmit a pre-recorded location message only when requested by the operator and be provided with an adjustable call time which can be extended on demand by the operator.
 - c. Once two-way communication has been established, voice prompts shall be provided which instruct the operator on how to activate these functions as well as alerting the operator when a call is being attempted from another elevator in the building.
 4. The system shall be compatible with ring down equipment and PBX switchboards.

5. The system shall be capable of serving as the audio output for an external voice annunciation system.
 - a. Conversation levels shall measure 60 dbA or higher and measure 10 dbA above ambient noise levels.
 - b. Each device shall be provided with a self-diagnostic capability in order to automatically alert building personnel should an operational problem be detected.
6. The phone shall be able to:
 - a. Receive incoming calls from any On-Site Rescue Station (when provided or required).
 - b. Receive incoming calls from other off-site locations via the public telephone system.
 - c. Acknowledge incoming calls and automatically establishing hands-free two way communications.
 - 1) If no On-Site Rescue Station is provided, each hands-free device shall have built in line consolidation which will allow up to six (6) elevators to be called individually from outside the building over a single telephone line and up to eighty (80) elevators if an On-Site Rescue Station is provided.
7. The emergency elevator communication system shall require a maximum of one (1) telephone line.
 - a. The system must provide line sharing capability to eliminate the need for a dedicated telephone line.
 - b. The line sharing function must ensure that the emergency telephones always receive dialing priority even if the line is in use and that the emergency telephones can be called into from an off-site location.
8. The system shall provide its own four-hour backup power supply in case of a loss of regular AC power.
9. The system must provide capability for building personnel to call into elevators and determine the charge state of any backup batteries provided for the emergency telephones.
10. Pushing the activation button in any of the elevator car stations will cause any on-site Rescue Station (where provided or required) or security telephone to ring.
 - a. If the on-site call is not picked up within thirty (30) seconds, the call will be automatically forwarded to a twenty-four (24)-hour off-site monitoring service.
 - b. The arrangements and costs of the off-site monitoring and telephone line shall be by others.
11. All connections from the junction box to the telephone system shall be done by the Elevator Contractor where existing provisions can be reused.
12. New telephone lines, where required, shall be provided and interfaced by others.

D. Central Exchange Communication System / Intercom (New)

1. Provide an ADA compatible, hands-free intercommunication system for all elevators for two-way, multi-path communication between the elevator car stations and master stations using a central exchange design system.

2. The communication system shall include:
 - a. A car station in each elevator.
 - b. A master station in each machine room to communicate with the central and satellite monitor panels, and with each car within its group.
3. The car station shall have a loudspeaker and a microphone to provide hands-free communication. The station shall be installed behind the car operating panel.
4. Master stations shall include:
 - a. Selector push buttons.
 - b. Annunciator lights for each connected station.
 - c. Speaker/microphone.
 - d. Volume control and function buttons.
5. A call shall be placed from the elevator car station by pressing the emergency call or alarm button.
 - a. This action shall cause the lamp in the corresponding button of all the designated master stations to flash and an intermittent tone to be heard.
 - b. When the incoming call is answered, the flashing light shall go to a steady condition.
 - c. Disconnection of a call is simply done by depressing the designated car button once.
 - d. If a call request is placed during a conversation, it shall be indicated by a flashing light and short tone of every designated master station.
 - e. When the original conversation is completed, the normal intermittent tone shall resume.
6. A master station shall be connected to any of its designated car stations by depressing the corresponding call button.
 - a. The lamp in the button shall be illuminated while the button is depressed.
 - b. In the car station an audible tone shall be emitted and immediate communication is established.
 - c. The call shall be ended by depressing the button a second time, disconnecting the circuit.
 - d. The master stations shall call any other master station by depressing the corresponding call button.
 - e. The button shall lock in its down position and the lamp shall be lit with a steady light.
 - f. At the called master station, a short tone shall be sent out and the lamp in the button corresponding to the "calling" party shall be lit.
 - g. After the tone, immediate communication is established.
7. On all non-called master stations, the lamps corresponding to the calling and called stations shall be illuminated as an indication that those stations are busy.
8. Provide all power supplies, wire, conduit, fittings, etc., for both systems.
9. Location of the stations, in the specified rooms or areas, shall be directed by the Owner.
10. The intercom system shall include the following features:
 - a. Test button and monitoring features to verify audio circuit path.
 - b. All call buttons to initiate a call to all cars in the systems.

- c. Priority button in the remote monitoring panel stations.
 - d. Visual acknowledgment and engraving for the hearing impaired.
11. Provide a battery backup power supply for the intercom capable of providing sufficient power to operate the complete system for a minimum of four (4) hours.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Related Documents

- 1. Contract Documents

B. Inspection

- 1. Study the Contract Documents with regard to the work as specified and required so as to ensure its completeness.
- 2. Examine surface and conditions to which this work is to be attached or applied and notify the Owner in writing if conditions or surfaces are detrimental to the proper and expeditious installation of the work. Starting the work shall imply acceptance of the surfaces and conditions to perform the work as specified.
- 3. Verify, by measurements at the job site, dimensions affecting the work. Bring field dimensions which are at variance with those on the accepted shop drawings to the attention of the Owner. Obtain the decision regarding corrective measures before the start of fabrication of items affected.
- 4. Cooperate in the coordination and scheduling of the work of this section with the work of other sections so as not to delay job progress.

3.2 INSTALLATION / PROJECT PHASING

A. Installation

- 1. Modernize the elevator, using skilled personnel in strict accordance with the final accepted shop drawings and other submittals.
- 2. Comply with the code, manufacturer's instructions, and recommendations.
- 3. Coordinate work with the work of other building functions for proper time and sequence to avoid delays and to ensure right-of-way of system. Use lines and levels to ensure dimensional coordination of the work.
- 4. Accurately and rigidly secure supporting elements within the shaftways to the encountered construction within the tolerance established.
- 5. Provide and install motor, switch, control, safety and maintenance and operating devices in strict accordance with the submitted wiring diagrams and applicable codes and regulations having jurisdiction.
- 6. Ensure sill-to-sill running clearances do not exceed 1 1/4" at all landings served.
- 7. Arrange door tracks and sheaves so that no metal-to-metal contact exists.
- 8. Reinforce hoistway fascias to allow not more than 1/2" of deflection.

9. Install elevator cab enclosure on platform plumb and align cab entrance with hoistway entrances.
10. Sound isolate cab enclosure from car structure. Allow no direct rigid connections between enclosure and car structure and between platform and car structure.
11. Isolate cab fan from canopy to minimize vibration and noise.
12. Remove oil, dirt and impurities and give a factory coat of rust inhibitive paint to all exposed surfaces of struts, hanger supports, covers, fascias, toe guards, dust covers and other ferrous metal.
13. Prehang traveling cables for at least twenty-four (24) hours with ends suitably weighted to eliminate twisting after installation.

B. Removal of Elevators

1. If extenuating circumstances (i.e., separating controller interconnections, inspection, testing, etc.), require that multiple cars of a single elevator group be removed from service simultaneously, the work shall be performed outside of the normal business hours at a time mutually agreed to by the Owner and Contractor.
2. A minimum of five (5) days advance written notice shall be given to the Owner and Elevator Consultant by the Contractor detailing the reasons for the simultaneous removal of the elevators from service along with the estimated out-of-service time.
3. The request shall be subject to review by the Elevator Consultant and approved by the Owner prior to the commencement of the work.
4. Costs for this work in addition to associated expenses shall be included as part of the base bid pricing.

C. Transfer of Hall Button Risers

1. Transfer of the hall button riser(s) to the new signal control systems shall be performed on a not-to-interfere basis and shall not interrupt building operations or inconvenience building occupants.
2. Costs for this work in addition to associated expenses shall be included as part of the base bid pricing.

3.3 FIELD QUALITY CONTROL

A. Inspection and Testing

1. Upon completion of each work phase or individual elevator specified herein, the Contractor shall, at its own expense, arrange and assist with inspection and testing as may be required by the A.H.J. in order to secure a Certificate of Operation.

B. Substantial Completion

1. The work shall be deemed "Substantially Complete" for an individual unit or group of units when, in the opinion of the Consultant, the unit is complete, such that there are no material and substantial variations from the Contract Documents, and the unit is fit for its intended purpose.
2. Governing authority testing shall be completed and approved in conjunction with inspection for operation of the unit; a certificate of operation or other required

documentation issued; and remaining items mandated for final acceptance completion are limited to minor punch list work not incorporating any life safety deficiencies.

3. The issuance of a substantial completion notification shall not relieve the Contractor from its obligations hereunder to complete the work.
4. Final completion cannot be achieved until all deliverables, including but not limited to training, spare parts, manuals, and other documentation requirements, have been completed.

C. Contractor's Superintendent

1. The Contractor shall assign a competent project superintendent during the work progress and any necessary assistant, all satisfactory to the Owner. The superintendent shall represent the Contractor and all instructions given to him shall be as binding as if given to the Contractor.

3.4 PROTECTION / CLEANING

A. Protection and Cleaning

1. Adequately protect surfaces against accumulation of paint, mortar, mastic and disfiguration or discoloration and damage during shipment and installation.
2. Upon completion, remove protection from finished surfaces and thoroughly clean and polish surfaces with due regard to the type of material. Work shall be free from discoloration, scratches, dents and other surface defects.
3. The finished installation shall be free of defects.
4. Before final completion and acceptance, repair and/or replace defective work, to the satisfaction of the Owner, at no additional cost.
5. Remove tools, equipment and surplus materials from the site.

B. Barricades and Hoistway Screening

1. The Contractor shall provide barricades where necessary in order to maintain adequate protection of areas in which work specified by the Contract Documents is being performed, including open hoistway entrances. Fabrication and erection as all barricades shall be in compliance with applicable OSHA regulations.
2. As required, the Contractor shall provide temporary wire mesh screening in the hoistway and of any elevator undergoing work specified in the Contract Documents. This screening shall be installed in such a manner as to completely segregate the hoistway from that of adjacent elevators. Screening shall be constructed from .041" diameter wire in a pattern that rejects passage of a 1" diameter ball.

3.5 DEMONSTRATION

A. Performance and Operating Requirements

1. Freight elevator shall be adjusted to meet the following performance requirements:
 - a. Speed: within $\pm 3\%$ in both directions of travel under any loading condition.

- b. Leveling: within $\pm 1/4"$ as measured between the car entrance threshold and the landing sill on any given floor under any loading condition.
2. Maintain the following ride quality requirements for the passenger elevators:
 - a. Noise levels inside the car shall not exceed the following:
 - 1) Car at rest with doors closed and fan off - 40 dba.
 - 2) Car at rest with doors closed, fan running - 55 dba.
 - 3) Car running at high speed, fan off - 50 dba.
 - 4) Door in operation - 60 dba.
 - b. Vertical accelerations shall not exceed 14 milli-g and horizontal accelerations shall not exceed 20 milli-g.
 - 1) The accelerometer used for this testing shall be capable of measuring and recording acceleration to nearest 0.01 m/s^2 (1 milli-g) in the range of $0\text{-}2 \text{ m/s}^2$ over a frequency range from $0\text{-}80 \text{ Hz}$ with ISO 8041 filter weights applied. Accelerometer should provide contact with the floor similar to foot pressure, 60 kPa (8.7psi).
 - c. The amplitude of acceleration and deceleration shall not exceed $2.6 - 2.8 \text{ ft./sec}^2$ for geared traction elevators.
 - d. The maximum jerk rate shall be 1.5 to 2.0 times the acceleration and deceleration.
 - e. The maximum velocity which the elevator achieves in either direction of travel while operating under load conditions that vary between empty car and full rated load shall be within $\pm 3\%$ of the rated speed.

B. Acceptance Testing

1. Comply with the requirements of the contract documents.
2. The Contractor shall provide at least five (5) days prior written notice to the Owner and Consultant regarding the exact date on which work specified in the Contract Documents will reach completion on any single unit of vertical transportation equipment.
3. In addition to conducting whatever testing procedures may be required by local inspecting authorities in order to gain approval of the completed work, and before seeking approval of said work by the Owner, the Contractor shall perform certain other tests in the presence of the Consultant.
4. The Contractor shall provide test instruments, test weights, and qualified field labor as required to safely operate the unit under load conditions that vary from empty to full rated load and, in so doing, to successfully demonstrate compliance with applicable performance standards set forth in the project specifications with regard to:
 - a. Operation of safety devices.
 - b. Sustained high-speed velocity of the elevator in either direction of travel.
 - c. Brake-to-brake running time and floor-to-floor time between adjacent floors.
 - d. Floor leveling accuracy.
 - e. Door opening/closing and dwell times.
 - f. Ride quality inside the elevator car.
 - g. Communication system.

- h. Load settings at which anti-nuisance, load dispatch, and load non-stop features are activated.
- 5. Upon completion of work specified in the Contract Documents on the last car in any group of elevators, and in conjunction with the aforementioned testing procedures, the Contractor shall carry out additional testing of group dispatch/supervisory control features in the presence of the Consultant.
- 6. The Contractor shall provide test instruments and qualified field labor as required to successfully demonstrate:
 - a. The back-up operating mode for group dispatch failure.
 - b. Simulated and actual emergency power operation.
 - c. Firefighter, attendant and independent service operations.
 - d. Restricted access security features and card reader controls.
 - e. Zoning operations and floor parking assignments.
 - f. Up/down peak operation.
- 7. After hour tests of systems such as emergency generators, fire service, and security systems shall be conducted at no extra cost to the Owner.

END OF SPECIFICATION

SECTION 14 21 43
ELECTRIC GEARED TRACTION SERVICE ELEVATORS

PART 1 - GENERAL

1.1 SUMMARY AND DEFINITIONS

A. Related Documents

1. Contract Documents

B. Intent

1. The following specifications provide for the modernization of two (2) geared traction service elevators (elevators No.4 and No.6) located at the Baltimore Convention Center, One West Pratt Street in Baltimore, MD.
2. All work shall be performed during regular time working hours and of regular working days (Monday – Friday, 6:00 a.m. to 5:00 p.m.) except designated holidays and where otherwise specified.
3. Modernization of service elevator No.4 is alternate No.1 modernization of service elevator No.6 is alternate No.2. Only one (1) elevator can be taken out of service at any one time should alternate No.1 and/or alternate No.2 be selected with elevator No.4 being modernized first after the completion of freight elevator No.5 – base bid.
4. Related equipment shall be designed, constructed, installed and adjusted to produce the highest results with respect to smooth, quiet, convenient and efficient operation, durability, economy of maintenance, and the highest standard of safety.
5. It is not the intent of these specifications to detail the construction and design of all parts of the equipment, but it is expected that the type, materials, design, quality of work and construction of each part shall be adequate for the service required, durable, properly coordinated with all other parts, and in accordance with the best commercial standards applicable and of the highest commercial efficiency possible.
6. Electric and magnetic circuits and related parts shall be of proper size, design and material to avoid heating and arcing, and all other objectionable effects which may reduce the efficiency of operation, economy of maintenance and/or net-useful life of the apparatus.
7. Minimum requirements for design, materials, etc., are for certain parts of the equipment. Equivalent requirements approved by the Consultant shall apply to such parts as are of special design, construction or material and to which the specified requirements are not directly applicable. These minimum requirements as a whole shall be considered as establishing proportionate general minimum standards for all parts of the equipment.
8. General requirements for design, materials and construction are intended primarily to apply to the heavy-duty and important parts of the equipment specifically mentioned and to other parts of similar duty and importance. Less important and light-duty parts may be of the standard design, materials and construction provided that, in the opinion of the Consultant, such standards are in accordance with the best commercial practice and are fully adequate for the purpose of use. All such variations shall be made only on the Consultant's written approval.

9. All equipment and component parts installed, supplied or provided under this contract shall be manufactured and distributed by a third-party, non-installer company servicing the vertical transportation industry.
 - a. Apparatus shall conform to the design and construction standards referenced herein, and shall be rated the best commercial grade suitable for this application.
 - b. Equipment and component systems shall not employ any experimental devices or proprietary designs that could hamper and/or otherwise prohibit subsequent maintenance repairs or adjustments by all qualified contractors.
 - c. Manufacturers of the apparatus shall provide technical support and parts replacements for their equipment and component systems for a minimum of twenty (20) years and issue such guarantee of support to the purchaser with written certification naming the final Owner of their product(s) to ensure the apparatus or systems remain maintainable regardless of who may be selected for future service.
10. All equipment provided shall be factory and field tested with a history of design reliability and net-useful life established.
 - a. Contractor must be able to demonstrate the apparatus to be installed has been used successfully in a substantially similar manner under comparable conditions.
 - b. If the apparatus proposed differs substantially in construction, material composition, design, size, capacity, duty or other such rating from the equipment previously used for the same purpose by the manufacturer, the Consultant may reject the apparatus or require the vendor test and demonstrate the adequacy and suitability for this particular situation. Any necessary tests shall be performed at the sole expense of the Contractor with no prior guarantee of acceptance after the testing procedure.
11. The Contractor shall not use as part of the permanent equipment any experimental devices, proprietary design, components, construction of materials which have not been fully tried out in at least substantially similar or under comparable service, except as may be especially approved by the Consultant. If any important equipment or devices to be used on this installation differ substantially in construction, materials, design, size, capacity or duty from corresponding items previously used for the same purpose by the manufacturer, they shall pass such tests as the Consultant may require to fully show their adequacy and suitability. These tests shall be in addition to tests herein specified and shall be made at the expense of the Contractor.
12. Certain design limitations, tests, etc., are herein specified as a partial check of the adequacy of design, construction and materials used. These requirements do not cover all features necessary to ensure satisfactory and approved operation, etc., of the equipment.
13. It is understood, the entire system shall be designed, fabricated, modified and/or upgraded in full compliance with applicable local laws and code standards. The absence of a particular item or requirement shall not relieve the Contractor of the full and sole responsibility for such equipment, features and/or procedures.
14. With the exception of only those items specifically identified as being performed by others, the Specifications are intended to include all engineering, material, labor, testing, and inspections needed to achieve work specified by the Contract Documents. Inasmuch as it is understood that any incidental work necessary to complete the project is also covered by the Specifications, bidders are cautioned to familiarize themselves with the existing job site conditions. Additional charges for material or labor shall not be permitted subsequent to execution of the Contract.

15. Bidders must report discrepancies or ambiguities occurring in the Specifications to the Consultant for resolution prior to the bidding deadline, otherwise the Specifications shall be deemed acceptable in their existing form.

C. Termination of Existing Agreements

1. By submitting a bid, the existing maintenance provider agrees that any service contracts in effect shall be terminated by the Owner should the project be awarded to another vendor upon thirty (30)-day written notice to the Contractor by the Owner.
 - a. The contracts shall be terminated with no penalty to the Owner or Contractor.
 - b. Owner will be responsible for money owed the Contractor for services provided and work performed up until the date of cancellation.

D. Abbreviations and Symbols

1. The following abbreviations, Associations, Institutions, and Societies may appear in the Project Manual or Contract Documents:

AHJ	Authority Having Jurisdiction
AIA	American Institute of Architects
ANSI	American National Standards Institute
ASME	American Society of Mechanical Engineers
ASTM	American Society for Testing and Materials
AWS	American Welding Society
IBC	International Building Code
IEEE	Institute of Electrical and Electronics Engineers
NEC	National Electrical Code
NEMA	National Electrical Manufacturers Association
NFPA	National Fire Protection Agency
OSHA	Occupational Safety and Health Act

E. Codes and Ordinances / Regulatory Agencies

1. Work specified by the Contract Documents shall be performed in compliance with applicable Federal, State, and municipal codes and ordinances in effect at the time of Contract execution. Regulations of the Authority Having Jurisdiction shall be fulfilled by the Contractor and Subcontractors. The entire installation, when completed, shall conform with all applicable regulations set forth in the latest editions of:
 - a. Local and/or State laws applicable for logistical area of project work.
 - b. Building Code applicable to the AHJ.
 - c. Elevator Code applicable to the AHJ.
 - d. Safety Code for Elevators and Escalators, ASME A17.1 and all supplements as modified and adopted by the AHJ.
 - e. Safety Code for Elevators and Escalators, A17.1S supplement to A17.1 as modified and adopted by the AHJ for Machine Room Less installations (MRL).
 - f. Guide for Inspection of Elevators, Escalators, and Moving Walks, ASME A17.2.
 - g. Safety Code for Existing Elevators and Escalators, ASME A17.3 as modified and adopted by the AHJ.

- h. Guide for emergency evacuation of passengers from elevators, ASME A17.4.
 - i. National Electrical Code (ANSI/NFPA 70).
 - j. American with Disabilities Act - Accessibility Guidelines for Building and Facilities and/or A117.1 Accessibility as may be applicable to the AHJ.
 - k. ASME A17.5/CSA-B44.1 - Elevator and escalator electrical equipment.
 - l. ECC (Energy Conservation Code) as may be applicable to the AHJ.
2. The Contractor shall advise the Owner's Representative of pending code changes that could be applicable to this project and provide quotations for compliance with related costs.

F. Definitions

1. Defective Work: Operation or control system failure, including excessive malfunctions; performances below specified ratings; excessive wear; unusual deterioration or aging of materials or finishes; unsafe conditions; need for excessive maintenance; abnormal noise or vibration; and similar unusual, unexpected, and unsatisfactory conditions.
2. Provide: Where used in this document, provide shall mean to install new device, apparatus, system, equipment or feature as specified in this document.
3. Definitions in ASME A17.1 as amended or modified by the AHJ apply to work of this Section.

1.2 PERMITS AND SUBMITTALS

A. Permits

1. Comply with the requirements of the contract documents.
2. Prior to commencing work specified by the Contract Documents, the Contractor shall, at its own expense, obtain all permits or variances as may be required by the AHJ and provide satisfactory evidence of having obtained said permits and variances to both the Owner's Representative and Consultant.
3. File necessary drawings for approval of all Authorities Having Jurisdiction.
4. The Elevator Contractor shall undertake the necessary review and search procedure to identify open applications and/or outstanding violations for this property; and, close-out such applications and/or expunge such violations relative to the project scope as required for final acceptance by the AHJ.
 - a. Outstanding applications and violations must be indicated on the request for permit filing for this procedure to ensure such applications and/or violations are dismissed accordingly.
 - b. All relative costs shall be included in the base bid proposal with the understanding that corrective actions are covered under the specified scope of work.

B. Submittals

1. Prior to beginning the work, the Contractor shall submit and have approved copies of layout drawings, shop drawings and standard cuts.
2. The Consultant and the Owner's Representative shall pass on the submittals with reasonable promptness and the Contractor shall be responsible to ensure that there will be no delay in their work or that of any other trade involved.

3. Approved filing and submittal requirements must be completed before equipment and related materials are ordered.
4. Copies of Department of Buildings' permits and/or governing authority's documents will be posted at the job site with copies issued to the Owner's Agent, Owner's Representative and Consultant.
5. Samples of wood, metal, plastic, paint or other architectural finish material applicable to this project shall be submitted for approval by the Owner's designee.
6. It shall be understood that approval of the drawings and cuts by Owner's designee, Architect and/or Consultant shall be for general arrangement only and does not include measurements which are the Contractor's responsibility or approval of variations from the contract documents required by the AHJ.
7. The Contractor shall prepare a record log and maintain all submittals, shop drawings, catalog cuts and samples.

C. Measurements and Drawings

1. Drawings or measurements included with the bidding material shall be for the convenience of the bidders only and full responsibility for detailed dimensions lies with the Contractor.
2. In the execution of the work on the job, the Contractor shall verify all dimensions with the actual conditions.
3. Where the work of the Elevator Contractor is to join other trades, the shop drawings shall show the actual dimensions and the method of joining the work of the various trades.

D. Keys

1. Upon the initial acceptance of work specified by the Contract Documents on each unit, the Contractor shall deliver to the Owner, six (6) keys for each general key-operated device that is provided under these specifications in accordance with ASME A17.1, Part 8 standards as may be adopted and modified by the AHJ.
2. All other keying of access or operation of equipment shall be provided in accordance with ASME A17.1 Part 8 as may be adopted and modified by the AHJ.

E. Diagnostic Tools

1. Prior to seeking final acceptance of the project, the Contractor shall deliver to the Owner any specialized tools required to perform diagnostic evaluations, adjustments, and/or programming changes on any microprocessor-based control equipment installed by the Contractor. All such tools shall become the property of the Owner.
 - a. Owner's diagnostic tools shall be configured to perform all levels of diagnostics, systems adjustment and software program changes which are available to the Contractor.
 - b. Owner's diagnostic tools that require periodic re-calibration and/or re-initiation shall be performed by the Contractor at no additional cost to the Owner for a period equal to the term of the maintenance agreement from the date of final acceptance of the project.
 - c. The Contractor shall provide a temporary replacement, at no additional cost to the Owner, during those intervals in which the Owner might find it necessary to surrender a diagnostic tool for re-calibration, re-initiation or repair.

2. Contractor shall deliver to the Owner, printed instructions, access codes, passwords or other proprietary information necessary to interface with the microprocessor-control equipment.

F. Service Support Requirements / Spare Parts

1. Software / Firmware Updates

- a. During the life of the equipment and subject to the term of the maintenance agreement, where revisions to firmware and/or software are issued by the control manufacturer or manufacturer of solid state and microprocessor based subsystems subsequent to the beneficial use of the equipment, updates shall be provided so that the installation and spare circuit boards are current with respect to software and firmware versions.

G. Wiring Diagrams, Operating Manuals and Maintenance Data

1. Comply with the requirements of Division 01.
2. Deliver to the Owner, four (4) identical volumes of printed information organized into neatly bound manuals prior to seeking final acceptance of the project.
3. The manuals shall also be submitted in electronic format on non-volatile media, incorporating raw 'CAD' and/or Acrobat 'PDF' file formats.
4. Manuals, as well as electronic copies, shall contain the following:
 - a. Step-by-step adjusting, programming and troubleshooting procedures that pertain to the solid-state microprocessor-control and motor drive equipment.
 - b. Passwords or identification codes required to gain access to each software program in order to perform diagnostics or program changes.
 - c. A composite listing of the individual settings chosen for variable software parameters stored in the software programs of both the motion and dispatch controllers.
 - d. Method of control and operation.
5. Provide four (4) sets of "AS INSTALLED" straight-line wiring diagrams in both hard and electronic format in accordance with the following requirements:
 - a. Displaying name and symbol of each relay, switch or other electrical component utilized including identification of each wiring terminal.
 - b. Electrical circuits depicted shall include all those which are hard wired in both the machine room and hoistway.
 - c. Supplemental wiring changes performed in the field shall be incorporated into the diagrams in order to accurately replicate the completed installation.
6. Furnish four (4) bound instructions and recommendations for maintenance, with special reference to lubrication and lubricants.
7. Manuals or photographs showing controller repair parts with part numbers listed.

H. Training

1. Prior to seeking final acceptance of the project, the Contractor shall conduct a two (2) hour training program on-site with building personnel selected by the Owner.
2. The focus of the session shall include:
 - a. Instructions on proper safety procedures and who to contact for the purpose of assisting passengers that may become entrapped inside an elevator car.
 - b. Explain each control feature and its correct sequence of operation.
3. Control features covered shall include but, not be limited to:
 - a. Independent Service Operation.
 - b. Emergency Fire Recall Operation - Phase I.
 - c. Emergency In-car Operation - Phase II.
 - d. Emergency Communications Equipment.
 - e. Security Operating Features.

I. Advertising

1. Advertising privileges shall be retained by the Owner.
2. It shall be the responsibility of the Contractor to keep the job site free of posters, signs, and/or decorations.
3. Contractor's logo shall not appear on faceplates or entrance sills without the approval of the Owner.

1.3 QUALITY ASSURANCE

A. Materials and Quality of Work

1. All materials are to be new and of the best quality of the kind specified.
2. Installation of such materials shall be accomplished in a neat manner and be of the highest quality.
 - a. Should the Contractor receive written notification from the Owner stating the presence of inferior, improper, or unsound materials or quality of installation, the Contractor shall, within twenty-four (24) hours, remove such work or materials and make good all other work or materials damaged.
 - b. Should the Owner permit said work or materials to remain, the Owner shall be allowed the difference in value or shall, at its election, have the right to have said work or materials repaired or replaced as well as the damage caused thereby, at the expense of the Contractor, at any time within one (1) year after the completion of the work; and neither payment made to the Contractor, nor any other acts of the Owner shall be construed as evidence of acceptance and waiver.

B. Mechanical Design Requirements (General)

1. The following typical requirements shall apply to all parts of the work where applicable and are supplementary to other requirements noted under the respective headings.

- a. All bearings, pivots, guides, guide shoes, gearing, door hanger sheaves, door hanger tracks and similar elements subject to friction or rolling wear in the entire elevator installation shall be accurately and smoothly finished and shall be arranged and equipped for adequate and convenient lubrication. Means shall be provided for flushing and draining the larger bearings and gear case. All oiling holes shall have dustproof, self-cleaning caps.
- b. Bearings of governor and governor sheaves and important supporting bearings of other parts in motion when the elevator is traveling shall, unless otherwise specified or approved, be of ball or roller bearing type.
- c. Bearings for brake levers and similar uses where the amount of movement under load is light and the wear negligible may be unlined.
- d. All plain bearings shall be liberally sized in accordance with the best commercial elevator usages which have proved entirely satisfactory on heavy-duty installations.
- e. Bearings of motors shall be arranged and equipped for adequate automatic lubrication. Ring or chain oilers, spring-fed grease cups and equivalent devices properly used in accordance with the best commercial elevator practice will be acceptable. Approved means shall be provided for visibly checking the amount of lubricant contained and for flushing and draining. Means shall also be provided for preventing leakage of lubricant when the reservoirs or grease cups are filled to proper levels.
- f. Ball and roller bearings shall be of liberal size and of a type and make which have been extensively and successfully used on other similar, heavy-duty elevator installations. They shall be fully enclosed. Loading, lubrication, support and all other conditions of use shall be in accordance with the recommendations of the bearing manufacturer based on previous extensive and satisfactory elevator usage.
- g. All armature spiders and similar items intended to rotate with their shafts shall be keyed and/or firm press or shrunk fit on the shafts. Set screw fastening will be permitted only for minor items not subject to hoisting loads and where means for field adjustment is required.
- h. All bolts used to connect moving parts, bolts carrying hoisting stresses and all other bolts, except guide rail bolts, subject to vibration or shock shall be fitted with adequate means to prevent loosening of the nuts and bolts. Bolts transmitting important shearing stresses between machine parts shall have tight body fit in drilling holes.
- i. All machine work, assembling and installing shall be done by skilled and experienced mechanics using first-class, modern equipment and tools. All work shall be thoroughly high grade in every respect. All parts will be manufactured to high precision standards so that wearing parts will be readily interchangeable with stock repair parts with a minimum of field fitting.
- j. All bearing and sliding surfaces of shafts, pins, bearings, bushings, guides, etc., shall be smoothly and accurately finished. They shall be assembled and installed in accurate alignment and with working clearance most suitable for the load, speed, lubrication and other conditions of use.
- k. Structural steel used for supporting and securing equipment and for the construction of car slings, etc., shall conform to the A.S.T.M. specification for Structural Steel for Buildings. Design stresses shall not exceed those specified in the local Building Code.
- l. Castings of motor frames, sheaves, gear casings, etc., shall be of the best quality metallurgically controlled, hard, close grained gray machinery cast iron, free from blow holes, sand holes, or shrinkage cracks, ground to remove overruns, sanded and

machined so as to leave a finish suitable for its particular application. Surfaces of sheaves and brake drums shall be entirely free from defects and shall show a hardness of not less than 220 Brinell.

C. Electrical Design Requirements (General)

1. The following typical requirements shall apply to all parts of the work and are supplementary to other requirements noted under the respective headings.
 - a. The design and construction of the motors shall conform to the requirements of these specifications and to the ASME Standards for Rotating Electrical Machinery with revisions issued to the first day when the work of this Contract was advertised.
 - 1) Motors shall operate successfully under all loads and speeds and during acceleration and deceleration.
 - 2) Motors shall be designed for quiet operation without excessive heat.
 - 3) Insulation on motor coils and windings and on all insulated switch, relay, brake and other coils shall conform to the requirements of minimum Class "F" insulation, as defined in ANSI Standards for Rotating Electrical Machinery. All motors shall be impregnated twice.
 - 4) Switches, relays, etc., on controller, starter and signal panels and similar items on other parts of the equipment shall be the latest improved type for the condition of use. They shall function properly in full accordance with the requirements of the machines controlled and with the specified operating requirements of the elevator. Any of these parts showing wear or other injurious effects during the guarantee period to the extent that abnormal maintenance is required or indicated shall be replaced with proper and adequate parts by the Contractor.
 - 5) Contacts in elevator motor circuits which are intended to be opened by governors or other safety devices shall be copper to carbon or other approved non-fusing type.
 - 6) Where required, controllers and other component parts of the installation shall be labeled in accordance with the latest codes and standards as adopted and/or otherwise modified by the AHJ.
 - 7) Electrical equipment, motors, controllers, etc., installed under this contract shall have necessary CSA/US or UL/US listing as may be required by the AHJ. Equipment shall be labeled or tagged accordingly.

D. Energy Conservation Code

1. The Contractor shall comply with the requirements set forth in the Energy Conservation Code as may be applicable to the AHJ.
2. Except for equipment or systems under the purview of other disciplines, elevator and escalator equipment provided by the Contractor requiring compliance shall include, but not be limited to:
 - a. Gear ratio efficiencies in geared machines.
 - b. Energy efficiencies of geared and gearless motors.
 - c. Absorption of regenerated power for elevators and escalators.
 - d. Energy efficiencies of car interior lighting and ventilation.

- e. Automatic operation of car interior lighting and ventilation through the individual car controller.

E. Materials, Painting and Finishes

1. Two (2) coats of rust inhibiting machinery enamel shall be applied to exposed ferrous metal surfaces in the pit that do not have a galvanized, anodized, baked enamel, or special architectural finishes.
2. Two (2) coats of rust inhibiting enamel paint to the machinery located within the machine room and secondary level (where applicable) as well as to the machine room floors.
3. Architectural metal surfaces of bronze or similar non-ferrous materials which are specified to be refinished, re clad and/or provided new, shall be sufficiently clear coated so as to resist tarnishing during normal usage for a period of not less than twelve (12) months after final acceptance by the Owner.
4. Identify all equipment including buffers, crosshead, safety plank, machine, controller, drive, governor, disconnect switch, etc., by 4" high numerals which shall contrast with the background to which it is applied. The identification shall be either decalcomania or stencil type.
5. Paint or provide decal-type floor designation not less than six (6) inches high on hoistway doors (hoistway side), fascias and/or walls as required by Code at intervals not exceeding 7'-0". The color of paint used shall contrast with the color of the surface to which it is applied.

F. Accessibility Requirements

1. Locate the alarm button and emergency stop switch at 35", and floor and control buttons not more than 48" above the finished floor. The alarm button shall illuminate when pressed for visual acknowledgement to user.
2. Provide raised markings in the panel to the left of the car call and other control buttons. Letters and numbers shall be a minimum of 5/8" and raised .03" and shall be in contrasting color to the call buttons and cover plate.
3. The centerline of new hall push button shall be 42" above the finished floor.
4. The hall arrival lanterns or cab direction lantern provided shall sound once for the "up" direction and twice for the "down" direction. Design and locate fixtures per Federal standards.
5. Provide floor designations at each entrance on both sides of jamb at a height of 60" above the floor.
6. Provide an audible signal within the elevator to tell passenger that the car is stopping or passing a floor served by the elevator.
7. Where elevators operate at a speed greater than 200 fpm, provide a verbal annunciator to announce the floor at which the elevator is stopping where required by the AHJ or specifications.
8. Provide signal control timing for passenger entry/exit transitions per Federal and/or Local standards.
9. Ensure sill-to-sill running clearances do not exceed 1-1/4" at all landings served.
10. Provide visual call acknowledgment signal for car emergency intercommunication device.

1.4 DELIVERY / STORAGE / HANDLING / COORDINATION

A. Delivery and Storage of Material and Tools

1. Comply with the requirements of the contract documents.
2. Delivery, Storage and Handling:
 - a. Deliver materials to the site ready for use in the accepted manufacturer's original and unopened containers and packaging, bearing labels as to type of material, brand name and manufacturer's name. Delivered materials shall be identical to accepted samples.
 - b. Store materials under cover in a dry and clean location, off the ground.
 - c. Remove delivered materials which are damaged or otherwise not suitable for installation from the job site and replace with acceptable materials.
3. The Owner shall bear no responsibility for the materials, equipment or tools of the Contractor and shall not be liable for any loss thereof or damage thereto.
4. The Contractor shall confine storage of materials on the job site to the limits and locations designated by the Owner and shall not unnecessarily encumber the premises or overload any portion with materials to a greater extent than the structural design load of the Facility.

B. Work with Other Trades / Coordination

1. Coordinate installation of sleeves, block outs, equipment with integral anchors, and other items that are embedded in concrete or masonry for the applicable equipment. Furnish templates, sleeves, equipment with integral anchors, and installation instructions and deliver to Project site in time for installation.
2. Coordinate sequence of installation with other work to avoid delaying the Work.
3. Coordinate locations and dimensions of other work relating to the equipment scheduled for installation including pit ladders, sumps, and floor drains in pits; entrance subsills; machine beams; and electrical service, electrical outlets, lights, and switches in pits and machine rooms, secondary levels, overhead sheave rooms and hoistways as it relates to the specific equipment.

C. Removal of Rubbish and Existing Equipment

1. On a scheduled basis, the Contractor shall remove all rubbish generated in performing work specified in the Contract Documents from the job site.
2. Any component of the existing elevator plant that is not reused under the scope of work specified in the Contract Documents shall become property of the Contractor and, as such, shall be removed from the premises at the Contractor's sole expense.
3. The Contractor agrees to dispose of the aforementioned equipment and rubbish in accordance with any and all applicable Federal, State, and municipal environmental regulations, and further accepts all liability that may result from handling and/or disposing of said material.

D. Protection of Work and Property

1. The Contractor shall continuously maintain adequate protection of all their work from damage and shall protect the Owner's property from injury or loss arising out of this contract.
2. The Contractor shall make good any such damages, injury or loss, except such as may be directly caused by agents or employees of the Owner.

3. The Contractor shall provide all barricades required to protect open hoistways or shafts per OSHA regulations. Such protection shall include any necessary guards or other barricades for employee protections during and after the modernization procedure.

1.5 RELATED WORK

- A. Related building work to be Included in Base Bid per the Contract Documents.

1. Related building work shall include all work necessary to return elevators to automatic operation with local Code authority approval. Related building work requirements shall be applicable based on prevailing conditions at the site of work and/or mandated modifications for code compliance.

1.6 WARRANTY / MAINTENANCE SERVICES

- A. Contract Close-Out, Guarantee and Warranties

1. The Contractor agrees to certify that work performed in accordance with the Contract Documents shall remain free of defects in materials and quality of work for a period of two (2) years after final acceptance of the completed project, or acceptance thereof by beneficial use on a unit by unit basis, whichever occurs first.
2. The sole duty of the Contractor under this warranty is to correct any non-conformance or defect and all damages caused by such defect without any additional cost to the Owner and within fifteen (15) days of notification.
3. The express warranty contained herein is in lieu of all other warranties, express or implied, including any warranty of merchantability or fitness for a particular purpose.
4. In the event the Contractor fails to fulfill its obligations defined herein, the Owner shall have the express right to perform the Contractor's obligations and to charge the Contractor the cost of such performance or deduct an equal amount from any monies due the Contractor.

1.7 ALTERNATES

The following alternatives are elective upgrades which constitute changes to the base scope of work specified. Pricing for each alternate upgrade is requested from the bidder with costs indicated in the appropriate space in the Request for Proposal (RFP). Contractor shall take into consideration, as part of the alternative pricing, alternate work that is required either in lieu of, or in addition to, work specified in the base scope and shall not duplicate costs.

- A. Alternate No. 4 - VVVF Emergency Return/Auxiliary Power System (New) Elevator No.4 Only:

1. In the appropriate space on the Bid Form, provide an "add" for material and labor necessary to perform the following.
2. Provide a system that will make back-up power available to the elevator when commercial power fails.
3. The unit shall safely move the elevator to a landing and provide power to the door operator to allow passengers to exit.
4. Movement of the car may be load dependent utilizing dynamic braking to control car speed.

5. The unit shall include:
 - a. On board controller.
 - b. UPS status monitor capable of notifying building management system.
 - c. Restart input from the car door open button.
 - d. Test button to simulate power failure.
 - e. UPS bypass control.
 - f. Monitoring of the disconnect switch.
 - g. Lockable shut-off switch.
 - h. Three-phase, 208/460 VAC input.
 - i. Battery level LED indicator.
 - j. Necessary fusing for batteries, outputs, logic circuitry and charger.
6. Provide new main line disconnects with auxiliary contacts to enable controls to distinguish between power failure and routine removal of power via the disconnect.

PART 2 - PRODUCTS

2.1 SUMMARY AND DEFINITIONS

A. Related Documents

1. Contract Documents

2.2 GENERAL DESCRIPTION

A. Geared Traction Service Elevators No.4, No.6

1.	Quantity	Two (2)
2.	Type	Geared Traction Service
3.	Capacity (lbs.)	9,000
4.	Speed (fpm)	200
5.	Travel in Feet	65'- 0" (Field Verify)
6.	Roping/Ropes	1:1
	a. Hoist	New
	b. Governor	New
7.	Number of Landings	Elevator No.4: Four (4) Elevator No.6: Five (5)
8.	Number of Openings	Elevator No.4: Five (5) Elevator No.6: Five (5)
9.	Front Openings	Elevator No.4: Two (2) *100, 200 Elevator No.6: Two (2) *100, 200
10.	Rear Openings	Elevator No.4: Three (3) 100, 300, 400 Elevator No.6: Three (3) 300, 350, 400
11.	Operation	Simplex Selective Collective / New
12.	Control	Microprocessor / New
13.	Power Drive	VVVF / New

14.	Fireman's Control	Phase I and II / New
15.	Machine Type	Geared / New
16.	Machine Deflector Sheaves	New
17.	Motor	AC / New
18.	Machine Location	Elevator No.4: Adjacent Side (level 350) Elevator No.6: Adjacent Side (level 400)
19.	Governor	New
20.	Car Platform / Sling	Reuse / Refurbish
21.	Safety	Reuse / Refurbish
22.	Counterweight	Reuse / Refurbish
23.	Hoistway Deflector Sheaves	Reuse / Refurbish
24.	Car / Counterweight Guide Rails	Reuse / Refurbish
25.	Car / Counterweight Roller Guides	New
26.	Buffers	Reuse / Refurbish
27.	Car Door Size	5'- 0" Wide x 7'- 0" High
28.	Hoistway Door Size	Same as Car Door
29.	Door Operation	Two-Speed, Center Opening
30.	Mater Door Operator	New
31.	Hoistway Entrance Jambs	Reuse / Refurbish
32.	Hoistway Doors	Reuse / Refurbish
33.	Hoistway Entrance Sills	Reuse / Refurbish
34.	Tracks / Hangers	New
35.	Interlocks / Closers / Rollers	New
36.	Emergency Exits	Reuse / Refurbish
37.	Power Supply	480 (Field Verify)
38.	Wiring and Traveling Cables	New
39.	Security/Card Reader Provisions	New / Card Readers by Others
40.	CCTV Provisions	New / CCTV by Others
41.	Number of Push Button Risers	One (1) per Elevator
42.	Hall Operating Fixtures	New
43.	Car Operating Fixtures	New
44.	Communication	New
45.	Door Protective Device	New / 3D Infrared Light Curtain Type
46.	Emergency Cab Lighting	New
47.	Car Ventilation / Fan	New
48.	Car Doors	New
49.	Car Sill	New / Nickel Silver
50.	Cab Enclosure / Interiors	New / As Further Specified.

2.3 MANUFACTURERS

A. Pre-Approved Equipment Manufacturers

1. The following manufacturer's equipment and materials have been pre-approved for use on this project.
2. Other equipment not specifically mentioned shall be considered for approval on an individual basis.
 - a. Controller - GAL (GALaxy), Motion Control Engineering, Elevator Controls Corporation, Elevator Systems, Inc., Smartrise.

- b. Tracks, Hangers, Interlocks and Door Operators - G.A.L., ECI.
- c. Fixtures - G.A.L., Adams, EPCO, Monitor, E-Motive USA, C.E. Electronics, Innovation, PTL, MAD, National.
- d. Door Protective Device - Janus, Adams, G.A.L., T.L. Jones, Tri-Tronics.
- e. Cabs and Entrances/Entrance Door Panels – EMCO, Accurate Elevator Door Corp, CEC Elevator Cab, EDI/ECI, Elite Elevator Cab, National Cab & Door, Tyler, Velis, Gunderlin, Premier, Prestige, Regency, Columbia Elevator Products, United Cabs.
- f. Machines - Hollister-Whitney, Titan, Imperial, Torin.
- g. Motors - Imperial Electric, General Electric, Baldor, Reuland Electric.
- h. VVVF Power Drives - Mitsubishi, MagneTek, Yaskawa, TorqMax.
- i. VVVF Emergency Power Systems - MCE, Reynolds & Reynolds Electronics.
- j. Electrical Traveling Cables - Draka, James Monroe.
- k. Guide Shoes/Rollers – ELSCO, G.A.L.
- l. Wire Ropes - Paulsen, Bethlehem, Wayland, Draka.
- m. Intercommunications/Telephones - Webb Electronics, K-Tec, Ring, Wurtec, Janus, approved equal.

2.4 CONTROL FEATURES / OPERATION

A. Motion Control (New)

- 1. Smooth stepless acceleration and deceleration of the elevator car shall be provided in either direction of travel during both single and multiple floor runs.
- 2. Use digital logic to calculate optimum acceleration and deceleration patterns during each run.
- 3. Acceleration, deceleration, jerk, maximum velocity, leveling accuracy and elapsed flight time, for a typical elevator one floor run, shall not exceed values as further specified.

B. Simplex Selective Collective Operation (New)

- 1. Provide simplex selective collective operation from a riser of hall push button stations.
- 2. The registration of one or more car calls shall dispatch the car to the selected floors.
 - a. The car shall also respond to registered hall calls in the same direction of travel.
 - b. Car and hall calls shall be canceled when answered.
- 3. Stops in response to calls that are registered in either the car or hall push button stations shall occur in the natural order of progression in which the floors are encountered, depending on the direction of car travel, and irrespective of the order in which calls are registered.
- 4. When the car has responded to the highest or lowest call, and calls are registered for the opposite direction, the car shall reverse direction automatically and respond to those registered calls.
- 5. When the car arrives at its last stop and reverses direction of travel, all previously registered car calls shall be automatically cancelled.
- 6. When the car arrives at a landing where both up and down hall calls are registered, it will answer the call in the direction of travel.

- a. After a pre-determined delay, if no car call is registered, the car shall respond to calls registered for the opposite direction. Car doors shall close immediately, re-open and respond to the call for the opposite direction.
 - b. Hall lantern operation shall always correspond to direction of service.
7. When an empty car reverses direction at a landing with no hall calls, the doors shall not open and the hall lantern shall not operate.
 8. If the car has no car calls registered and arrives at a floor where both up and down hall calls have been registered, the car shall respond to the hall call corresponding to the last direction of car travel. If, after making its stop, a car call is not registered and no other hall calls exist ahead of the car corresponding to its original direction of travel, the doors shall close and immediately reopen in response to the hall call for the opposite direction.
 9. The car shall maintain its original direction at each stop until the doors are fully closed to permit a passenger to register a car call before the car reverses its direction of travel.

C. Independent Service Operation (New)

1. The car operating station shall be equipped with a key-operated switch labeled "IND SER".
2. Locate the switch in the locked service compartment.
3. When placed in the "on" position the following shall occur:
 - a. Group elevator - the elevator shall bypass corridor calls and travel directly to any floor chosen by registration of a car call. Hall calls shall remain registered for service by another elevator in the group.
 - b. Simplex elevator - existing hall call registrations shall extinguish and hall buttons shall remain inoperative as an indication to passengers that there is no elevator service.
4. During Independent Service Operation, the elevator doors shall remain open at any landing until the door close or a car call push button is pressed and maintained until the doors are fully closed.
5. If more than one (1) car call is registered, all registered car calls shall extinguish when the elevator stops in response to the first call.
6. Fire Emergency Recall shall automatically override Independent Service Operation and engage Phase I - Fire Emergency Recall Operation following a period of approximately forty-five (45) seconds.

D. Inspection Service Operation (New)

1. The car shall move at a speed not to exceed 150 feet per minute (0.75 meters per second) as per code with both the hall and car door panels in the closed and locked position.
2. The top of the elevator car shall be equipped with a control for limited operation of the car during repairs, maintenance and inspection conducted in the hoistway. The transfer of control to the top of car operating device shall cause that device to be the sole means of control for the elevator.
 - a. Visual and audible indication shall be provided on the top of the car when Firefighters' Emergency Operation is initiated.
3. Power door operating equipment shall be rendered inoperative while the car is being operated in the Inspection Service mode with the exception of power closing of the door.

The control system shall maintain closing power on the door while the elevator is moving under Inspection Service Operation.

4. Machine Room Inspection Operation and Inspection Operation with open door circuits shall be provided in accordance with A17.1 Safety Code, as modified and adopted, where required or allowed by the AHJ.

E. Hoistway Access Operation (New)

1. Provisions shall be made to allow access to the hoistway through the use of hoistway access switches.
2. Operating the access switch shall permit the car to move at a speed not to exceed 150 feet per minute (0.75 meters per second) as per code with the hall and car doors in the open position to obtain access to the top of the car or climb-in pit.
3. The car shall automatically stop motion when the car top is level with the hoistway door sill for access to top of car.
4. The access key switches shall be keyed differently than other typical keys used in the operation of the elevator. Keying shall be in accordance with Security Group Classifications as required by applicable code.
5. Access operation shall be disabled when top of car inspection operation is in effect.

F. Load Weighing Operation (New)

1. A positive means shall be provided to continuously monitor the amount of load being transported by the elevator car.
2. The system shall be used to:
 - a. Preload static motor drives.
 - b. Activate control features that include:
 - 1) anti-nuisance operation.
 - 2) load dispatch operation.
 - 3) load dependent non-stop operation where applicable.
3. The anti-nuisance feature shall operate at loads not exceeding 200 lbs., whereas load dispatch and load non-stop shall be set to function at 65% of the rated loading capacity for the initial set up and adjustment procedure.

G. Anti-Nuisance Operation (New)

1. In the event car loading is not commensurate with the number of car calls registered, all car calls shall be canceled.
 - a. The system shall monitor the door protection device to determine if passenger transfer has occurred.
 - b. If after the third (3rd) stop a passenger transfer has not occurred, the system shall cancel all remaining registered car calls and respond to assigned hall call demand.
 - c. The number of calls registered with no passenger transfer that will trigger anti-nuisance shall be adjustable and initially set to three (3) calls.

H. Firefighters' Emergency Operation (New)

1. Phase I Emergency Recall Operation shall be provided for each car in accordance with ASME A17.1 code as modified under the applicable local or State law.
2. Each main or auxiliary car operating station shall be provided with an indicator light and warning buzzer, each of which shall become activated whenever Phase I Operation is engaged.
 - a. The warning buzzer shall cease to function once the car has completed the recall sequence and is positioned at the designated recall landing.
 - b. The indicator light shall remain illuminated as long as Phase I Operation is activated.
3. A three-position, key-operated switch shall be provided on the designated recall landing to manually activate Phase I Operation.
 - a. When activated, Phase I Operation shall be arranged so that in order to reset normal service, all cars must first be returned to the designated recall landing, after which the Phase I key-switch must be turned to the "OFF" position.
4. A standardized Fire Recall Key shall be used where required by the codes and standards applicable to the AHJ.
5. Phase II Emergency Recall In-Car Operation shall be provided for each car in accordance with ASME A17.1 code as modified under local or State law.
6. Locate controls required for Phase II In-Car Operation in a locked access cabinet in the main car operating panel.
 - a. The cover of the locked access panel shall be engraved as required by local or State law.
 - b. The locked access panel shall contain:
 - 1) Phase II key switch.
 - 2) Fire indicator light.
 - 3) Call cancel push button.
 - 4) Door open push button.
 - 5) Door close push button.
 - 6) Run/Stop switch.
 - 7) Other devices as may be required by local law.
 - c. Engrave the Firefighters' Service operating Instructions on the inside of the locked cabinet door.

I. Emergency Power Operation / Duplicate Existing – Elevator No.6 Only (New)

1. Existing emergency power provisions shall be duplicated and upgraded to automatically resume normal operation upon loss of normal power.
2. An illuminated signal marked "ELEVATOR EMERGENCY POWER" shall be provided in the elevator lobby at the designated landing to indicate that the normal power supply has failed and the emergency power is in effect.
3. Prior to return to normal power, the building ATS shall provide a "pre-transfer" signal to the elevator equipment that will initiate the landing of elevators prior to transfer from emergency power to normal power.

- a. Timer of the pre-transfer signal shall be adjustable from 15 to 30 seconds.
 4. The following additional requirements apply:
 - a. Firefighters' Service Operation will remain active at all times during emergency power operation but limited to the elevator selected to be in operation.
 - b. All car lighting will remain active with car lighting on separate emergency power feeders in addition to battery back-up.
 - c. Communications will remain active all times via emergency power feeders in addition to battery back-up.
 - d. Position indicator for each elevator will be active in the selected elevator and security room (where applicable), as well as lobby display panels.
 5. Testing of elevators under emergency power shall be accomplished with the building ATS providing necessary "pre-transfer" signals to the elevator control apparatus.
- J. Emergency Power / Power Regeneration Control – Elevator No.6 Only (New)
1. The elevator control system shall be provided with a means to divert regenerated power when operating on a "Co-Generation" Emergency Power system, or any system using an "inverter" to produce Alternating Current for the elevator system. Comply with ASME A17.1 Rule 2.26.10
 - a. Upon receipt of a signal provided by others, the control system shall redirect regenerated power, produced by the elevator system, from the building main line wiring to a bank of resistors.
 - b. Resistors used for the absorption and dissipation of the regenerated power may be the same resistor bank used for dynamic braking of the elevator.
 - c. Resistors shall be of the correct power rating and properly isolated/insulated from the controller steel frame.
- K. Alternate No. 4 - VVVF Emergency Return/Auxiliary Power System (New) Elevator No.4 only
1. In the appropriate space on the Bid Form, provide an "add" for material and labor necessary to perform the following.
 2. Provide a system that will make back-up power available to the elevator when commercial power fails.
 3. The unit shall safely move the elevator to a landing and provide power to the door operator to allow passengers to exit.
 4. Movement of the car may be load dependent utilizing dynamic braking to control car speed.
 5. The unit shall include:
 - a. On board controller.
 - b. UPS status monitor capable of notifying building management system.
 - c. Restart input from the car door open button.
 - d. Test button to simulate power failure.
 - e. UPS bypass control.
 - f. Monitoring of the disconnect switch.
 - g. Lockable shut-off switch.
 - h. Three-phase, 208/460 VAC input.
 - i. Battery level LED indicator.

- j. Necessary fusing for batteries, outputs, logic circuitry and charger.
 - 6. provide new main line disconnects with auxiliary contacts to enable controls to distinguish between power failure and routine removal of power via the disconnect.
- L. Floor Lockout Feature / Keyed Security Control / Car Only – Elevator No.6 Only (New)
- 1. Provide a car call floor lockout feature for elevator No.6 which will prevent registration of car calls to level 350.
 - a. Provide a two (2) position “on-off” key switch located in the car station adjacent to the level 350 car call button.
 - b. Turning the key switch to the “off” (lockout) position shall prevent the registration of a call when the corresponding car call button is pressed>
 - c. The key switch shall be individually keyed with a master.
 - 2. Activation of the floor lockout key switch shall no effect on the operation of the hall call station, i.e., the car can be called to the floor from the hall call button that is locked out in the car station.
 - 3. The “floor lockout” key switch shall be in a material and finish to match the car operating panel cover plate.
 - 4. Fire Service shall override the car call lockout feature.
- M. Floor Lockout Feature / Keyless - Card Reader Control / Wiring Provisions (New)
- 1. Wiring: Provide six (6) pair of 20 gauge two (2) flexible conductor low voltage cables with an overall braided shield in the traveling cable of all elevators for card reader interface.
 - a. The cables shall extend from the security interface terminal cabinet in the elevator machine room to behind the elevator return panel above the space allotted for the card reader.
 - b. Terminate the cable to dual screw barrier terminal strips on each end.
 - 2. Card Reader Space: Allocate card reader space in each main car station as directed by the consultant. Provide a flush Lexan lens and mounting provisions for the card reader unit which is provided by others.
 - 3. Interface: For floor programmable card access control in all elevators, provide a pair of terminals for all floors such that application of a momentary dry (no voltage present) contact closure across those terminals by the security system shall enable the selection of the corresponding floor from the floor selector button in the elevator cab.
 - a. Locate the terminals inside an interface terminal cabinet in the elevator machine room.
 - b. Provide all relays required to interface the elevator control system to the momentary dry contact closures provided for under another section of these specifications.
 - c. If applicable, the card reader shall be operable and compatible with the issued card keys used building wide.
 - d. Coordinate system requirements with the manufacturer of the issued card key system.

4. Card Reader "Secure/Bypass" Switch: Provide separate card reader control bypass key switches for each elevator.
 - a. The bypass key switches shall be located in the car operating panel service cabinets
 - b. The bypass key switches shall be a maintained contact type key switch with the key removable in the secure or bypass position.
 - 1) When the key switch is in the secure position, the card reader control mode shall be initiated.
 - 2) When in the bypass position, the card reader control mode shall be bypassed and the elevator shall return to normal operation, permitting free access to any floor.
5. The card reader operation shall bypass floor cut-out switches.
6. Firefighters' Service Operation shall override Floor Lockout Feature.

N. CCTV Camera / Wiring Provisions (New)

1. Wiring: Provide two (2) RG-59U stranded center conductor coax cables and two (2) conductor 20 gauge stranded, low voltage cables with an overall braided in the traveling cable of all elevators for CCTV Camera interface.
 - a. The cables for the CCTV camera shall extend from the elevator / security interface terminal cabinet in the elevator machine room to the top of the elevator cab. Provide an excess loop of 10 feet of cable at each end.
 - b. Provide one (1) 120V duplex unswitched outlet dedicated to security on top of each elevator equipped with CCTV camera.

O. Car to Lobby Operation (New)

1. Provide a key-operated Car-to-Lobby feature.
 - a. Provide a three-position key-operated switch for each elevator in the main landing hall call station to activate the Car-to-Lobby operating feature.
2. When engaged, this feature shall:
 - a. Cause the affected elevator to return non-stop to the lobby after it has discharged all registered car calls.
 - b. Open the door upon arriving at the lobby for approximately ten (10) seconds, after which the elevator shall park out of service with the door closed.
 - c. Maintain door open button function during the interval in which the car is out of service.
3. Returning the key-operated switch in the lobby panel to the "on" position shall restore the car to normal operation.
4. Override the Priority Service feature with Firefighters' Service in accordance with code and local law.

P. Door Operation (New)

1. Car and hoistway doors shall be arranged to operate in unison without excessive noise or slamming in either direction of travel.
 - a. Door opening speeds of two (2) feet per second shall be provided in conjunction with closing speeds of 1.0 foot per second in accordance with governing code.
 - b. Door operation shall commence as the car stops level at the floor and the machine brake is applied. Pre-door opening shall not be permitted.
2. Where the hoistway door and the car door are mechanically coupled, the kinetic energy of the closing door system shall be based upon the sum of the hoistway and the car door weights, as well as all parts rigidly connected thereto, including the rotational inertia effects of the door operator and the connecting transmission to the door panels.
3. The force necessary to prevent closing of the car and hoistway door from rest shall not exceed thirty (30) lbf. This force shall be measured on the leading edge of the door with the door at any point between one-third and two-thirds of its travel.
4. Door open and door close time shall be measured between the moment car door operation in either direction begins and the instant at which that cycle is completed.
5. When responding to either a car or corridor call, the amount of time that the elevator door remains stationary in the open position shall be adjustable up to sixty (60) seconds.
 - a. Door open dwell time for a corridor call shall be separate of that for a car call, and in both cases, dwell time shall be canceled whenever the car door protection device is momentarily interrupted by passenger transfers, followed by a reduced door open dwell time of approximately one (1) second (adjustable) after the door protection device is cleared of obstructions.
6. The operation of the door protective device by interruption of one or more infrared light beams (dual or multi-beam non-contact) during the close cycle shall cause the immediate reversing of the doors to the full open position.
7. The door closing cycle shall be arranged so that, in the event the door protective devices become continually obstructed after the normal door open dwell time has expired, and following a time interval of approximately thirty (30) seconds (adjustable), a warning tone shall sound and the door closing cycle shall commence at reduced speed and torque per applicable Code requirements.
8. Each car operating station shall be provided with a “door open” and “door close” push button.
 - a. Pressure on the “door open” button shall cause doors in the full open position to remain so and doors engaged in the close cycle to reverse direction and assume the full open position so long as pressure remains applied to the button.
 - b. The “door open” buttons shall also control the open cycle during Phase II - Emergency In-car Operation.
 - c. The “door close” push button shall function on Independent Service, Attendant Service and Phase II - Emergency In-car Operation as well as during normal automatic operations.

9. Each car operating station shall be provided with a “door hold” push button.
 - a. Pressure on the “door hold” button shall cause doors in the full open position to remain in the open position and doors operating in the close cycle to reverse direction and travel to the full open position for an extended (adjustable) period of time to allow for loading and unloading.
 - b. The “door hold” feature shall be overridden when the elevator is on Fire Emergency Phase I and Phase II.
 - c. The “door hold” feature shall be canceled when the “door close” button is pressed.
 - d. The “door hold” button shall illuminate when in operation.
 10. Repeated attempts by the power door operator to open or close the door at any landing shall be monitored by the control system.
 - a. In the event the door fails to cycle properly after a preset (adjustable) number of attempts, the car shall either travel to the next stop or remove itself from service, depending upon whether the malfunction is in the open or close cycle.
 11. Each hoistway door shall be provided with an automatic self-closing mechanism arranged so that the door shall close and lock if the car should leave the landing while the hoistway door is unlocked.
 12. Car doors shall be arranged to prevent their being manually opened from inside the car unless the elevator is positioned within a floor landing zone.
- Q. Door Operation / Selective (New)
1. Selective door operation shall be provided at floors where both front and rear openings occur.
 - a. Provide a floor button for each opening, clearly identified for front and rear in the car operating panel. A hall call station shall be provided for each hoistway entrance.
 - b. The front doors shall only open in response to a front car call and the rear doors only shall open in response to rear car call.
 - c. The front and rear doors shall open simultaneously in response to a front and rear call registered for the same floor.
 - d. The front doors only shall open in response to front hall call and the rear door shall open in response to a rear hall call providing the registered hall call is for the same direction of travel.
 - 1) If the front and rear hall calls are registered at the same floor for the direction of travel, both front and rear doors shall open simultaneously contingent on applicable fire codes of the AHJ.
 - 2) If front and rear hall calls are registered at the same floor for opposite directions, only the front rear doors shall open in response to the registered hall call which corresponds to the direction of travel.
 - e. A registered hall call for the direction opposite of the car travel shall not be cancelled and will be answered by the car traveling in the opposite direction.
 - f. Front and rear open buttons shall be provided in the car operating panel, the pressing of which shall stop and closing of the corresponding doors and return them to their fully open position.

- g. An elevator responding to Phase I Firefighters' Emergency Recall Operation shall return non-stop to the designated recall landing and shall only open to the side that has the Firefighters' Emergency Operation controls.

2.5 MACHINE ROOM / SECONDARY EQUIPMENT

A. Control Equipment (New)

1. The elevators shall have microprocessor-based controller/dispatchers.
2. Digital logic shall calculate optimum acceleration, deceleration and velocity patterns for the car to follow during each run.
3. Closed-loop distance and velocity feedback shall monitor the actual performance of the elevator car with the desired speed profile.
4. System operating software shall be stored in non-volatile memory.
5. Elevator control relays, contactors, switches, capacitors, resistors, fuses, circuit breakers, overload relays, power supplies, electronic circuit boards, microprocessors, static motor drive units, wiring terminal blocks and related components shall be totally enclosed inside a free-standing metal cabinet with hinged access doors.
 - a. Provide natural or mechanical ventilation for the controller cabinets.
 - b. Equip the vent openings and exhaust fans with filters.
6. Mount equipment to moisture-resistant, noncombustible panels supported from the steel frame.
7. Provide "noise filter" between hoistway wiring and controller/dispatchers to eliminate interference.
8. Optically isolate communication cables between components.
9. Wiring: Wiring on the units, whether factory or field wiring, shall be done in neat order, and all connections shall be made to studs and/or terminals by means of grommets, solderless lugs or similar connections. All wiring shall be copper.
10. Terminal Blocks: Provide terminal blocks with identifying studs on units for connection of board wiring and external wiring.
11. Marking: Identifying symbols or letters shall be permanently marked on or adjacent to each device on the unit, and the marking shall be identical with marking used on the wiring diagrams. In addition to the identifying marks, the ampere rating shall be marked adjacent to all fuse holders.
12. A 17" flat-panel LCD monitor shall be provided inside the elevator machine room for diagnostic purposes. The monitor shall be permanently mounted in a cabinet, on a shelf immediately adjacent or attached to or in a control cabinet of at least one car of a group. By means of graphic depiction, information available on the screen shall include:
 - a. An overview of car and corridor calls currently existing within the system.
 - b. Elevator operating status.
 - c. Elevator position, direction of travel and velocity.
 - d. The open/close status of elevator door.
 - e. The current operational status of each CPU input and output.
 - f. A sequential history of faults detected within the control system over the previous thirty (30) days.

13. The manufacturer's standard on-board "LCD" display shall be incorporated on the main processor board and/or otherwise incorporated in the controller cabinet. The "LCD" shall be capable of providing alpha-numeric characters to view the operational status of the elevator and/or group functions depending on the application. The display shall provide the user with necessary information for troubleshooting and reprogramming of the basic system parameters.
 - a. Where the "LCD" is not an integral part of the controller and troubleshooting/reprogramming requires the use of a separate tool, the tool shall be maintained in the machine room and accessible to service personnel. This tool, along with all technical documentation for the correct use of the tool, shall remain the property of the Owner.
 - b. Password protection of critical programming features is required to prevent accidental changes to life-safety and other non-typical control settings.
 - c. Where a separate dispatch or group control panel is provided, a separate "LCD" display shall be provided to view group functions.

14. In the event diagnostics and monitoring is accomplished via Field Service Tools, provide the required Field Service Tools with related control system appurtenances for diagnostic evaluations, system monitoring and field adjustments.
 - a. Provide instructions for proper use of such diagnostic tools and/or equipment with all coding and other operational requirements.
 - b. Maintain and calibrate the diagnostic tools and update the associated instructions and other related documents under the service agreement.
 - 1) Should the agreement be cancelled for any reason by either party, maintenance and updating of diagnostic tools shall be provided to the Owner at the Contractor's cost without the need to purchase or lease additional diagnostic devices, special tools or instructions from the original equipment provider.
 - 2) The Owner may request field and technical instructions be provided by the original installation contractor or manufacturer for proper servicing by other qualified elevator company personnel.
 - 3) The established cost-plus profit, as previously specified, shall be applicable for the life of the system.
 - 4) If the equipment for fault diagnosis is not completely self-contained within the controllers but requires a separate detachable device, that device shall be furnished to the Owner as part of this installation.
 - 5) Such device shall be in possession of and become property of the Owner.

15. Microprocessor Documentation
 - a. Provide and/or obtain complete information on systems' design, component parts, installation and/or modification procedures, adjusting procedures and associated computer conceptual logic circuitry and field connection.

B. Machine Beams (New / Existing)

1. Provide additional support beams, angles, plates, bearing plates, blocking steel members, etc., to support new machine, governors, dead end hitches, deflector and overhead sheaves from existing machine beams where applicable.
2. Contractor shall verify adequacy of all existing supports scheduled to be reused.

C. Geared Traction Machine / Sheaves / Brake (New)

1. Provide a worm-gear traction machine with a direct current brake and demountable drive sheave, mounted in proper alignment on a common bedplate.
2. The worm shall be accurately machined from steel and provided with a single end, double race ball bearing thrust.
3. The worm gear shall be made from a phosphor bronze rim, accurately cut, fitted and bolted to a cast iron spider.
4. The drive sheave shall be a demountable casting from the best grade of metal with a Brinell hardness of 215 to 230, and shall be machined with grooves, providing maximum traction with a minimum of rope and sheave wear.
 - a. Roping requirements and type of steel rope used as suspension means shall be engineered by the contractor and manufacturer of the equipment for maximum life of ropes and sheave.
5. Provide means for lubricating the machine.
6. The gear housing shall have a gasketed hole to inspect the gear.
7. Provide machine with an electro-mechanical brake.
 - a. The brake shall be spring applied and electrically released where drum or disk-type brakes are employed.
 - b. Design the brake electro-magnet for quick release and application of the brake.
 - c. The brake lining material shall be non-asbestos.
 - d. The brake pulley or disk shall act as the coupling between the drive motor shaft and the worm shaft.
8. Provide sheave guards to prevent ropes from jumping off of the sheave grooves.
9. Provide hoist cable guards at the car and counterweight-drop side of the machine sheave.
 - a. Guards shall cover cables from the point of slab penetration to the point where the hoist cables contact the sheave.
 - b. Guards shall prevent access to cables at pinch points.
10. Provide hoisting machine based on service elevator cab enclosure weight.

D. Deflector Sheaves Hoisting Machine (New)

1. Provide hoisting machine wire rope deflector sheaves with related apparatus and structural mounting supports.
 - a. Locate and size new sheave to maximize use of available clearances maintaining the present car and counterweight hitch drops.
 - b. New support bearings shall be of a roller type designed for a minimum of twice the total load calculation.
 - c. The sheaves shall be equipped with suitable lubrication devices.

- d. The deflector sheave shall be provided with means to guard the hoist ropes so they do not jump out of their respective grooves during a slack rope condition.
- e. Required new mounting beams and structural supports shall be interfaced with existing building structures as may be modified under the terms of this contract for the new design rated loading where applicable.

E. Deflector Sheaves Overhead/Hoistway (Reuse)

- 1. The existing overhead and hoistway sheave assemblies shall be refurbished and reused.
 - a. The sheave assemblies shall be washed clean of accumulated oil and grease and examined for any indication of bearing failure or leakage.
 - b. Bearings which are worn or found to emit unusual noises, excessive heat or other unfavorable characteristics shall be renewed or re-babbitted per OEM standards.
- 2. Overhead and hoistway sheave fastenings and beams shall be inspected to verify the structural integrity of the attachment.
- 3. Sheave alignment with the hoist ropes shall be checked and reset as necessary.
- 4. Remove rust, oil, dirt and impurities on existing hoistway/overhead sheaves and paint with a rust inhibitive paint to all exposed surfaces of sheaves, beams and fastenings/supports.

F. AC Drive Motor / Geared Applications (New)

- 1. Provide a vector duty, variable speed, reversible alternating current induction motor with high starting torque and low starting current, rated for 50° C (122° F) during continuous operation, designed for this particular elevator application.
 - a. Provide adequate ventilation of internal stator windings and rotating element to prevent overheating. (Constant velocity fan for constant cooling.)
 - b. Provide thermal overload protection of the stator windings.
- 2. The hoist motor housing shall have a rigid cast iron stator frame.
 - a. Core plate stator laminations shall be press fit into frame and properly secured.
 - b. Minimum class "F" (or approved equal) insulation shall be used to ensure long-term reliability.
- 3. The rotating element shall be fabricated from drawn bars machined and fitted in slots with end rings brazed together and shall be dynamically balanced for vibration-free operation. The motor shaft shall be manufactured from high-strength alloy steel for maximum strength.
- 4. Provide a motor coupling machined for proper fit on motor shaft with slotted keyway and key to properly secure same for standard NEMA mounted construction (foot or footless).
- 5. Properly align the hoisting motor to the hoisting machine for vibration-free operation.
- 6. The motor shall have proper labeling in accordance with the requirements of the AHJ.

G. VVVF AC Drive (New)

- 1. Provide a solid-state, variable voltage, variable frequency (VVVF), 3-phase AC hoist motor drive system as part of the microprocessor-based equipment.

- a. VVVF drive system shall be a low-noise, flux-vector inverter device.
 - b. Include a digital LED readout and touch-key pad to facilitate software parameter adjustments, monitor system operation and display fault codes.
2. The drive shall utilize a 3-phase, full wave rectifier and capacitor bank to provide direct current power for solid-state inversion.
 3. The inverter shall utilize IGBT power semiconductors and duty cycle modulation fundamental frequency of not less than one kilohertz to synthesize 3-phase, variable voltage variable frequency output.
 4. The system shall be designed and configured with the following countermeasures for noise generated by the pulse-width modulated (PWM) inverters.
 - a. Control of radiated noise via inverter and/or motor cables.
 - b. Conducted noise through power lines.
 - c. Induction noise and ground noise.
 5. Inverter shall be encased in metal and independently grounded.
 6. A noise filter for the input power line shall be provided to prevent penetration into radios, wireless equipment and smoke detectors.
 7. A 3% three-phase line reactor shall be provided on the power system rated at the utility voltage input to the drive and sized for the rated drive current.
 8. The drive shall:
 - a. Be configured as a complete digital drive system.
 - b. Be totally software configurable.
 - c. Interface with external equipment/signals via either discrete local I/O connections or high speed Local Area Network (LAN).
 - d. Be located within the limits of the control cabinet (where system size allows) or separately mounted in an appropriate chassis with hinged swing-out doors with clearances equal to the cabinet width dimensions.
 - e. Provide programmable linear or S-curve acceleration.
 - f. Provide free run or programmable linear or S-curve deceleration.
 - g. Have controlled reversing.
 9. Operating and Environmental Conditions:
 - a. Have a service factor of 1.0.
 - b. Rated for continuous duty.
 - c. Humidity - 90% rated humidity non-condensing.
 - d. Cooling - forced air when required.
 - e. Digital display for:
 - 1) Running - output frequency, motor RPM, output current, voltage.
 - 2) Setting - Parameters values for setup and review.
 - 3) Trip - separate message for each trip, last thirty (30) trips to be retained in memory.
 10. Protective Features:
 - a. Motor overspeed.
 - b. Adjustable current limit.

- c. Isolated control circuitry.
- d. Digital display for fault conditions.
- e. Selectable automatic restart at momentary power loss.
- f. Manual restart.
- g. Over/Under Voltage.
- h. Line to line and line to ground faults.
- i. Over-temperature.

H. VVVF AC Drive - Regenerative Module (New)

- 1. The system shall provide full regenerative capabilities to control overhauling motor speed and reduce hoist motor deceleration time by allowing overhaul power to be discharged back into the power lines.
 - a. The regenerative section may be an integral part of the drive or a stand-alone unit mounted in a separate cabinet with proper ventilation as required by the manufacturer.

I. Overspeed Governor (New)

- 1. Provide a speed governor, located overhead, to operate the car safety.
 - a. Maintain the proper tension in the governor rope with a weighted tension sheave located in the pit.
 - 1) Springs used to develop the tension are not acceptable.
 - b. Provide rope grip jaws, designed to clamp the governor rope to actuate the car safety upon a predetermined overspeed downward.
 - 1) The centrifugal type governor shall trip and set rope jaws within 60 degrees of governor sheave rotation after reaching rated tripping speed.
 - c. Design the governor rope tripping device so that no appreciable damage to or deformation of the governor rope shall result from the stopping action of the device in operating the car safety.
 - d. Provide an electrical governor overspeed protective device which shall remove power from the driving machine motor and brake before or at the application of the safety.
 - 1) The setting for the overspeed switch shall be as prescribed in the ASME A17.1 Safety Code.
 - 2) Locate and enclose the switch to ensure that excess lubrication will not enter the switch enclosure.
 - 3) Overspeed switch shall operate in both direction of travel on systems employing a static power drive unit.
 - e. Seal and tag the governor with the running speed, tripping speed and date last tested.
 - f. Design the governor to prevent false tripping due to conditions caused by rope dynamics.

J. Equipment Isolation (New)

1. Provide sound reducing vibration isolation elements at all support points of elevator controller, solid-state motor drives, isolation transformers, reactance units, hoisting motors and machines.
2. The elements for controllers, solid-state motor drives and isolation transformers shall be similar to double deflection neoprene-in-shear mounts, as manufactured by Mason Industries, Type ND, with 0.35" static deflection under design load ratings.
3. Elements between the hoisting machine unitized base and machine support beams shall be similar to triple layer ribbed neoprene pads, separated by appropriate steel shims as manufactured by Mason Industries, Type W pads, at 50 durometer, loaded for 40 psi or approved equal.
4. All bolts through isolation elements, where necessary, are to incorporate resilient washers and bushings.
5. Isolation of existing hoisting machine and motor is contingent on the OEM design of the apparatus.
 - a. Existing isolation pads shall be replaced with new.

K. Emergency Brake (New)

1. Ascending Car Overspeed Protection Device
 - a. Provide a device designed to prevent an ascending elevator from striking the hoistway overhead structure.
 - b. The device shall decelerate the car with any load up to the rated capacity by applying an emergency brake.
 - 1) The device shall detect an ascending car overspeed condition of not greater than 10% higher than the speed that the car governor is set to trip.
 - 2) The device, when activated, shall prevent operation of the car until the device is manually reset.
 - 3) The device shall meet the requirements of the ASME A17.1 Safety Code as may be modified by the AHJ.
2. Unintended Car Movement Protection Device
 - a. Provide a device to prevent unintended car movement away from the landing when the car and hoistway doors are not closed and locked.
 - 1) The device shall prevent such movement in the event of failure of:
 - a) The electric driving machine motor.
 - b) The brake.
 - c) The machine shaft or shaft coupling.
 - d) Machine gearing.
 - e) Control system.
 - f) Any component upon which the speed of the car depends.
 - g) Suspension ropes and the drive sheave of the traction machine are excluded.

- 2) The device shall prevent operation of the car until the device is manually reset.
 - 3) The device shall meet the requirements of the ASME A17.1 Safety Code as may be modified by the AHJ.
3. Where the installation of the Emergency Brake involves the raising of existing hoisting machines or modifications to the machine room slab, the contractor shall provide necessary engineering data, structural review and drawings as part of the submittal process.

L. Hoisting Machine Brake Inspection Platforms and Ladders (New)

1. Provide platforms, grating, handrails, ladders and required accessories to service and maintain the hoisting machine brake assemblies where their height above the floor exceeds that mandated by the AHJ.
2. The design, fabrication and installation shall be by the Elevator Contractor and shall be in compliance with all applicable Codes.
3. Submit drawings showing details for the assembly for approval by the Owner and structural engineer.
4. Apply two (2) coats of rust inhibiting paint to exposed ferrous metal surfaces.

2.6 HOISTWAY EQUIPMENT

A. Guide Rails / Inserts / Brackets (Reuse)

1. Car and counterweight guide rails, fishplates, rail brackets, backing support and related attachments shall be inspected to determine if unfavorable conditions exist that diminish the structural integrity of any component.
 - a. In the event substandard conditions are disclosed by means of this inspection, the Contractor shall immediately inform the Consultant as to the exact nature of said problems and then undertake whatever repairs and/or replacements the Consultant may deem appropriate to remedy the situation.
2. Each stack of guide rails shall be individually examined to determine if excessive compression has occurred from building settlement.
 - a. In the event such conditions are found to exist, each affected stack shall be cut off enough to relieve pressure.
 - b. Jacking bolts shall be provided underneath each stack of both car and counterweight guide rails.
3. Each stack of guide rails shall be realigned so that total deviation from plumb in any direction does not exceed 1/8" over the entire length of the hoistway and that DBG measurements never vary more than .030".
4. As required, car guide rails joints shall be individually filled, filed and sanded in order to eliminate minor variations in adjoining machined surfaces.

B. Counterweight Assembly (Reuse)

1. The existing counterweight assembly shall be refurbished to as new condition and reused.

2. Individual counterweight frame members shall be inspected for any indication of damage and to determine if the overall assembly is twisted, racked, or otherwise distorted.
 - a. All fastenings between counterweight frame members shall be individually examined, tightened and if necessary renewed.
 - b. In case any of these conditions are found to exist, the Contractor shall immediately inform the Consultant about the exact nature of the problem and undertake whatever corrective action the Consultant may deem appropriate to remedy the situation.
3. The amount of filler weight placed within the counterweight frame shall be adjusted so the weight of the entire counterweight assembly is equal to that of the renovated elevator car, plus forty to forty-two percent (40-42%) of its rated loading capacity unless otherwise required by a manufacturer where new hoisting machinery is employed.
 - a. Filler weights shall be held securely in place at all times with tie rods passing through holes in both the weights and the counterweight frame with tie rods secured on each end with double lock nut and a cotter pin arrangement.

C. Roller Guides (New)

1. Provide roller guide shoes with adjustable mounting base, rigidly bolted to the top and bottom of each side of the car and counterweight frame.
 - a. Roller guides shall consist of a set of sound reducing wheels in precision bearings held in contact with the three (3) finished rail surfaces by adjustable stabilizing springs.
 - b. The bearings shall be sealed or provided with grease fittings for lubrication.
 - c. Equip roller guides with adjustable stops to control postwise float.
 - d. Fit the top car roller guides with galvanized, painted or powder coated steel guards.
2. Approved applications and manufacturers:
 - a. Geared service traction elevators: ELSCO Model A for car roller guides and ELSCO Model C for counterweight guides, with red polyurethane rollers and adjustable stops.

D. Hoist Ropes (New)

1. Pre-formed traction steel wire rope, specifically constructed for elevator applications, shall be provided for suspension of the elevator car and counterweight assembly.
 - a. Fastenings shall be accomplished by use of individual tapered rope sockets (wedge clamp) with adjustable shackles.
 - b. General design requirements for rope shackles and the method of securing wire rope shall conform with ASME A17.1 elevator safety code as modified by, and/or in addition to codes and standards accepted by the AHJ.
2. Broken rope shackle springs shall be replaced on an as needed basis.
3. New rope shackles shall be provided.
4. Existing hitch plates shall be inspected for wear. Hitch plates with elongated holes or other conditions that may damage shackles shall be replaced with new.

5. Provide anti-spinout as required by applicable code at all shackles where applicable.
- E. Governor Rope (New)
1. Pre-formed wire rope specifically constructed for elevator applications, shall be provided for governor ropes.
 - a. Rope shall be traction steel or iron in accordance with OEM design requirements.
 - b. Rope diameter and method of fastening shall be in accordance with ASME A17.1 Safety Code as adopted and/or otherwise modified by the AHJ.
- F. Electrical Conduit / Wiring / Traveling Cable (New)
1. Electrical wiring shall be provided.
 - a. All wiring shall be stranded copper conductors, manufactured in compliance with ANSI/ASTM B174-71 and UL 62 requirements, and polyvinyl chloride insulation complying with ETT requirements of UL 62 and Article 400 of the National Electric Code.
 - b. Electrical wiring provided for hoistway interlock shall be of a flame retardant type, capable of withstanding temperatures of at least 392 degrees Fahrenheit. Conductors shall be Type SF or equivalent.
 - c. Each run of electrical conduit or duct shall contain no less than 10% spare wires and, in any case, no fewer than two (2) spare wires.
 - d. Crimp-on type wire terminals shall be used where possible.
 2. Traveling cable shall be provided.
 - a. Each traveling cable shall be provided with a flame and water resistant polyvinyl chloride jacket.
 - b. Electrical wiring shall consist of stranded copper conductors, manufactured in compliance with ANSI/ASTM B174-71 and UL 62 requirements, and polyvinyl chloride insulation complying with ETT requirements of UL 62 and Article 400 of the National Electric Code.
 - c. Each traveling cable shall contain no less than 10% spare wires.
 - d. Traveling cable exceeding 100' in length shall be provided with a steel wire rope support strand from which the cable shall be suspended.
 - e. Traveling cable must be contained within an approved electrical conduit to within 6' of the final suspension point in the hoistway.
 - f. Each traveling cable shall be arranged to provide no fewer than six (6) individually shielded pairs of 20 gauge wire and arranged to contain no less than one (1) coaxial cable for CCTV remote monitoring.
 - g. Traveling cable conductors that terminate at a hoistway center box shall be connected to stud blocks provided for that purpose.
 - 1) Each wiring terminal shall be clearly identified by its nomenclature as shown on the "as built" wiring diagrams and solderless, crimp-on type wire terminals shall be used where possible.
 - h. The attachment of a traveling cable to the underside of the elevator car shall be performed so that a minimum loop diameter of 30x the cable diameter is provided.

2.7 PIT EQUIPMENT

A. Car and Counterweight Buffer (Reuse)

1. Existing car and counterweight buffers shall be reused.
 - a. Pit channels, related supports and fastenings shall be inspected for damage and to determine if the structural integrity of any component is diminished by the effects of rust or other unfavorable conditions.
 - 1) In the event defects are found, the Contractor shall immediately inform the Consultant and undertake whatever repair and/or replacement the Consultant may deem appropriate.
 - b. Surface rust shall be removed from all reused components.
 - c. Apply two (2) coats of rust inhibitive primer/paint to pit channels and buffer springs.
 - d. Provide a permanent buffer marking plate which indicates the manufacturer's name, identification number, rated impact speed and stroke.
 - e. Provide a permanent data plate in the vicinity of the counterweight buffer indicating the maximum designed counterweight runby in accordance with ASME A17.1 as may be modified by, and/or in addition to codes and standards accepted by the AHJ.
 - f. The buffer shall undergo testing in accordance with ASME A17.1 Code as modified by, and/or in addition to codes and standards accepted by the AHJ.

B. Ladders, Screens and Guards (New)

1. Provide the following secondary metal work in the pit, hoistway and in elevator machine room in accordance with bid documents.
 - a. Counterweight shall be guarded by means of a fixed screen from the pit floor to a position of at least 2450 mm (96") above pit floor.
 - b. Guard around adjacent mounted hoist machine and hoistway.
 - c. Pit access ladders.
 - d. Guard around machine, ropes and rope holes.
2. The pit ladder shall have continuous steel flat bar side rails 12 mm (1/2") x 75 mm (3"), with eased edges, spaced a minimum of 400 mm (16") apart. Rungs shall be steel bars 18 mm (3/4") in diameter, spaced 300 mm (12") apart with top to have a non-slip surface. Rungs shall be located along centerline of side rails, located not less than 180 mm (7") from the nearest permanent object or structure. Plug weld and grind smooth on outer rails faces. Support each ladder at top and bottom and at intermediate points spaced not more than 1500 mm (60"). Extend side rails 1200 mm (48") above top rung.
3. Prime paint and apply two (2) coats of rust inhibiting machinery enamel to metal work specified above as approved by the Consultant.

C. Governor Rope Tension Assembly (New)

1. Provide a governor rope tension assembly.
 - a. Maintain the proper tension in the governor rope with a weighted tension sheave located in the pit.

- 1) Springs used to develop the tension are not acceptable.
- b. The sheave shall be of proper diameter and set directly plumb with the governor rope drop to prevent the rope from pulling off of the sheave at an angle.
- c. Lubrication fittings shall be provided on the assembly.
- d. The assembly shall have necessary rope guards to prevent accidental contact of the rope/sheave by service personnel and to prevent the governor rope from jumping off of the sheave.

D. Pit Stop Switch (New)

1. Where climb-in pit depth exceeds 67", each pit shall be provided with two (2) push/pull or toggle switches conspicuously designated "EMERGENCY STOP".
 - a. Both of these stop switches, shall be located immediately adjacent to the pit access ladder.
 - 1) Place one stop switch approximately 47" above the pit floor.
 - 2) Place the second stop switch 18" above the hoistway entrance sill on the lowest landing served.
 - 3) These switches shall be arranged so as to prevent the application of power to the hoist motor or machine brake when either one is placed in the "OFF" position.

2.8 HOISTWAY ENTRANCES

A. Hoistway Entrances (Reuse)

1. Hoistway entrance sills, sill supports, entrance frames, headers and header supports shall be reused and refurbished.
 - b. Hoistway entrances that have become distorted or bent shall be straightened, plumbed, reset to the proper width dimension and reinforced as necessary.
 - c. Provide 14-gauge steel fascia plates that extend at least the full width of the door and be secured at hanger support and sill with oval head machine screws.
 - 1) Reinforce fascia to allow not more than 1/2" of deflection.
 - 2) Provide fascia plates where the clearance between the edge of the loading side of the platform and the inside face of the hoistway enclosure exceeds the code allowed clearance.
 - d. Provide 14-gauge steel toe guards that extend 12" below any sill not protected by fascia.
 - 1) The toe guards shall extend the full width of the door and shall return to the hoistway wall at a 15-degree angle and be firmly fastened.
 - e. Remove oil, dirt and impurities on new and existing apparatus and give a factory coat of rust inhibitive paint to all exposed surfaces of struts, hanger supports, covers, fascias, toe guards, dust covers and other ferrous metal.

- f. Existing hoistway entrance frames shall be painted in color as selected by Owner's representative / Architect.

B. Slide Type Hoistway Entrance Door Panels (Reuse)

- 1. Hoistway entrance door panels shall be reused and refurbished.
 - a. Provide each door panel with two (2) removable laminated plastic composition guides, arranged to run in existing sill grooves with a minimum clearance.
 - 1) The guide mounting shall permit their replacement without removing the door from the hangers.
 - 2) A steel wear indicator shall be enclosed in each guide.
 - b. Provide the meeting edge of center opening doors with necessary new continuous rubber astragal bumper strips.
 - 1) Astragal shall be relatively inconspicuous when the doors are closed.
 - 2) Provide rubber bumpers at the top and bottom of each section of door to stop them at their limit of travel in the opening direction.
- 2. In multi-speed door arrangements, provisions shall be made to interlock the individual panels so all panels close should the normal door panel relating means fail.
- 3. Provide a special key so that an authorized person can open any landing door when the car is elsewhere.
 - a. The key hole shall be not less than 3/8" in diameter and shall be fitted with a stainless steel or bronze ferrule to match related equipment.
 - b. Where applicable, plug the abandoned hoistway door access hole in each door panel, secured from the hoistway side of the door, finished to match existing or as otherwise directed by the Owner's representative/consultant.
- 4. Where conditions warrant, or where otherwise required by code, equip all hoistway landing doors with one-piece full height non-vision wings of material and finish to match hall side of door panels.
- 5. Existing hoistway door panels shall be painted in color as selected by Owner's representative / Architect.

C. Tracks / Hangers / Closers / Related Equipment (New)

- 1. Formed or extruded steel landing door hanger tracks shall be provided.
- 2. Each landing door panel shall be suspended from a pair of door hanger assemblies that are compatible with the hanger tracks.
 - a. Hanger assemblies shall be directly mounted to the door panel using 3/8" diameter or better hardware.
 - b. Solid steel blocks shall be used where job-site conditions dictate the use of spacers between hanger assemblies and the landing door panel.
 - c. Hanger assemblies shall be adjusted or shimmed so that door panels are suspended in a plumb manner with no more than 3/8" vertical clearance to the cab entrance threshold.

- d. Upthrust rollers shall be adjusted for minimal operating clearance against the bottom edge of the hanger track.
 - e. Means shall be provided to prevent hangers from jumping the track.
 - f. Blocks shall be provided to prevent rollers from overrunning the end of the track.
3. Each set of multi-speed center opening landing doors shall be provided with a sill-mounted spring closing mechanism with necessary door panel relating hardware.
 4. In multi-speed door arrangements, provisions shall be made to interlock the individual panels so all panels close should the normal door panel relating means fail.
 - a. Spirator-type spring closers shall be acceptable should prevailing sill depth or runby clearance conditions require their use.
 5. Where multi-speed side slide door panels exist, provide a secondary interlocking device that will prevent separation of the panels should the sill closer or relating cable(s) fail.

D. Interlocks / Unlocking Devices (New)

1. Each set of landing doors shall be provided with a complete electromechanical interlock assembly.
 - a. Each interlock assembly shall consist of:
 - 1) A switch housing with contacts.
 - 2) Lock keeper.
 - 3) Clutch engagement/release subassembly.
 - 4) Associated linkages.
 - b. Arrange the lock so that individual leading door panels (side slide or center opening) are locked when in the closed position.
2. Non-typical mounting arrangements for interlocks and/or related mechanisms must receive prior approval from the Consultant.
3. Each hoistway door interlock assembly shall be provided with an emergency release mechanism utilizing a drop-leaf type access key at all landings served.
 - a. Each hoistway door shall accommodate manufacturers standard lock release key with escutcheon.
 - 1) The key hole shall be fitted with a metal ferrule that matches the door finish.

E. Hoistway Door Bottom Guides / Safety Retainers (New)

1. The bottom of each side sliding type hoistway door panel shall be equipped with a minimum of two (2) guiding members.
 - a. Metal mounting angles shall be secured to the integral panel frame structure; and when conditions warrant, additional external metal support plates or angles shall be installed to ensure the integrity of the panel frame is not compromised.
 - b. Guides shall be manufactured of low friction non-metal material with sufficient strength to withstand forces placed on door panels per ASME A17.1 Standards.

- c. Each guide assembly shall incorporate a steel wear indicator and be so designed to permit sliding member replacements without removal of door panel(s) from top hanger devices.
 - d. Panels shall be hung with a maximum vertical clearance of 3/8 inch between top of sill and bottom of panel and the guide shall engage the sill groove by not less than 1/4 inch.
2. The bottom of each side sliding type hoistway door panel shall be equipped with a guiding member safety retainer to prevent displacement in the event of primary guide means failure.
- a. A metal reinforcement (12 gauge stainless or galvanized steel) shall be installed between the two (2) primary guiding members (a.k.a. "Z" bracket).
 - b. The reinforcement shall be designed with a minimum length of eight (8) inches or the maximum possible length that will fit between the primary members and a minimum overall height of two and one-half (2.5) inches secured on the internal face of the door panel. (Hoistway side)
 - c. The retainer shall be set with the supplemental safety angle 3/8 inch into the corresponding sill groove; and be capable of preventing displacement of the panel no more than 3/4 inch with an applied force of 1125 lbf at right angles over an area twelve (12) inches x twelve (12) inches at the approximate center of the door panel.

2.9 CAR EQUIPMENT / FRAME

A. Car Frame (Reuse)

1. The existing car frame assembly shall be refurbished to as new condition and reused.
2. Individual car frame members, platform isolation framework, door operator support structure, related bracing and hardware shall be inspected for any indication of damage or distortion.
 - a. Where damage is detected, the Contractor shall immediately inform the Consultant and then undertake corrective action deemed appropriate by the Consultant to remedy the condition.
3. Provide new elastomer isolation pads for all existing platforms where pads are presently installed.
4. The car frame, door operator support and related bracing shall be modified or reconfigured as necessary in order to accommodate new cab enclosure and/or master door operating equipment specified herein.
5. The elevator car shall undergo static balancing upon substantial completion of all work described in the project specifications and subsequent to any car interior refinishing or cab replacement work performed in conjunction with the project.

B. Car Platform (Reuse)

1. The existing platform shall be modified to accommodate the new apparatus specified herein.

- a. Where necessary, the underside of platform shall be refurbished and treated with fire-rated material.
- b. Top of platform shall be refurbished with a marine grade plywood set to receive new finished floor covering as selected by Owner.

C. Car Safety (Reuse)

1. The existing governor actuated car safety device shall be retained, overhauled and upgraded for current code compliance.
2. Readjust safety for proper operation in accordance with current ASME A17.1 design standards.
3. Check the existing safety operated switch (plank-switch) for proper adjustment and operation.
 - a. Provide a new plank-switch where none currently exists.
4. A new safety shall be provided where the existing is not suitable for reuse due to overall condition or in conjunction with an increase in the elevator speed or full load capacity.

D. Automatic Leveling / Releveling / Positioning Device (New)

1. Equip the elevator with a floor leveling device which shall automatically bring the car to a stop within 1/4" of any floor for which a stop has been initiated regardless of load or direction of travel.
2. This device shall also provide for releveling which shall be arranged to automatically return the elevator to the floor in the event the elevator should move below or above floor level in excess of 1/4".
3. This device shall be operative at all floors served and whether the hoistway or car door is open or closed provided there is no interruption of power to the elevator.
4. A positioning device shall be part of the controller microprocessor systems.
 - a. Position determination in the hoistway may be through fixed tape in the hoistway or by sensors fitted on each driving machine to encode and store car movement.
 - b. Design the mechanical features and electrical circuits to permit accurate control and rapid acceleration and retardation without discomfort.
5. Where there are consecutive floors/stops that are short stops, the system shall be capable of distinguishing between the two landing zones without error.
6. All equipment and logic required for leveling system to properly function with short stops shall be included.

E. Top-of-Car Inspection Operating Station (New)

1. An inspection operating station shall be provided on top of the elevator car.
2. This station shall be installed so that the controls are plainly visible and readily accessible from the hoistway entrance without stepping on the car.
3. When the station is operational, all operating devices in the car shall be inoperative.
4. Provide the following control devices and features:

- a. A push/pull or toggle switch designated "EMERGENCY STOP" shall be arranged so as to prevent the application of power to the hoist motor or machine brake when in the "off" position.
- b. A toggle switch designated "INSPECTION" and "NORMAL" to activate the top of car Inspection Service Operation.
- c. Push button designated "Up", "Down" and "Enable" to operate the elevator on Inspection Service (the "Enable" button shall be arranged to operate in conjunction with either the "Up" or "Down" button).
- d. An indicator light and warning buzzer that are subject to activation under Phase I - Fire Emergency Recall Operation.

F. Load Weighing Device (New)

1. Provide means to measure the load in the car within an accuracy of $\pm 4\%$ of the elevator capacity.
2. Provide one of the following types of devices:
 - a. A device consisting of four (4) strain gauge load cells located at each corner of the car platform and supporting a free floating car platform and cab with summing circuits to calculate the actual load under varying conditions of eccentric loading.
 - b. A strain gauge device located on the crosshead, arranged to measure the deflection of the crosshead and thus determine the load in the car.
 - c. A device consisting of four (4) strain gauge load cells, supporting the weight of the elevator machine with summing circuits to calculate the actual load under varying conditions of load.
 - d. A device to measure the tension in the elevator hoist ropes and thus determine the load in the car.
3. Arrange that the output signal from the load weighing device be connected as an input to the signal and motor control systems to pre-torque of the hoisting machine motors where applicable.
4. Provide audible and visual signals in connection with the load weighing device when used as an "overload" device.

G. Car Enclosure Work Light / Receptacle (New)

1. The top and bottom of each car shall be provided with a permanent lighting fixture and 110 volt GFI receptacle.
2. Light control switches shall be located for easy accessibility from the hoistway entrance.
3. Where sufficient overhead clearance exists, the car top lighting fixture shall be extended no less than 24" above the crosshead member of the car frame.
4. Light bulbs shall be guarded so as to prevent breakage or accidental contact.

H. Emergency Exits / Top (Reuse)

1. Ensure they operate as per code and have proper electrical contacts and mechanical locks on the exterior of the cab enclosure.

- I. Master Door Power Operator System – VVVF/AC (New)
 1. Provide a heavy-duty master door operator on top of the elevator car enclosure for power opening and closing of the cab and hoistway entrance door panels.
 2. Operator shall utilize an alternating current motor, controlled by a variable voltage, variable frequency (VVVF) drive and a closed-loop control with programmable operating parameters.
 - a. System may incorporate an encoder feedback to monitor positions with a separate speed sensing device or an encoderless closed-loop VVVF-AC control to monitor motor parameters and vary power applied to compensate for load changes.
 3. The type of system shall be designated as a high speed operator, designed for door panel opening at an average speed of two (2.0) feet per second and closing at approximately one (1.0) foot per second.
 - a. Reduce the closing speed as required to limit kinetic energy of closing doors to within values permitted by ASME A17.1 as may be adopted and/or modified by the AHJ.
 4. The door shall operate smoothly without a slam or abrupt motion in both the opening and closing cycle directions.
 - a. Provide controls to automatically compensate for load changes such as:
 - 1) Wind conditions (stack effect).
 - 2) Use of different weight door panels on multiple landings.
 - 3) Other unique prevailing conditions that could cause variations in operational speeds.
 - b. Provide nudging to limit speed and torque in conjunction with door close signaling/closing and timing devices as permitted by ASME A17.1 as may be adopted and/or modified by the AHJ. Nudging shall be initiated by the signal control system and not from the door protective device.
 5. In case of interruption or failure of electric power from any cause, the door operating mechanism shall be so designed that it shall permit emergency manual operation of both the car and corridor doors only when the elevator is located in the floor landing unlocking zone.
 - a. The hoistway door shall continue to be self-locking and self-closing during emergency operation.
 - b. The door operator and/or car door panel shall be equipped with safety switches and electrical controls to prevent operation of the elevator with the door in the open position as per ASME A17.1 Code Standards.
 - c. Provide zone-lock devices as required by ASME A17.1 as may be adopted and/or otherwise modified by the AHJ.
 6. Construct all door operating levers of heavy steel or reinforced extruded aluminum members.

7. All components shall be designed for stress and forces imposed on the related parts, linkages and fixed components during normal and emergency operation functions.
 - a. All pivot points, pulleys and motors shall have either ball or roller-type bearings, oilite bronze bushings or other non-metallic bushings of ample size.
 8. Provide operating data / data tag permanently attached to the operator as required by applicable code and standards.
- J. Car Door Hangers / Tracks / Gate Switch (New)
1. Provide sheave type two-point suspension hangers and track for each car door.
 - a. Sheaves shall be hardened steel, not less than 3-1/4 inches in diameter with sealed grease packed precision ball bearings.
 - b. The upthrust shall be taken by a roller mounted on the hanger and arranged to ride on the underside of the track.
 2. The track shall be of formed cold rolled steel or cold drawn steel and shall be rounded on the track surface to receive the hanger sheaves.
 - a. The track shall be removable and shall not be integral with the header.
 3. Provide a gate switch that mounts directly to the car door track.
 - a. The gate switch shall prevent movement of the elevator until such time as it signals the control equipment that the car door has physically closed.
- K. Car Door Panels (New)
1. Provide standard 1" thick, 14-gauge hollow metal flush construction panels with Rigidized "5WL" textured satin stainless steel finish, reinforced for power operation and insulated for sound deadening.
 2. Paint the hoistway side of each panel black and face the cab side with 16-gauge sheet steel matching the existing returns or in selected material and finish as otherwise directed by Owner's representative/Architect.
 3. The panels shall have no binder angles and welds shall be continuous, ground smooth and invisible.
 4. Drill and reinforce panels for installation of door operator hardware, door protective device, door gibs, etc.
 - a. Provide each door panel with two (2) removable laminated plastic composition guides, arranged to run in the sill grooves with minimum clearance.
 - b. The guide mounting shall permit their replacement without removing the door from the hangers.
 5. Provide the meeting edge of center opening doors with necessary continuous rubber astragal bumper strips.
 - a. These strips shall be relatively inconspicuous when the doors are closed.

L. Door Reopening Device / “3D” (New)

1. Provide a combination infrared curtain and 3D door protection system.
2. The door shall be prevented from closing and will reopen when closing if any one of the curtain light rays is interrupted or should an object enter the 3D detection zone.
3. The door shall start to close when the protection system is free of any obstruction.
4. The infrared curtain and 3D zone protective system shall provide:
 - a. Protective curtain field not less than 71” above the sill.
 - b. 3D protective zone field not less than 61” above the sill.
 - c. Accurately positioned infrared lights to conform to the requirements of the applicable handicapped code.
 - d. Modular design to permit on board test operation and replacement of all circuit boards without removing the complete unit.
 - e. Self-contained, selectable 3D zone timeout feature to allow for closing at nudging speed with audible signal.
 - f. Automatic turning-off of the 3D zone in the event of three (3) consecutive 3D triggers.
 - 1) Light curtain shall continue to operate after 3D system timeout.
 - g. Selectable control of the 3D zone operation on an “always-on” or “as doors close” basis.
 - h. Controls to shut down the elevator when the unit fails to operate properly.
 - i. Provide audible and visual notification of pending door close.

2.10 FINISH / MATERIALS / SIGNAGE

A. Material, Finishes and Painting

1. General
 - a. Cold-rolled Sheet Steel Sections: ASTM A366, commercial steel, Type B
 - b. Rolled Steel Floor Plate: ASTM A786
 - c. Steel Supports and Reinforcement: ASTM A36
 - d. Aluminum-alloy Rolled Tread Plate: ASTM B632
 - e. Aluminum Plate: ASTM B209
 - f. Stainless Steel: ASTM A167 Type 302, 304 or 316
 - g. Stainless Steel Bars and Shapes: ASTM A276
 - h. Stainless Steel Tubes: ASTM A269
 - i. Aluminum Extrusions: ASTM B221
 - j. Nickel Silver Extrusions: ASTM B155
 - k. Structural Tubing: ASTM A500
 - l. Bolts, Nuts and Washers: ASTM A325 and A490
 - m. Laminated / Safety Tempered Glass: ANSI Z97.1
2. Finishes
 - a. Stainless Steel

- 1) Satin Finish: No. 4 satin, long grain.
- b. Sheet Steel:
 - 1) Shop Prime: Factory-applied baked on coat of mineral filler and primer.
 - 2) Finish Paint: Two (2) coats of low sheen baked enamel, color as selected by the Owner's representative/Architect.
 - 3) Steel Equipment: Two (2) coats of manufacturer's standard rust-inhibiting paint to exposed ferrous metal surfaces in both the hoistway and pit that do not have galvanized, anodized, baked enamel, or special architectural finishes.
3. Painting
 - a. Apply two (2) coats of paint to the machine room floor.
 - b. Apply two (2) coats of rust inhibitive primer/paint to pit channels, buffer springs, platforms, overhead and hoistway beams, sheave supports, sheaves and fascia.
 - c. Identify all equipment including buffers, car apron, crosshead, safety plank, machine, controller, drive, governor, disconnect switch, etc., by 4" high numerals which shall contrast with the background to which it is applied. The identification shall be either decalcomania or stencil type.
 - d. Paint or provide decal-type floor designation not less than four (4) inches high on hoistway doors (hoistway side), fascias and/or walls as required by A17.1 as may be adopted and/or modified by the AHJ. The color of paint used shall contrast with the color of the surface to which it is applied.
- B. Hoistway Entrances:
 1. Entrance Frames:
 - a. Existing hoistway entrance frames shall be painted in color as selected by Owner's representative / Architect.
 2. Door Panels:
 - a. Existing hoistway entrance door panels shall be painted in color as selected by Owner's representative / Architect.
- C. Hoistway Entrances:
 1. Entrance Frames:
 - a. Existing hoistway entrance frames shall be painted in color as selected by Owner's representative / Architect.
 2. Door Panels:
 - a. Existing hoistway entrance door panels shall be painted in color as selected by Owner's representative / Architect.

D. Car Interior Finishes

1. Contractor shall provide samples of finishes as required for approval prior to fabrication.
2. Refer to specifications for other design requirements where provided.
3. Special attention shall be given to flooring materials and suitability for intended duty.

E. Designation and Data Plates, Labeling and Signage.

1. Provide an elevator identification plate on or adjacent to each entrance frame where required by the AHJ.
2. Provide floor designation cast plates at each elevator entrance, on both sides of the jamb at a height of sixty (60) inches to the baseline of floor indication.
 - a. Floor number designations and Braille shall be 2" high, 0.03" raised.
3. Identify the designated medical emergency services elevator with 3" high international symbol at each elevator entrance on both sides of the jamb.
4. Provide raised designations and Braille markings to the left of the car call and control buttons of the car operating panel(s).
 - a. Designations shall be a minimum of 5/8" high, 0.03" raised and stud mounted.
5. Provide elevators with data and marking plates, labels, signages and refuge space markings complying with A17.1 Elevator Safety Code as may be adopted and/or otherwise modified by the AHJ.

2.11 FIXTURES / SIGNAL EQUIPMENT

A. General - Design and Finish

1. The design and location of the hall and car operating and signaling fixtures shall comply with the ADAAG and local requirements of the AHJ.
2. The operating fixtures shall be selected from the manufacturer's premium line of fixtures.
3. Custom designed operating and signaling fixtures shall be as shown on the drawings or as approved by the Owner's representative/consultant.
4. The layout of the fixtures including all associated signage and engraving shall be as approved by the Owner's representative/consultant.
5. The pushbuttons shall be as follows:
 - a. Stainless steel vandal resistant type as selected by the Owner's representative/consultant from the manufacturer's premium line of push buttons.
 - b. The button shall have a round indicator on the button with LED call registered light.
6. The faceplates shall be as follows:
 - a. Service elevators
 - 1) All Floors - 1/8" thick stainless steel with No. 4 finish and tamperproof screws.

7. Mount service elevator fixtures with tamperproof screws. The screw/fastener and key switch cylinder finishes shall match faceplate finish.
8. Where key-operated switch and or key operated cylinder locks are furnished in conjunction with any component of the installation, four (4) keys for each individual switch or lock shall be furnished, stamped or permanently tagged to indicate function.
9. All caution signs, pictographs, code mandated instructions and directives shall be engraved and filled with epoxy in code required colors.

B. Main Car Operating Panel (New)

1. Provide a main car operating push button panel on the inside front return panel of the car
2. Car operating panel shall be flush mounted with swing type, one-piece faceplate with heavy-duty concealed hinges.
 - a. Mount all key switches that are required to operate and maintain the elevators exposed on the car station except those specified within a locked service cabinet.
3. The push buttons shall become individually illuminated as they are pressed and shall extinguish as the calls are answered.
4. The operating panel shall include:
 - a. A call button for each floor served, located not more than 48" above the cab floor.
 - b. An "on-off" floor lockout key switch located in the car station adjacent to the level 350 car call button (elevator No.6 only).
 - c. "Door open" / "Door close" / "Door Hold" buttons.
 - d. "Alarm" button, interfaced with emergency alarm. The alarm button shall illuminate when pressed.
 - e. "Emergency Stop" switch per local law located at 35" above the cab floor.
 - f. Self-dialing, hands-free emergency communication system actuation button with call acknowledging feature and ASME A17.1. design provisions.
5. Locked Firemen's Service cabinet, keyed in accordance with local Code, containing required devices and signals in accordance with ASME A17.1 Standards.
6. Provide a Firefighter's telephone jack per existing and/or local code requirements.
7. Provide a locked service cabinet flush mounted and containing the key switches required to operate and maintain the elevator, including, but not limited to:
 - a. Independent service switch.
 - b. Light switch.
 - c. Fan switch.
 - d. On/Off switch
 - e. Card reader on/off switch
 - f. G. F. I. duplex receptacle.
 - g. Emergency light test button and indicator.
 - h. Inspection Service Operation key switch.
 - i. Dimmer for cab interior lighting.
8. Equip the car operating panel with proximity card reader provisions.
 - a. Provide a 3" x 5" cut-out with smoked gray Plexiglas lens in the car operating panel.

- b. Security system shall be overridden by Phase II Firefighter's Emergency Operations in accordance with code.
 9. Car operating panel shall incorporate:
 - a. An integral (no separate faceplate) digital L.E.D. floor position indicator.
 - b. Emergency light fixture (without a separate faceplate) and black-filled engraved unit I.D. number or other nomenclature, as approved by Owner.
 - c. A "No Smoking" advisory as required by the AHJ.
 - d. The rated passenger load capacity in pounds.
 - e. State of Maryland "warning in event of fire" instructions.
 10. Post Inspection Certificate behind an opening in the car operating panel that is fitted with a flush-mounted clear Plexiglas without a frame.
- C. Auxiliary Car Operating Panel (New)
 1. Provide an auxiliary car operating panel that contains the following:
 - a. Car call registration buttons.
 - b. Door open and close buttons.
 - c. Door hold button.
 - d. Key switches.
 - e. Illuminated alarm button.
 2. Operating devices shall be of the same design, material and finish as the main operating panel.
 3. Design this station so as to duplicate the layout of the main operating panel.
 4. Provide a digital position indicator, emergency light unit, elevator ID and engraving to match the main car operating panel.
- D. Car Position Indicator (New)
 1. The position of the car in the hoistway shall be indicated by the illumination of the position indicator numeral corresponding to the floor at which the car has stopped or is passing.
 - a. Provide 2" high, 10-segment LED type position indicator with direction arrows, integral with the car operating panels.
 - b. Provide Lexan cover lens with hidden support frame behind fixture plate to protect the indicator readout.
 - c. Provide audible floor passing signal per ADA standards where not provided by the elevator signal control.
 - d. Flush mount fixture with cover to match selected car front or car operating panel finish as directed by the Owner.
- E. Voice Annunciator (New)
 1. Provide a voice annunciator in each elevator.
 2. The device features shall comply with the requirements of ADAAG and local accessibility requirements.
 3. Coordinate size, shape and design with Designer and other trades.

4. The system shall include, but not limited to:
 - a. Solid state digital speech annunciator.
 - b. A recording feature for customized messages.
 - c. Playback option.
 - d. Built-in voice amplifier.
 - e. Master volume control.
 - f. Audible indication for selected floor, floor status or position, direction of travel, floor stop, seismic operation, firefighter service and nudging.
 5. Locate all associated equipment in a single, clearly labeled enclosure located either in the machine room and/or on car top.
- F. Corridor Push Button Stations / Risers (New)
1. Push button signal fixtures shall be provided on each landing.
 2. Provide one (1) riser of buttons for each simplex elevator with 1/8" thick satin stainless-steel No. 4 faceplates and tamperproof screws. Faceplates shall be sized to cover existing and/or new fixture cut-outs and existing faceplate dimensions.
 3. Each signal fixture shall consist of:
 - a. Up and down illuminating push buttons measuring 3/4" at their smallest dimension as selected by the Owner.
 - b. A recessed mounting box, electrical conduit and wiring.
 4. Intermediate landings shall be provided with fixtures containing two (2) push buttons while terminal landings shall be provided with fixtures containing a single push button.
 5. Include firefighter key switch, emergency power jewel (elevator No.6 only), car to lobby key switch and elevator communications failure code requirements in the main lobby level station or other designated recall landing.
 6. Where existing fixtures are located greater than 48" above the floor:
 - a. The existing back boxes shall be removed.
 - b. New back boxes shall be installed to provide a new centerline to buttons of 42" above the floor.
 - c. Standardize the new centerline on each floor.
 7. All cutting, patching, grouting, plastering of masonry walls resulting from the removal or installation of corridor fixtures shall be performed by the Contractor so as to maintain the fire rating of the hoistway.
 - a. Finished painting or decorating of wall surfaces shall be by Others.
 8. Provide a digital floor position indicator with 1" high numerals at all typical landings served.
- G. Floor Position Indicator (New)
1. Provide a digital LED type floor position indicator at the main lobby only.
 2. Indicator shall include 2" high numerals with integral direction arrows that will indicate the direction in which the elevator is traveling.

3. Provide Lexan cover lens with hidden support frame behind fixture plate to protect the indicator readout.
4. Indicator shall be located adjacent to the hoistway entrance frames.

H. Hall Direction Lanterns (New)

1. Provide a visual and audible signal at each entrance to indicate the direction of travel and, where applicable, which car shall stop in response to the hall call.
 - a. Design the lantern with vandal resistant up and down indication at intermediate landings and a single indication at terminal landings.
 - b. Lanterns shall sound once for the up direction and twice for the down direction.
 - 1) Provide an electronic chime with adjustable sound volume.
 - c. Provide adjustable signal time (three [3] to ten [10] seconds, with one [1] second increments) to notify passengers which car shall answer the hall call and preset per ADAAG notification standards.
2. Locate the lantern adjacent to the corridor entrance.

I. Hoistway Access Switch (New)

1. Install a cylindrical type keyed switch at top terminal in order to permit the car to be moved at slow speed with the doors open to allow authorized persons to obtain access to the top of the car.
2. Where there is no separate pit access door, a similar switch shall be installed at the lowest landing in order to permit the car to be moved away from the landing with the doors open in order to gain access to the pit.
3. Locate the switch in the hall call push button station at the top and bottom terminal landings where required if allowed by the Authority Having Jurisdiction.
4. This switch is to be of the continuous pressure spring-return type and shall be operated by a cylinder type lock having not less than a five (5) pin or five (5) disc combination with the key removable only in the "OFF" position.
 - a. The lock shall not be operable by any key which operates locks or devices used for other purposes in the building and shall be available to and used only by inspectors, maintenance men and repairmen in accordance with A17.1 applicable Security Group.

2.12 CAR ENCLOSURES

A. Elevator Car Enclosures and the Five Percent (5%) Rule:

1. In accordance with A17.1, Section 8.7, as adopted and/or modified by the AHJ, entitled "Alterations", where a new or remodeled elevator car enclosure is included in the base scope of work, the Contractor shall, within thirty (30) days after execution of the contract, weigh the elevator, or one (1) elevator of each group of elevators included in the base scope of work, to determine the present deadweight of the platform/sling/cab assembly.

2. The Contractor shall, when necessary, weigh the interior materials of a single cab to better estimate the total existing weight of existing materials being removed as part of the alteration.
3. The Contractor shall make every effort to provide accurate weight measurements while taking into consideration all weights that may present themselves at the time the measurement is taken such as compensation, compensating sheave, hoist ropes and traveling cables that may affect the measurement of the assembly itself.
4. The Contractor shall evaluate the actual counterbalance percentage for each sample elevator to identify prevailing conditions.
5. Measurements of actual cab weight shall be compared to the original deadweight of the car as stamped on the crosshead data tag.
6. Where no data tag exists, the Contractor shall make every effort to determine the original weight of the platform/sling/cab through calculations based on the current weight of the counterweight assembly and the verified percent of full load counterbalance.
7. The amount of weight that may be added to the car, so as to remain within the limits of the "5% Rule", shall be calculated based on the following:
 - a. $(\text{Original Deadweight} + \text{Capacity}) \times (0.05) = \text{Maximum Additional Weight Allowed}$
8. The Contractor shall document and notify the Owner and Consultant of the results of the measurements taken and what weight, if any, can be added or needs to be removed from the cab in order to maintain compliance with the 5% Rule.
9. The Contractor shall work diligently with the Owner and/or Owner's Representative and/or Architect as well as the manufacturer of the car enclosure to minimize additional weights of the new or remodeled car enclosure so as to maintain compliance with the 5% Rule.
10. Contractor shall be responsible for proper adjustment of the counterbalance of the system, including the static balance of the platform/sling/car enclosure, upon completion of the car interior work.
11. Costs associated with this work shall be included in the base modernization price.
12. Provide a new data tag on the crosshead of the elevator indicating the new deadweight, the current percent counterbalance and the date of the alteration.

B. Service Elevator Cab Shells / General Design Requirements (New)

1. Car Shell
 - a. The car sides and rear wall shall be constructed of No. 14-gauge sheet steel.
 - b. Apply sound deadening material to the outside face of the shell.
 - 1) Sound deadening material shall be of the rubberized type and shall be of either brush or spray-on consistency.
 - 2) Material shall be applied to a minimum of 1/8" thickness.
 - c. The car top shall be of no less than No. 12-gauge sheet steel suitably braced to meet the requirements of the A17.1 Code.
 - d. Top of car emergency exit shall include hinging and locking arrangements with electrical safety switch to prevent operation with door open.
 - 1) Attach the top of car exit to the dome of the cab via sash-chain or other suitable means, where the exit cover is not hinged or otherwise permanently attached to the dome.

- e. The transom and fixed front/rear return panels shall be constructed of 14-gauge Rigidized "5WL" textured satin stainless steel and proper reinforcing to prevent oil canning.
 - 1) Fixed type return panel shall have required cutouts for car operating and signaling fixtures.
- f. Cab shell and base shall be provided with vent slots to allow the proper amount of air to infiltrate the cab based on the CFM of the exhaust fan and car interior size.

C. Service Elevator Cab Interiors / General Design Requirements (New)

- 1. Cab Doors: Standard 1" thick, 14-gauge hollow metal flush construction with Rigidized "5WL" textured satin stainless steel, reinforced for power operation and insulated for sound deadening. Paint hatch side of doors black and face cab side with 16-gauge sheet steel in selected material and finish.
 - a. The door panels shall have no binder angles. All welds shall be continuous, ground smooth and invisible.
 - b. Drill and reinforce doors for installation of door operator hardware, door protective device, door gibs, etc.
- 2. Car Sill: Provide car door entrance saddle using an extruded nickel silver sill. Set sill to accommodate flooring selected.
- 3. Wall panels: 3/4" thick fire retardant plywood or particleboard with front/side surfaces faced with Rigidized "5WL" textured satin stainless steel. The panels shall be constructed as the removable type.
- 4. Base and Reveals: Provide satin stainless steel finished base and reveals.
- 5. Lighting: Provide three (3) LED T8 light fixtures with a minimum of two (2) LED T8 lights for each fixture. Flush mount fixtures in the ceiling and provide 1/8" thick acrylic lenses with stainless steel frame.
- 6. Flooring: 1/4" thick aluminum checkered plate, mounted with flat head stainless steel screws not over 12" on centers, removable from within the car without dismantling cab shell/interiors.
- 7. Handrails: Double row of flat 1/4" x 4" satin stainless-steel handrails at 12" and 32" above floor on side and rear walls. Handrails shall have returned ends. Mount rails to cabs at 12" on centers and arrange them to be removable from within car. Suitably reinforce cab panel to provide for secure handrail mounting.
- 8. Elevator Cab Enclosure Fan: Provide an exhaust type two-speed fan unit with cover grill, mounting accessories and necessary cab enclosure modifications.
 - a. Fan unit shall include self-lubricating motor with housing rubber mounted for sound vibration isolation.
 - b. Provide a key switch in the elevator service cabinet for control of fan unit.
 - c. Provide necessary wiring and approved conduit to properly connect fan unit with power source and control key switch.

D. Elevators Interiors / Cab Fabrication and Installation

- 1. Maintain accurate relation of planes and angles with hairline fit of contacting panels and/or surfaces.

2. Any shadow gaps (reveals) between panels shall be consistent and uniform.
3. Unless otherwise specified or shown on the drawings, for work exposed to view use concealed fasteners.
4. Maximum exposed edge radius at corner bends shall be 1/16". There shall be no visible grain difference at the bends.
5. Form the work to the required shapes and sizes with smooth and even curves, lines and angles. Provide necessary brackets, spacers and blocking material for assembly of the cab.
6. Interior cab surfaces shall be flat and free of bow or oil canning. The maximum overall deviation between the low and high points of 24" x 24" panel section shall not exceed 1/32".
7. Make weights of connections and accessories adequate to safely sustain and withstand stresses to which they will be subjected.
8. All steel work except stainless steel materials shall be painted with an approved coat of primer and one (1) coat of baked enamel paint.
9. Cab Finish Warranty Enhancement
 - a. Contractor shall be responsible for engineering and installing interior cab finishes in a manner that will withstand all code mandated inspections and test procedures. Failure of finishes during testing shall be repaired by the contractor without expense to the owner. Any objections or qualifications to material selection or design shall be identified during the engineering of the cab interior drawings for review by the owner.

2.13 EMERGENCY LIGHTING / COMMUNICATIONS / SIGNALING

A. Battery Back Up Emergency Lighting Fixture and Alarm (New)

1. Provide a self-powered emergency light unit.
 - a. The light fixture shall contain a minimum of two (2) LED lamps. Flush mount the light fixture in the main car station. The fixture shall have a milk white lens.
2. Provide a car-mounted battery unit including solid-state charger and testing means enclosed in common metal container.
 - a. The battery shall be rechargeable nickel cadmium with a ten (10)-year minimum life expectancy. Mount the power pack on the top of the car.
 - b. Provide a 6" diameter alarm bell mounted directly to the battery/charger unit and connected to sound when any alarm push button or stop switch in the car enclosure is operated.
 - c. The bell shall be configured to operate from power supplied by the building emergency power generator. The bell shall produce a sound output of between 80-90 dBa (measured from a distance of 10') mounted on top of the elevator car.
 - 1) Activation of this bell shall be controlled by the stop switch and alarm button in the car operating station.
 - 2) The alarm button shall illuminate when pressed.
3. Where required by Code for the specific application, the unit shall provide mechanical ventilation for at least one (1) hour.

4. The operation shall be completely automatic upon failure of normal power supply.
5. Unit shall be connected to normal power supply for car lights and arranged to be energized at all times so it automatically recharges battery after use.

B. Common Alarm Bell (New)

1. Provide a common alarm bell located in the elevator pit.
 - a. The bell shall be configured to operate when the alarm or stop switch of any elevator is activated, during both normal and battery back-up power conditions.
 - b. Existing common alarm bells may be rehabilitated and reused providing they meet the intent of this section and applicable codes.

C. Emergency Voice Communication / Telephone (New)

1. A hands-free emergency voice communication system shall be furnished in each car mounted as an integral part of the car operating panel.
 - a. Necessary wires shall be included in the car traveling cable and shall consist of a minimum of one shielded pair of 20AWG conductors.
 - b. 120V power shall be provided to power the hands-free device.
2. The telephone shall be equipped with an auto-dialer and illuminating indicator which shall illuminate when a call has been placed and begin to flash when the call has been answered.
 - a. Engraving shall be provided next to the indicator which says "When lit help is on the way".
3. In addition to the standard "Alarm" button, a separate activation button shall be provided on the car operating panel to initiate the emergency telephone and place a call.
 - a. The telephone must not shut off if the activating button is pushed more than once.
 - b. The telephone shall transmit a pre-recorded location message only when requested by the operator and be provided with an adjustable call time which can be extended on demand by the operator.
 - c. Once two-way communication has been established, voice prompts shall be provided which instruct the operator on how to activate these functions as well as alerting the operator when a call is being attempted from another elevator in the building.
4. The system shall be compatible with ring down equipment and PBX switchboards.
5. The system shall be capable of serving as the audio output for an external voice annunciation system.
 - a. Conversation levels shall measure 60 dbA or higher and measure 10 dbA above ambient noise levels.
 - b. Each device shall be provided with a self-diagnostic capability in order to automatically alert building personnel should an operational problem be detected.

6. The phone shall be able to:
 - a. Receive incoming calls from any On-Site Rescue Station (when provided or required).
 - b. Receive incoming calls from other off-site locations via the public telephone system.
 - c. Acknowledge incoming calls and automatically establishing hands-free two way communications.
 - 1) If no On-Site Rescue Station is provided, each hands-free device shall have built in line consolidation which will allow up to six (6) elevators to be called individually from outside the building over a single telephone line and up to eighty (80) elevators if an On-Site Rescue Station is provided.
7. The emergency elevator communication system shall require a maximum of one (1) telephone line.
 - a. The system must provide line sharing capability to eliminate the need for a dedicated telephone line.
 - b. The line sharing function must ensure that the emergency telephones always receive dialing priority even if the line is in use and that the emergency telephones can be called into from an off-site location.
8. The system shall provide its own four-hour backup power supply in case of a loss of regular AC power.
9. The system must provide capability for building personnel to call into elevators and determine the charge state of any backup batteries provided for the emergency telephones.
10. Pushing the activation button in any of the elevator car stations will cause any on-site Rescue Station (where provided or required) or security telephone to ring.
 - a. If the on-site call is not picked up within thirty (30) seconds, the call will be automatically forwarded to a twenty-four (24)-hour off-site monitoring service.
 - b. The arrangements and costs of the off-site monitoring and telephone line shall be by others.
11. All connections from the junction box to the telephone system shall be done by the Elevator Contractor where existing provisions can be reused.
12. New telephone lines, where required, shall be provided and interfaced by others.

D. Central Exchange Communication System / Intercom (New)

1. Provide an ADA compatible, hands-free intercommunication system for all elevators for two-way, multi-path communication between the elevator car stations and master stations using a central exchange design system.
2. The communication system shall include:
 - a. A car station in each elevator.
 - b. A master station in each machine room to communicate with the central and satellite monitor panels, and with each car within its group.
3. The car station shall have a loudspeaker and a microphone to provide hands-free communication. The station shall be installed behind the car operating panel.

4. Master stations shall include:
 - a. Selector push buttons.
 - b. Annunciator lights for each connected station.
 - c. Speaker/microphone.
 - d. Volume control and function buttons.
5. A call shall be placed from the elevator car station by pressing the emergency call or alarm button.
 - a. This action shall cause the lamp in the corresponding button of all the designated master stations to flash and an intermittent tone to be heard.
 - b. When the incoming call is answered, the flashing light shall go to a steady condition.
 - c. Disconnection of a call is simply done by depressing the designated car button once.
 - d. If a call request is placed during a conversation, it shall be indicated by a flashing light and short tone of every designated master station.
 - e. When the original conversation is completed, the normal intermittent tone shall resume.
6. A master station shall be connected to any of its designated car stations by depressing the corresponding call button.
 - a. The lamp in the button shall be illuminated while the button is depressed.
 - b. In the car station an audible tone shall be emitted and immediate communication is established.
 - c. The call shall be ended by depressing the button a second time, disconnecting the circuit.
 - d. The master stations shall call any other master station by depressing the corresponding call button.
 - e. The button shall lock in its down position and the lamp shall be lit with a steady light.
 - f. At the called master station, a short tone shall be sent out and the lamp in the button corresponding to the "calling" party shall be lit.
 - g. After the tone, immediate communication is established.
7. On all non-called master stations, the lamps corresponding to the calling and called stations shall be illuminated as an indication that those stations are busy.
8. Provide all power supplies, wire, conduit, fittings, etc., for both systems.
9. Location of the stations, in the specified rooms or areas, shall be directed by the Owner.
10. The intercom system shall include the following features:
 - a. Test button and monitoring features to verify audio circuit path.
 - b. All call buttons to initiate a call to all cars in the systems.
 - c. Priority button in the remote monitoring panel stations.
 - d. Visual acknowledgment and engraving for the hearing impaired.
11. Provide a battery backup power supply for the intercom capable of providing sufficient power to operate the complete system for a minimum of four (4) hours.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Related Documents

1. Contract Documents

B. Inspection

1. Study the Contract Documents with regard to the work as specified and required so as to ensure its completeness.
2. Examine surface and conditions to which this work is to be attached or applied and notify the Owner in writing if conditions or surfaces are detrimental to the proper and expeditious installation of the work. Starting the work shall imply acceptance of the surfaces and conditions to perform the work as specified.
3. Verify, by measurements at the job site, dimensions affecting the work. Bring field dimensions which are at variance with those on the accepted shop drawings to the attention of the Owner. Obtain the decision regarding corrective measures before the start of fabrication of items affected.
4. Cooperate in the coordination and scheduling of the work of this section with the work of other sections so as not to delay job progress.

3.2 INSTALLATION / PROJECT PHASING

A. Installation

1. Modernize the elevators, using skilled personnel in strict accordance with the final accepted shop drawings and other submittals.
2. Comply with the code, manufacturer's instructions and recommendations.
3. Coordinate work with the work of other building functions for proper time and sequence to avoid delays and to ensure right-of-way of system. Use lines and levels to ensure dimensional coordination of the work.
4. Accurately and rigidly secure supporting elements within the shaftways to the encountered construction within the tolerance established.
5. Provide and install motor, switch, control, safety and maintenance and operating devices in strict accordance with the submitted wiring diagrams and applicable codes and regulations having jurisdiction.
6. Ensure sill-to-sill running clearances do not exceed 1 1/4" at all landings served.
7. Arrange door tracks and sheaves so that no metal-to-metal contact exists.
8. Reinforce hoistway fascias to allow not more than 1/2" of deflection.
9. Install elevator cab enclosure on platform plumb and align cab entrance with hoistway entrances.
10. Sound isolate cab enclosures from car structure. Allow no direct rigid connections between enclosure and car structure and between platform and car structure.
11. Isolate cab fan from canopy to minimize vibration and noise.
12. Remove oil, dirt and impurities and give a factory coat of rust inhibitive paint to all exposed surfaces of struts, hanger supports, covers, fascias, toe guards, dust covers and other ferrous metal.

13. Prehang traveling cables for at least twenty-four (24) hours with ends suitably weighted to eliminate twisting after installation.

B. Removal of Elevators

1. If extenuating circumstances (i.e., separating controller interconnections, inspection, testing, etc.), require that multiple cars of a single elevator group be removed from service simultaneously, the work shall be performed outside of the normal business hours at a time mutually agreed to by the Owner and Contractor.
2. A minimum of five (5) days advance written notice shall be given to the Owner and Elevator Consultant by the Contractor detailing the reasons for the simultaneous removal of the elevators from service along with the estimated out-of-service time.
3. The request shall be subject to review by the Elevator Consultant and approved by the Owner prior to the commencement of the work.
4. Costs for this work in addition to associated expenses shall be included as part of the base bid pricing.

C. Transfer of Hall Button Risers

1. Transfer of the hall button riser(s) to the new signal control systems shall be performed on a not-to-interfere basis and shall not interrupt building operations or inconvenience building occupants.
2. Costs for this work in addition to associated expenses shall be included as part of the base bid pricing.

3.3 FIELD QUALITY CONTROL

A. Inspection and Testing

1. Upon completion of each work phase or individual elevator specified herein, the Contractor shall, at its own expense, arrange and assist with inspection and testing as may be required by the A.H.J. in order to secure a Certificate of Operation.

B. Substantial Completion

1. The work shall be deemed "Substantially Complete" for an individual unit or group of units when, in the opinion of the Consultant, the unit is complete, such that there are no material and substantial variations from the Contract Documents, and the unit is fit for its intended purpose.
2. Governing authority testing shall be completed and approved in conjunction with inspection for operation of the unit; a certificate of operation or other required documentation issued; and remaining items mandated for final acceptance completion are limited to minor punch list work not incorporating any life safety deficiencies.
3. The issuance of a substantial completion notification shall not relieve the Contractor from its obligations hereunder to complete the work.
4. Final completion cannot be achieved until all deliverables, including but not limited to training, spare parts, manuals, and other documentation requirements, have been completed.

C. Contractor's Superintendent

1. The Contractor shall assign a competent project superintendent during the work progress and any necessary assistant, all satisfactory to the Owner. The superintendent shall represent the Contractor and all instructions given to him shall be as binding as if given to the Contractor.

3.4 PROTECTION / CLEANING

A. Protection and Cleaning

1. Adequately protect surfaces against accumulation of paint, mortar, mastic and disfiguration or discoloration and damage during shipment and installation.
2. Upon completion, remove protection from finished surfaces and thoroughly clean and polish surfaces with due regard to the type of material. Work shall be free from discoloration, scratches, dents and other surface defects.
3. The finished installation shall be free of defects.
4. Before final completion and acceptance, repair and/or replace defective work, to the satisfaction of the Owner, at no additional cost.
5. Remove tools, equipment and surplus materials from the site.

B. Barricades and Hoistway Screening

1. The Contractor shall provide barricades where necessary in order to maintain adequate protection of areas in which work specified by the Contract Documents is being performed, including open hoistway entrances. Fabrication and erection as all barricades shall be in compliance with applicable OSHA regulations.
2. As required, the Contractor shall provide temporary wire mesh screening in the hoistway and of any elevator undergoing work specified in the Contract Documents. This screening shall be installed in such a manner as to completely segregate the hoistway from that of adjacent elevators. Screening shall be constructed from .041" diameter wire in a pattern that rejects passage of a 1" diameter ball.

3.5 DEMONSTRATION

A. Performance and Operating Requirements

1. Service elevators shall be adjusted to meet the following performance requirements:
 - a. Speed: within $\pm 3\%$ in both directions of travel under any loading condition.
 - b. Leveling: within $\pm 1/4"$ as measured between the car entrance threshold and the landing sill on any given floor under any loading condition.
 - c. Service elevator(s) typical Floor-to-Floor Time: (Recorded from the doors start to close on one floor until they are 3/4 open at the next floor) under various loading conditions. Floor-to-Floor Performance Times based on 13' - 14' floor heights:

Elevators	Door Type	Opening (sec)	Close (sec)	Floor-to-Floor Performance (sec)
No.4, No.6	5'-0" W x 7'- 0" H 2SCO	2.1 – 2.5	3.6 – 4.0	12.8 – 13.8

- d. Door dwell time for hall calls: 5.0 sec without Advance lantern signals.
- e. Door dwell time for car calls: 3.0 seconds.
- f. Reduced non-interference dwell time: 1.0 seconds.

2. Maintain the following ride quality requirements for the passenger elevators:

- a. Noise levels inside the car shall not exceed the following:
 - 1) Car at rest with doors closed and fan off - 40 dba.
 - 2) Car at rest with doors closed, fan running - 55 dba.
 - 3) Car running at high speed, fan off - 50 dba.
 - 4) Door in operation - 60 dba.
- b. Vertical accelerations shall not exceed 14 milli-g and horizontal accelerations shall not exceed 20 milli-g.
 - 1) The accelerometer used for this testing shall be capable of measuring and recording acceleration to nearest 0.01 m/s² (1 milli-g) in the range of 0-2 m/s² over a frequency range from 0-80 Hz with ISO 8041 filter weights applied. Accelerometer should provide contact with the floor similar to foot pressure, 60 kPA (8.7psi).
- c. The amplitude of acceleration and deceleration shall not exceed 2.6 - 2.8 ft./sec² for geared traction elevators.
- d. The maximum jerk rate shall be 1.5 to 2.0 times the acceleration and deceleration.
- e. The maximum velocity which the elevator achieves in either direction of travel while operating under load conditions that vary between empty car and full rated load shall be within ± 3% of the rated speed.

B. Acceptance Testing

- 1. Comply with the requirements of the contract documents.
- 2. The Contractor shall provide at least five (5) days prior written notice to the Owner and Consultant regarding the exact date on which work specified in the Contract Documents will reach completion on any single unit of vertical transportation equipment.
- 3. In addition to conducting whatever testing procedures may be required by local inspecting authorities in order to gain approval of the completed work, and before seeking approval of said work by the Owner, the Contractor shall perform certain other tests in the presence of the Consultant.
- 4. The Contractor shall provide test instruments, test weights, and qualified field labor as required to safely operate the unit under load conditions that vary from empty to full rated load and, in so doing, to successfully demonstrate compliance with applicable performance standards set forth in the project specifications with regard to:
 - a. Operation of safety devices.

- b. Sustained high-speed velocity of the elevator in either direction of travel.
 - c. Brake-to-brake running time and floor-to-floor time between adjacent floors.
 - d. Floor leveling accuracy.
 - e. Door opening/closing and dwell times.
 - f. Ride quality inside the elevator car.
 - g. Communication system.
 - h. Load settings at which anti-nuisance, load dispatch, and load non-stop features are activated.
5. Upon completion of work specified in the Contract Documents on the last car in any group of elevators, and in conjunction with the aforementioned testing procedures, the Contractor shall carry out additional testing of group dispatch/supervisory control features in the presence of the Consultant.
6. The Contractor shall provide test instruments and qualified field labor as required to successfully demonstrate:
- a. The back-up operating mode for group dispatch failure.
 - b. Simulated and actual emergency power operation.
 - c. Firefighter, attendant and independent service operations.
 - d. Restricted access security features and card reader controls.
 - e. Zoning operations and floor parking assignments.
 - f. Up/down peak operation.
7. After hour tests of systems such as emergency generators, fire service, and security systems shall be conducted at no extra cost to the Owner.

END OF SPECIFICATION

SECTION 210500 - COMMON WORK RESULTS FOR FIRE PROTECTION

PART 1. GENERAL

1.1. SUMMARY

- A. All work under Division 21 is subject to the Division 01, *General Conditions* and Special Requirements for the entire contract.
- B. Provide all labor, materials, equipment, and services necessary for and incidental to the complete installation and operation of all mechanical work.
- C. Unless otherwise specified, all submissions shall be made to, and acceptances and approvals made by the Architect and the Engineer.
- D. Contract Drawings are generally diagrammatic and all offsets, fittings, transitions and accessories are not necessarily shown. Furnish and install all such items as may be required to fit the work to the conditions encountered. Arrange piping, equipment, and other work generally as shown on the contract drawings, providing proper clearance and access. Where departures are proposed because of field conditions or other causes, prepare and submit detailed shop drawings for approval in accordance with *Submittals* specified below. The right is reserved to make reasonable changes in location of equipment, and piping up to the time of rough-in or fabrication.
- E. Conform to the requirements of all rules, regulations and codes of local, state and federal authorities having jurisdiction.
- F. Coordinate the work under Division 21 with the work of all other construction trades.
- G. Be responsible for all construction means, methods, techniques, procedures, and phasing sequences used in the work. Furnish all tools, equipment and materials necessary to properly perform the work in first class, substantial, and workmanlike manner, in accordance with the full intent and meaning of the contract documents.

1.2. PERMITS AND FEES

- A. Obtain all permits and pay taxes, fees and other costs in connection with the work. File necessary plans, prepare documents, give proper notices and obtain necessary approvals. Deliver inspection and approval certificates to Owner prior to final acceptance of the work.
- B. Permits and fees shall comply with the Division 01, *General Requirements* of the specification.

1.3. EXAMINATION OF SITE

- A. Examine the site, determine all conditions and circumstances under which the work must be done, and make all necessary allowances for same. No additional cost to the Owner will be permitted for contractors' failure to do so.
- B. Examine and verify specific conditions described in individual specifications sections.
- C. Verify that utility services are available, of the correct characteristics, and in the correct locations.

1.4. CONTRACTOR QUALIFICATION

- A. Any Contractor or Subcontractor performing work under Division 21 shall be fully qualified and acceptable to the Engineer and Owner. Submit the following evidence when requested:
 - 1. A list of not less than five comparable projects which the Contractor completed.
 - 2. Letter of reference from not less than three registered professional engineers, general contractors or building owners.
 - 3. Local and/or State License, where required.
 - 4. Membership in trade or professional organizations where required.
- B. A Contractor is any individual, partnership, or corporation, performing work by contract or subcontract on this project.
- C. Acceptance of a Contractor or Subcontractor will not relieve the Contractor or subcontractor of any contractual requirements or his responsibility to supervise and coordinate the work, of various trades.

1.5. MATERIALS AND EQUIPMENT

- A. Materials and equipment installed as a permanent part of the project shall be new, unless otherwise indicated or specified, and of the specified type and quality. The Contractor shall be responsible for connecting all utilities as shown on the drawings, to equipment identified as existing.
- B. Where material or equipment is identified by proprietary name, model number and/or manufacturer, furnish named item, or its equal, subject to approval by Engineer. Substituted items shall be equal or better in quality and performance and must be suitable for available space, required arrangement, and application. Submit all data necessary to determine suitability of substituted items, for approval.
- C. Substituted items, including items other than first named shall be equal or better in quality and performance to that of specified items, and must be suitable for available space, required arrangement and application. Contractor, by providing other than the first named manufacturer, assumes responsibility for all necessary adjustments and modifications necessary for a satisfactory installation. Adjustments and modifications shall include but not be limited to electrical, structural, support, and architectural work.
- D. Substitution will not be permitted for specified items of material or equipment where noted.
- E. All items of equipment furnished shall have a service record of at least five (5) years.

1.6. FIRE SAFE MATERIALS

- A. Unless otherwise indicated, materials and equipment shall conform to UL, NFPA and ASTM standards for fire safety with smoke and fire hazard rating not exceeding flame spread of 25 and smoke developed of 50.

1.7. REFERENCED STANDARDS, CODES AND SPECIFICATIONS

- A. Specifications, Codes and Standards listed below are included as part of this specification, latest edition.
- B. ASTM - American Society for Testing and Materials
- C. FM - Factory Mutual
- D. IBC - International Building Code
- E. IEEE - Institute of Electrical and Electronics Engineers
- F. MSSP - Manufacturers Standards Society of the Valve and Fittings Industry
- G. NEC - National Electrical Code
- H. NEMA - National Electrical Manufacturers Association
- I. NFPA - National Fire Protection Association
- J. UL - Underwriters' Laboratories
- K. IFC - International Fire Code.

- L. All equipment materials, piping and installation shall comply with the codes and standards listed in the enforceable edition of the Applicable National Fire Protection Association Pamphlets.

1.8. SUBMITTALS, REVIEW AND ACCEPTANCE

- A. Refer to the latest edition of the City of Baltimore Department of Public Works Specification (Green Book).

1.9. SHOP DRAWINGS

- A. Prepare and submit shop drawings for all mechanical equipment, specially fabricated items, modifications to standard items, specially designed systems where detailed design is not shown on the contract drawings, or where the proposed installation differs from that shown on contract drawings.
- B. Submit data and shop drawings including but not limited to the list below, in addition to provisions of the paragraph above. Identify all shop drawings by the name of the item and system and the applicable specification paragraph number and drawing number.
- C. Every submittal including, but not limited to the list below, shall be forwarded with its own transmittal as a separate, distinct shop drawing. Grouping of items/systems that are not related shall be unacceptable.
- D. Items and Systems
 - Fire Protection System including Hydraulic Calculations, Equipment and Devices
 - Fire Stopping - Methods and Materials
 - Material and Equipment List
 - Operations and Maintenance Manuals
 - Pipe Materials Including Itemized Schedule
 - Preliminary Pipe Pressure Tests
 - Test Certificates
- E. Contractor, additionally, shall submit for review any other shop drawings as required by the Engineer. No item shall be delivered to the site, or installed, until the Contractor has received a submittal from the Engineer marked *Reviewed* or *Comments Noted*. After the proposed materials have been reviewed, no substitution will be permitted except where approved by the Engineer.

- F. For any shop drawing requiring more than two (2) reviews by the Engineer (including those caused by a change in subcontractor or supplier) the Owner will withhold contractor's funds by a change order to the contract to cover the cost of additional reviews. One review is counted for each action including rejection or return of any reason.

1.10. SUPERVISION AND COORDINATION

- A. Provide complete supervision, direction, scheduling, and coordination of all work under the Contract, including that of subcontractors.
- B. Coordinate rough-in of all work and installation of sleeves, anchors, and supports for piping, equipment, and other work performed under Division 21.
- C. Arrange for pipe spaces, chases, slots, and openings in building structure during progress of construction to allow for fire protection installations.
- D. Coordinate electrical work required under Division 21 with that under Division 26. Coordinate all work under Division 21 with work under all other Divisions.
- E. Supply services of an experienced (10 years minimum) and competent Project Manager to be in constant charge of work at site.
- F. Where a discrepancy exists within the specifications or drawings or between the specifications and drawings, the more stringent (or costly) requirement shall apply until clarification can be obtained from the Engineer. Failure to clarify such discrepancies with the Engineer will not relieve the Contractor of the responsibility of conforming to the requirements of the Contract.
- G. Failure of contractor to obtain a full and complete set of contract documents (either before or after bidding) will not relieve the contractor of the responsibility of complying with the intent of the contract documents.
- H. Coordinate installation of large equipment requiring positioning before closing in building.

1.11. CUTTING AND PATCHING

- A. Accomplish all cutting and patching necessary for the installation of work under Division 21. Damage resulting from this work to other work already in place, shall be repaired at Contractor's expense. Where cutting is required, perform work in neat and workmanlike manner. Restore disturbed work to match and blend with existing construction and finish, using materials compatible with the original. Use mechanics skilled in the particular trades required.
- B. Do not cut structural members without approval from the Architect or Structural Engineer.
- C. Provide dust barriers/partitions to control dust, debris, and odors to ensure the safety and health of building occupants and protection of surroundings.
- D. Provide temporary barricades, enclosure, partitions and other protection of openings and penetrations in building required to ensure the safety of building occupants and protection of surroundings.

1.12. CONCRETE AND MASONRY WORK

- A. Grout shall be non-shrink, high strength mortar, free of iron chlorides and suitable for use in contact with all metals, without caps or other protective finishes. Apply in accordance with manufacturer's instructions and standard grouting practices.

1.13. CONNECTIONS AND ALTERATIONS TO EXISTING WORK

- A. Unless otherwise noted on the drawings, where existing fire protection work is removed, pipes, valves, etc., shall be removed, including hangers, to a point below finished floors or behind finished walls and capped. Such point shall be far enough behind finished surfaces to allow for installation of normal thickness of required finish material.
- B. Where work specified in Division 21 connects to existing equipment and piping, etc., Contractor shall perform all necessary alterations, cuttings, fittings, etc., of existing work as may be necessary to make satisfactory connections between new and existing work, and to leave completed work in a finished and workmanlike condition.
- C. Where the work specified under Division 21, or under other Divisions, requires relocation of existing equipment, piping, etc., Contractor shall perform all work and make necessary changes to existing work as may be required to leave completed work in a finished and workmanlike condition.
- D. Where the relocation of existing equipment is required for access or the installation of new equipment, the contractor shall temporarily remove and/or relocate and re-install as required to leave the existing and new work in a finished and workman like condition.

1.14. DEMOLITION

- A. Unless otherwise noted all existing equipment, piping, etc., shall remain.
- B. Where existing equipment is indicated to be removed, all associated piping, conduit, power, controls, insulation, hangers, supports and housekeeping pads, etc. Patch, paint and repair walls/roof/floor to match existing and/or new finishes.
- C. Provide necessary piping, valves, temporary feeds, etc., as required. Drain and refill piping systems as often as necessary to accommodate phasing and to minimize time lengths of outages.
- D. The Contractor shall be responsible for visiting the site and determining the existing conditions in which the work is to be performed.
- E. Refer to General Notes for phasing plans of work.
- F. Where any abandoned pipes in existing floors, walls, pipe tunnels, ceilings, etc., conflict with new work, remove abandoned pipes as necessary to accommodate new work.
- G. The location of all existing equipment, piping, etc., indicated is approximate only and shall be checked and verified. Install all new fire protection work to connect to or clear existing work as applicable.
- H. Maintain egress at all times. Coordinate egress requirements with the State Fire Marshal, the Owner and the authorities having jurisdiction.
- I. Where required to maintain the existing systems in operation, temporarily backfeed existing systems from existing pipes. Contractor shall temporarily extend existing piping

systems to new piping systems with the appropriate shut-off valves and tamper switches.

- J. At completion of project all temporary piping, valves, controls, etc., shall be removed in their entirety.
- K. Existing piping, equipment, materials, etc., not required for re-use or re-installation in this project, shall be removed from the project site.
- L. Deliver to the Owner, on the premises where directed, existing equipment and materials which are removed and which are desired by the Owner or are indicated to remain the property of the Owner.
- M. All other materials and equipment which are removed shall become property of the Contractor and shall be promptly removed, from the premises, and disposed of by the Contractor, in an approved manner.
- N. Where piping is removed, remove all pipe hangers which were supporting the removed piping. Patch the remaining penetration voids with like materials and paint to match existing construction.
- O. Where required, provide and coordinate removal and re-installation of existing equipment. Take care to protect materials and equipment indicated for reuse. Contractor shall repair or replace items which are damaged. Contractor shall have Owner's representative present to confirm condition of equipment prior to demolition.
- P. Before demolition begins, and in the presence of the Owners representative, test and note all deficiencies in all existing systems affected by demolition but not completely removed by demolition. Provide a copy of the list of system deficiencies to the Owner and the Engineer. Videotape existing conditions in each space prior to beginning demolition work.
- Q. The Owner shall have the first right of refusal for all devices and equipment removed by the Contractor.
- R. All devices and equipment designated by the Owner to remain the property of the Owner shall be moved and stored by the Contractor at a location on site as designated by the Owner. It shall be the Contractor's responsibility to store all devices and equipment in a safe manner to prevent damage while stored.
- S. All existing equipment refused by the Owner shall become the property of the Contractor and shall be removed from the site by the Contractor in a timely manner and disposed of in a legal manner.
- T. Temporary Disconnection: Remove, store, clean, reinstall, reconnect, and make operational equipment indicated for relocation.

1.15. DEFINITIONS

- A. *Approve* - to permit use of material, equipment or methods conditional upon compliance with contract documents requirements.
- B. *Furnish and install* or *provide* means to supply, erect, install, and connect to complete for readiness for regular operation, the particular work referred to.
- C. *Contractor* means the mechanical contractor and any of his subcontractors, vendors, suppliers, or fabricators.

- D. *Piping* includes pipe, all fittings, valves, hangers, insulation, identification, and other accessories relative to such piping.
- E. *Concealed* means hidden from sight in chases, formed spaces, shafts, hung ceilings, embedded in construction or in crawl space.
- F. *Exposed* means not installed underground or *concealed* as defined above.
- G. *Invert Elevation* means the elevation of the inside bottom of pipe.
- H. *Finished Spaces*: Spaces other than mechanical and electrical equipment rooms, furred spaces, pipe and duct shafts, unheated spaces immediately below roof, spaces above ceiling, unexcavated spaces, crawl spaces, and tunnels.
- I. *Review* - limited observation or checking to ascertain general conformance with design concept of the work and with information given in contract documents. Such action does not constitute a waiver or alteration of the contract requirements.
- J. *Building Line*: Exterior wall of building.

PART 2. – NOT USED

PART 3. EXECUTION

3.1. EQUIPMENT INSTALLATION - COMMON REQUIREMENTS

- A. Install equipment to provide maximum possible headroom, if mounting heights are not indicated.
- B. Install equipment according to approved submittal data. Portions of the work are shown only in diagrammatic form. Refer conflicts to Engineer.
- C. Install equipment level and plumb, parallel and perpendicular to other building systems and components in exposed interior spaces, unless otherwise indicated.
- D. Install fire protection equipment to facilitate service, maintenance, and repair or replacement of components. Connect equipment for ease of disconnecting, with minimum interference to other installations. Extend grease fittings to accessible locations.
- E. Install equipment giving right of way to piping installed at required slope.
- F. Install flexible connectors on equipment side of shutoff valves, horizontally and parallel to equipment shafts if possible.

3.2. SUPPORTS, HANGERS AND FOUNDATIONS

- A. Provide supports, hangers, braces, attachments and foundations required for the work. Support and set the work in a thoroughly substantial and workmanlike manner without placing strains on materials, equipment, or building structure, submit shop drawings for approval. Coordinate all work with the requirements of the structural division.
- B. Supports, hangers, braces, and attachments shall be standard manufactured items or

fabricated structural steel shapes. All interior hangers shall be galvanized or steel with rust inhibiting paint. For un-insulated copper piping provide copper hanger to prevent contact of dissimilar metals. All exterior hangers shall be constructed of galvanized steel utilizing galvanized rods, nuts, washers, bolts, etc. At contractor's option stainless steel may be utilized for exterior hangers, rods, nuts, washers, bolts, etc.

3.3. PAINTING AND FINISHES

- A. Provide protective finishes on all materials and equipment. Use coated or corrosion-resistant materials, hardware and fittings throughout the work. Paint bare, untreated ferrous surfaces with rust-inhibiting paint. All exterior components including supports, hangers, nuts, bolts, washers, vibration isolators, etc. shall be stainless steel.

3.4. CLEANING OF SYSTEMS

- A. Thoroughly clean systems after satisfactory completion of pressure tests and before permanently connecting equipment, and other accessory items. Blow out and flush piping until interior surfaces are free of foreign matter.
- B. Flush piping to remove cutting oil, excess pipe joint compound, solder slag and other foreign materials. Do not use system pumps until after cleaning and flushing has been accomplished to the satisfaction of the Engineer. Employ chemical cleaners, including a non-foaming detergent, not harmful to system components. After cleaning operation, final flushing and refilling, the residual alkalinity shall not exceed 300 parts per million. Submit a certificate of completion to Engineer stating name of service company used.
- C. Pay for labor and materials required to locate and remove obstructions from systems that are clogged with construction refuse after acceptance. Replace and repair work disturbed during removal of obstructions.
- D. Leave systems clean, and in complete running order.

3.5. PROTECTION OF WORK

- A. Protect work, material and equipment from weather and construction operations before and after installation. Properly store and handle all materials and equipment.
- B. Cover temporary openings in piping and equipment to prevent the entrance of water, dirt, debris, or other foreign matter. Deliver pipes and tubes with factory applied end caps.
- C. Cover or otherwise protect all finishes.
- D. Replace damaged materials, devices, finishes and equipment.
- E. Protect stored pipes and tubes from moisture and dirt. Elevate above grade. Do not exceed structural capacity of floor, where stored inside.

3.6. OPERATION OF EQUIPMENT

- A. Clean all systems and equipment prior to initial operation for testing, or other purposes. Lubricate, adjust, and test all equipment in accordance with manufacturer's instructions. Do not operate equipment unless all proper safety devices or controls are operational. Provide all maintenance and service for equipment that is authorized for operation during construction.
- B. Where specified, or otherwise required, provide the services of the manufacturer's

factory-trained servicemen or technicians to start up the equipment. Where factory start-up of equipment is not specified, provide field start-up by qualified technician.

- C. Submit factory start-up sheets or field start-ups sheets for all equipment.

3.7. WALL AND FLOOR PENETRATION

- A. All penetrations of partitions, ceilings, roofs and floors by piping or conduit under Division 21 shall be sleeved, sealed, and caulked airtight for sound and air transfer control.
- B. All penetration of fire rated assemblies shall be sleeved, sealed, caulked and protected to maintain the rating of the wall, roof, or floor. Fire Marshal approved U.L. assemblies shall be utilized. See Division 07 Section, *Fire Protection, HVAC and Plumbing Protection Firestopping*.
- C. Where piping extends through exterior walls or below grade, provide waterproof pipe penetration seals, as specified in another division of these specifications.
- D. Provide pipe escutcheons for sleeved pipes in finished areas.
- E. Piping sleeves:
 - 1. Galvanized steel pipe, standard weight where pipes are exposed and roofs and concrete and masonry walls. On exterior walls provide anchor flange welded to perimeter.
 - 2. Twenty-two (22) gauge galvanized steel elsewhere.

3.8. RECORD DRAWINGS

- A. Upon completion of the mechanical installations, the Contractor shall deliver to the Engineer one complete set of prints of the fire protection drawings which shall be legibly marked in red pencil to show all changes and departures of the installation as compared with the original design. They shall be suitable for use in preparation of Record Drawings.
- B. Contractor shall incorporate all sketches, addendums, value engineering, change orders, etc., into record drawings prior to delivering to Architect.

3.9. WARRANTY

- A. Contractor's attention is directed to warranty obligations contained in the GENERAL CONDITIONS.
- B. The above shall not in any way void or abrogate equipment manufacturer's guarantee or warranty. Certificates of equipment manufacturer's warranties shall be included in the operations and maintenance manuals.
- C. The contractor guarantees for a two year period from the time of final acceptance by the Owner.
 - 1. That the work contains no faulty or imperfect material or equipment or any imperfect, careless, or unskilled workmanship.
 - 2. That all work, equipment, machines, devices, etc. shall be adequate for the use to which they are intended, and shall operate with ordinary care and attention in a satisfactory and efficient manner.

3. That the contractor will re-execute, correct, repair, or remove and replace with proper work, without cost to the Owner, any work found to be deficient. The contractor shall also make good all damages caused to their work or materials in the process of complying with this section.
4. That the entire work shall be water-tight and leak-proof.

3.10. INSTALLATION AND COORDINATION DRAWINGS

- A. Prepare, submit, and use composite installation and coordination drawings to assure proper coordination and installation of work. Drawings shall include, but not be limited, to the following:
 1. Complete Plumbing, Sprinkler and HVAC Piping Drawings showing coordination with lights, electrical equipment, HVAC equipment and structural amenities.
- B. Draw plans to a scale not less than 3/8-inch equals one foot. Include plans, sections, and elevations of proposed work, showing all equipment, and piping in areas involved. Fully dimension all work including lighting fixtures, conduits, pullboxes, panelboards, and other electrical work, walls, doors, ceilings, columns, beams, joists and other architectural and structural work.
- C. Identify all equipment and devices on wiring diagrams and schematics. Where field connections are shown to factory-wired terminals, include manufacturer's literature showing internal wiring.

3.11. PIPING SYSTEMS TESTING

- A. The entire new fire protection piping systems shall be tested hydrostatically before insulation covering is applied and proven tight under the following gauge pressures for a duration of four (4) hours. Testing to be witnessed by Owner's representative and documented in writing.

SYSTEM	TEST PRESSURE
Fire Protection (Refer to NFPA)	200 psi

- B. Testing and acceptance thereof shall be in accordance with local requirements and shall meet approval of authority having jurisdiction. Submit certificates and approved permits and insert one (1) copy in the *Operations and Maintenance Manuals*.

3.12. PHASING

- A. Refer to General Notes on the contract drawings for any required phasing.
- B. Maintain building egress and traffic ways at all times. Coordinate egress requirements with the State Fire Marshal, the Owner and Authorities having jurisdiction.
- C. Provide dust barriers/partitions, penetration closures, etc, to ensure safety of building occupants and protection of existing surroundings.
- D. The Building shall remain watertight at all times.
- E. Refer to phasing plans for additional requirements.

- F. Provide necessary piping, valves, etc. as required. Drain and refill piping systems as often as necessary to accommodate phasing and to minimize time length of outages. Temporarily feed new systems with existing system where required.
- G. Due to phased construction, some systems must be operated until later phases are completed.
- H. While work is in progress, except for designated short intervals during which connections are made, continuity of service shall be maintained to all existing systems. Interruptions shall be coordinated with the Owner as to time and duration. The contractor shall be responsible for any interruptions to service and shall repair any damages to existing systems caused by his operations.

3.13. OUTAGES

- A. Provide a minimum of fourteen (14) days' notice to schedule outages. The Contractor shall include in their bid outages and/or work in occupied areas to occur on weekends, holidays, or at night. Coordinate and get approval of all outages with the Owner.
- B. Submit *Outage Request form*, attached at end of this Section, to Owner for approval.

END OF SECTION 210500

OUTAGE REQUEST

DATE APPLIED: _____ BY: _____

DATE FOR OUTAGE: _____ FIRM: _____

START OUTAGE-TIME: _____ DATE: _____

END OUTAGE -- TIME: _____ DATE: _____

AREAS AND ROOMS: _____

FLOOR(S): _____

AREA(S): _____

ROOM(S): _____

WORK TO BE PERFORMED: _____

SYSTEM(S): _____

REQUEST APPROVED BY: _____
(FOREMAN OR OTHER PERSON IN CHARGE)

(FOR OWNER'S USE ONLY):

APPROVED: _____

YES ___ NO ___ BY: _____ DATE: _____

DATE/TIME-AS REQUESTED: _____ OTHER: _____

OWNER'S PRESENCE REQUIRED: _____

YES: ___ NO: ___ NAME: _____

POINT OF CONTACT: _____ PHONE: _____

SECTION 210505 - FIRE PROTECTION PIPING, FITTINGS AND VALVES

PART 1. GENERAL

1.1. SUMMARY

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

1.2. SYSTEM DESCRIPTION CONDITIONS

- A. Provide all labor and materials necessary to furnish and install all piping systems on this project as herein specified and/or shown on the drawings.
- B. All piping and insulation installed in ceiling plenums must be plenum rated and comply with NFPA and the authority having jurisdiction.
- C. Where more than one piping system material is specified, ensure system components are compatible and joined to ensure the integrity of the system is not jeopardized. Provide necessary joining fittings. Ensure flanges, union, and couplings for servicing are consistently provided.
- D. Use unions, flanges, and couplings downstream of valves and at equipment or apparatus connections. Do not use direct welded or threaded connections to valves, equipment or other apparatus.
- E. Use non-conducting dielectric connections whenever jointing dissimilar metals in open systems.
- F. Provide pipe hangers and supports in accordance with ASTM B31.9, MSS SP69 and NFPA-13 unless indicated otherwise.

1.3. DELIVERY, STORAGE AND HANDLING

- A. Deliver, store, protect and handle products to site under as hereinbefore specified.
- B. Accept valves on site in shipping containers with labeling in place. Inspect for damage.
- C. Provide temporary protective coating on cast iron and steel valves.
- D. Provide temporary end caps and closures on piping and fittings. Maintain in place until installation.
- E. Protect piping systems from entry of foreign materials by temporary covers, completing sections of the work, and isolating parts of completed systems.

PART 2. PRODUCTS

2.1. PIPE MATERIALS

- A. All materials, unless otherwise specified, shall be new and of the best quality of their respective kinds, and shall conform to the requirements and ordinances of local, state and insurance authorities having jurisdiction.

- 1. Fire Protection Piping (NFPA-13):

- a. Piping Above Grade (Inside): Steel, schedule 40, ASTM A53, black pipe. Piping 4 inches and smaller shall be ASTM A120, black steel pipe.
 - b. Wet Pipe Fittings: Malleable iron fittings shall be ASME B16.3, threaded fittings.
 - c. Finish: All exposed fire protection piping shall be primed and painted with epoxy red paint. White letters shall indicate pipe and indicate direction of flow.
 - d. Special Requirements: All fire protection piping, valves, fittings and joints shall comply with applicable National Fire Protection Pamphlets (NFPA) local codes, building codes, Fire Marshal, Owner's Insurance Underwriter, and the authority having jurisdiction.
- B. Steel pipe shall be similar and equal to National Allied Tube or Wheatland black or zinc-coated (galvanized) as hereinafter specified. Pipe shall be free from all defects which may affect the durability for the intended use. Each length of pipe shall be stamped with the manufacturer's name.

2.2. PIPE HANGERS

- A. All hangers for metallic piping shall be adjustable, wrought clevis type, or adjustable malleable split ring swivel type, having rods with machine threads. Hangers shall be Grinnell Company's Figure 260 for pipe ¾-inch and larger, and Figure 65 for pipe 2-inches and smaller, or approved equal. Hanger spacing and rod sizes for steel and copper pipe shall not be less than the following:

NOMINAL PIPE SIZE IN	STD. STEEL PIPE	MINIMUM ROD DIAMETER INCHES OF ASTM A36 STEEL THREADED RODS
3/4 & 1	6	3/8
1-½	6	3/8
2	8	3/8
2-½	10	½

- B. Hangers for pipe sizes ½ to 1-½ inch (13 to 38 mm): Carbon steel, adjustable swivel, split ring, comply with NFPA-13.
- C. Hangers for pipe sizes 2 to 4 inches (50 to 100 mm): Carbon steel, adjustable, clevis. Comply with NFPA-13.
- D. Multiple or Trapeze hangers: Steel channels with welded spacers and hanger rods.
- E. Wall support for pipe sizes to 3 inches (76 mm): cast iron hook, comply with NFPA-13.
- F. Hanger rods: Mild steel threaded both ends, threaded one end, or continuous threaded, comply with NFPA-13.

2.3. ESCUTCHEONS

- A. Provide chromium plated escutcheons properly fitted and secured with set screws on all exposed piping which passes through walls, floors or ceilings of finished spaces.
- B. All escutcheon plates shall be chrome plated spun brass of plain pattern, and shall be set tight on the pipe and to the building surface. Plastic escutcheon plates will not be accepted.

2.4. SLEEVES

- A. Sleeves shall be provided around all pipes through walls, floors, ceilings, partitions, roof structure members or other building parts. Sleeves shall be standard weight galvanized iron pipe two sizes larger than the pipe or insulation so that pipe or insulation shall pass through masonry or concrete walls or floors. Provide 20 gauge galvanized steel sheet or galvanized pipe sleeves for all piping passing through frame walls.
- B. Sleeves through floors shall be flush with the floor except for sleeves passing through Equipment Rooms which shall extend ¼-inch above the floor. Space between the pipe and sleeve shall be caulked. Escutcheon plates shall be constructed to conceal the ends of sleeves. Each trade shall be responsible for drilling existing floors and walls for necessary sleeve holes. Drilling methods and tools shall be as hereinbefore specified.
- C. Sleeves through walls and floors shall be sealed with with a waterproof caulking compound.
- D. Firestop at sleeves that penetrate smoke barriers smoke partitions and/or rated walls/floors.

PART 3. EXECUTION

3.1. GENERAL PIPING INSTALLATION REQUIREMENTS

- A. All pipes shall be cut accurately to measurements established at the building, and shall be worked into place without springing or forcing, properly clearing all windows, doors and other openings. Excessive cutting or other weakening of the building structure to facilitate piping installation will not be permitted. All pipes shall be so installed as to permit free expansion and contraction without causing damage. All open ends of pipe lines, equipment, etc., shall be properly capped or plugged during installation to keep dirt or other foreign material out of the system. All pipes shall be run parallel with the lines of the building and as close to walls, columns and ceilings as may be practical, with proper pitch. All piping shall be arranged so as not to interfere with removal of other equipment on devices not to block access to doors, windows, manholes, or other access openings. Flanges or unions, as applicable for the type of piping specified, shall be provided in the piping at connections to all items of equipment, and installed so that there will be no interference with the installation of the equipment. All valves and specialties shall be placed to permit easy operation and access and all valves shall be regulated, packed and glands adjusted at the completion of the work before final acceptance. All piping shall be installed so as to avoid air or liquid pockets throughout the work. Ends of pipe shall be reamed so as to remove all burrs.
- B. All piping shall be run to provide a minimum clearance of 2-inches between finished covering on such piping and all adjacent work. Group piping wherever practical at common elevations.
- C. All valves and other fittings shall be readily accessible.

- D. Spring clamp plates (escutcheons) shall be provided where pipes are exposed in the building and run through walls, floors, or ceilings. Plates shall be chrome plated spun brass of plain pattern, and shall be set tight on the pipe and to the building surface.
- E. Where pipe support members are welded to structural building framing, scrape, brush clean, weld and apply one coat of zinc rich primer.
- F. Protect piping systems from entry of foreign materials by temporary covers, completing sections of the work, and isolating parts of completed system.

3.2. PIPE JOINTS INSTALLATION REQUIREMENTS

- A. Screwed Joints: All screwed joints shall be made with tapered threads properly cut. Screwed joints shall be made perfectly tight with a stiff mixture of graphite and oil, applied with a brush to the male threads on the fittings.

3.3. HANGERS AND SUPPORTS INSTALLATION REQUIREMENTS

- A. General: All hangers shall be of an approved type arranged to maintain the required grading and pitching of lines to prevent vibration and to provide for expansion and contraction. Saddles shall be Grinnells Figure 173/273 or approved equal. Provide approved spacers between saddles and pipe where flexible insulation is specified. Provide insulation protection shields for insulated piping without saddles. Shield shall be Grinnell Figure 167 or as approved equal. Comply with NFPA-13.
- B. Spacing: Regardless of spacing, hangers shall be provided at or near all changes in direction, both vertical and horizontal, for all piping.
- C. Racks and Brackets: All horizontal piping on vertical walls shall be properly supported by suitable racks securely anchored into the wall construction. Where not practical to obtain ceiling anchorage, all piping near walls shall be supported by approved brackets securely anchored into the wall construction. Washer plates (Fib. 60, 60L) and other miscellaneous attachments, fasteners, etc., shall be Grinnell or as approved equal. All exterior hanger and bracket systems in their entirety shall be galvanized.
- D. Pipe Hangers and supports shall be attached to the panel point at the top chord of bar joist or at a location approved by the structural engineer.
- E. Select hangers and components for loads imposed. Secure rods with double nuts.
- F. Support of horizontal piping shall allow for vertical adjustment after installation of piping.
- G. Support overhead piping with clevis hangers.
- H. Do not support all parallel piping from the same joist. Stagger all supports in accordance with the structural engineer's recommendations.
- I. Fabricate and install steel anchors by welding steel shapes, plates, and bars to piping and to structure. Comply with ASME B31.9 and AWS D1.1.
- J. Construct concrete anchors of poured-in-place concrete of dimensions indicated and include embedded fasteners.

- K. Refer to structural documents for appropriate connection/attachment materials to building.

3.4. PIPING IDENTIFICATION INSTALLATION

- A. All piping shall be identified with painted background marked with the name of the service with arrows to indicate flow direction. Color code and system identification shall comply with ANSI Standards and piping identification system shall comply with ASME A13.1-81., scheme for the identification of piping systems and ASHRAE Fundamentals Handbook, latest edition.
- B. Markings shall be plain block letters, stenciled on pipes, and shall be located near each branch connection, near each valve, and at least every 10 feet on straight runs of pipe. Where pipes are adjacent to each other, markings shall be neatly lined up. All markings shall be located in such manner as to be easily legible from the floor. Pipe identification schedule shall be as follows:

OUTSIDE DIAMETER OF PIPE OR COVERING (INCHES)	LENGTH OF COLOR FIELD (INCHES)	SIZE OF LETTERS (INCHES)
1/2 to 1-1/4	8	1/2
1-1/2 to 2	8	3/4
2-1/2 to 6	12	1-1/4

END OF SECTION 210505

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SECTION 230500 - COMMON WORK RESULTS FOR HVAC

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. Piping materials and installation instructions common to most piping systems.
 - 2. Transition fittings.
 - 3. Dielectric fittings.
 - 4. Sleeves.
 - 5. Escutcheons.
 - 6. Grout.
 - 7. Equipment installation requirements common to equipment sections.
 - 8. Painting and finishing.
 - 9. Supports and anchorages.
- B. Provide all labor, materials, equipment, and services necessary for and incidental to the complete installation and operation of all mechanical work.
- C. Unless otherwise specified, all submissions shall be made to, and acceptances and approvals made by the Architect and the Engineer.
- D. Contract Drawings are generally diagrammatic and all offsets, fittings, transitions and accessories are not necessarily shown. Furnish and install all such items as may be required to fit the work to the conditions encountered. Arrange piping, ductwork, equipment, and other work generally as shown on the contract drawings, providing proper clearance and access. Where departures are proposed because of field conditions or other causes, prepare and submit detailed shop drawings for approval in accordance with "Submittals" specified below. The right is reserved to make reasonable changes in location of equipment, piping, and ductwork, up to the time of rough-in or fabrication.
- E. Conform to the requirements of all rules, regulations and codes of local, state and federal authorities having jurisdiction.
- F. Be responsible for all construction means, methods, techniques, procedures, and phasing sequences used in the work. Furnish all tools, equipment and materials necessary to properly perform the work in first class, substantial, and workmanlike manner, in accordance with the full intent and meaning of the contract documents.

- G. Indicate as separate line items in the Schedule of Values the following:
 - 1. O & M Manuals.
 - 2. Record Drawings/As-Builts.
- H. Coordinate the work under Division 23 with work of all other construction trades.

1.3 DEFINITIONS

- A. Finished Spaces: Spaces other than mechanical and electrical equipment rooms, furred spaces, pipe and duct chases, unheated spaces immediately below roof, spaces above ceilings, unexcavated spaces, crawlspaces, and tunnels.
- B. Exposed, Interior Installations: Exposed to view indoors. Examples include finished occupied spaces and mechanical equipment rooms.
- C. Exposed, Exterior Installations: Exposed to view outdoors or subject to outdoor ambient temperatures and weather conditions. Examples include rooftop locations.
- D. Concealed, Interior Installations: Concealed from view and protected from physical contact by building occupants. Examples include above ceilings and chases.
- E. Concealed, Exterior Installations: Concealed from view and protected from weather conditions and physical contact by building occupants but subject to outdoor ambient temperatures. Examples include installations within unheated shelters.

1.4 SUBMITTALS

- A. Product Data: For the following:
 - 1. Transition fittings.
 - 2. Dielectric fittings.
 - 3. Mechanical sleeve seals.
 - 4. Escutcheons.
- B. Welding certificates.

1.5 QUALITY ASSURANCE

- A. Steel Support Welding: Qualify processes and operators according to AWS D1.1, "Structural Welding Code--Steel."
- B. Steel Pipe Welding: Qualify processes and operators according to ASME Boiler and Pressure Vessel Code: Section IX, "Welding and Brazing Qualifications."
 - 1. Comply with provisions in ASME B31 Series, "Code for Pressure Piping."
 - 2. Certify that each welder has passed AWS qualification tests for welding processes involved and that certification is current.

- C. Electrical Characteristics for HVAC Equipment: Equipment of higher electrical characteristics may be furnished provided such proposed equipment is approved in writing and connecting electrical services, circuit breakers, and conduit sizes are appropriately modified. If minimum energy ratings or efficiencies are specified, equipment shall comply with requirements.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Deliver pipes and tubes with factory-applied end caps. Maintain end caps through shipping, storage, and handling to prevent pipe end damage and to prevent entrance of dirt, debris, and moisture.
- B. Store plastic pipes protected from direct sunlight. Support to prevent sagging and bending.

1.7 COORDINATION

- A. Arrange for pipe spaces, chases, slots, and openings in building structure during progress of construction, to allow for HVAC installations.
- B. Coordinate installation of required supporting devices and set sleeves in poured-in-place concrete and other structural components as they are constructed.
- C. Coordinate requirements for access panels and doors for HVAC items requiring access that are concealed behind finished surfaces. Access panels and doors are specified in Division 23.
- D. Refer to installation and coordination drawings for additional information.

1.8 PERMITS AND FEES

- A. Obtain all permits and pay taxes, fees and other costs in connection with the work. File necessary plans, prepare documents, give proper notices and obtain necessary approvals. Deliver inspection and approval certificates to the City prior to final acceptance of the work.
- B. Permits and fees shall comply with the General Requirements of the specifications.

1.9 EXAMINATION OF SITE

- A. Examine the site, determine all conditions and circumstances under which the work must be performed, and make all necessary allowances for same. No additional cost to the City will be permitted for Contractor's failure to do so.

1.10 CONTRACTOR QUALIFICATION

- A. Any Contractor or subcontractor performing work under Division 23 shall be fully qualified and acceptable to the Architect. Submit the following evidence if requested.
 - 1. A list of not less than five comparable projects that the Contractor completed.
 - 2. Letter of reference form not less than three registered professional engineers, general contractors or building owners.
 - 3. Local and/or State License, where required.

- 4. Membership in trade or professional organizations where required.
- B. A Contactor is any individual, partnership, or corporation, performing work by Contract or subcontract on this project.
- C. Acceptance of a Contractor or Subcontractor will not relieve the Contractor or subcontractor of any contractual requirements or his responsibility to supervise and coordinate the work, of various trades.

1.11 MATERIALS AND EQUIPMENT

- A. Materials and equipment installed as a permanent part of the project shall be new, unless otherwise indicated or specified, and of the specified type and quality.
- B. Where material or equipment is identified by proprietary name, model number and/or manufacturer, furnish named item, or its equal of manufacturer indicated in this specification.
- C. The suitability of named item only has been verified. Where more than one Manufacturer is named, only the first named Manufacturer has been verified as suitable. Manufacturers and items other than first named shall be equal or better in quality and performance to that of specified items, and must be suitable for available space, required arrangement and application.
- D. Substitution will not be permitted for specified items of material or equipment.
- E. The Contractor shall only submit those manufacturers indicated in the specification. Proposed alternate manufacturers will not be considered unless the specific item indicates "or as approved equal". Submit in a paragraph-by-paragraph format, all data necessary to determine suitability of alternative manufacturers' items for approval. Failure to do so will result in a "Revise and Resubmit" response.
- F. Refer to the General Conditions of this specification for additional information, including substitution request. Substitutions are for materials or manufacturers not listed in this specification. For each substitution proposed by the Contractor, the Contractor clearly identifies all differences (i.e., paragraph-by-paragraph, performance differences, etc.) from the specified item, changes in Contract cost, benefits to the City and a brief description why the substitution is being proposed.

1.12 FIRE SAFE MATERIALS

- A. Unless otherwise indicated, materials and equipment shall conform to UL, NFPA or ASTM Standards for fire safety with smoke and fire hazard rating not exceeding flame spread of 25 and smoke developed of 50.

1.13 REFERENCED STANDARDS, CODES AND SPECIFICATIONS

- A. Specifications, Codes and Standards listed below are included as part of this specification, latest edition.
 - AABC - Associated Air Balance Council
 - ACCA - Air Conditioning Contractors of America
 - AMCA - Air Movement and Control Association
 - ANSI - American National Standards Institute
 - ARI - Air Conditioning and Refrigeration Institute

ASHRAE- American Society of Heating, Refrigerating and AirConditioning Engineers
ASME - American Society of Mechanical Engineers
ASTM - American Society for Testing and Materials
CABO - Council of American Building Officials
CS - Commercial Standard
CSA - Canadian Standards Association
IBC - International Building Code, 2012
IEEE - Institute of Electrical and Electronics Engineers
IMC - International Mechanical Code, 2012
NEC - National Electrical Code
NEMA - National Electrical Manufacturers Association
NFPA - National Fire Protection Association
SMACNA- Sheet Metal and Air Conditioning Contractors National Association
UL - Underwriters' Laboratories

- B. All mechanical equipment and materials shall comply with the codes and standards listed in the latest ASHRAE Handbook

1.14 SUBMITTALS REVIEW AND ACCEPTANCE

- A. Refer to the latest edition of the City of Baltimore Department of Public Works Specification (Green Book).

1.15 SHOP DRAWINGS

- A. Prepare and submit shop drawings within thirty (30) calendar days after award of contract for all specially fabricated items, modifications to standard items, specially designed systems where detailed design is not shown on the contract drawings, or where the proposed installation differs from that shown on contract drawings.
- B. Submit data and shop drawings as listed below, in addition to provisions of paragraph 1 above. Identify all shop drawings by the name of the item and system and the applicable specification paragraph number.

Items and Systems

Automatic Temperature Controls
Ductless Split System Air Conditioning, cooling only.
Fire Stopping - Methods and Materials.
Identification System.
Piping and valves.
Sprinkler System.
Sump Pump
Vibration Isolation.

- C. Contractor, additionally, shall submit for approval any other shop drawings as required by the Engineer. No item listed above shall be delivered to the site, or installed, until approved. After the proposed materials have been approved, no substitution will be permitted except where approved by the Engineer/City.

1.16 SUPERVISION AND COORDINATION

- A. Provide complete supervision, direction, scheduling, and coordination of work under the Contract, including that of subcontractors.

- B. Coordinate rough-in of work and installation of sleeves, anchors, and supports for piping and other work performed under Division 23.
- C. Coordinate electrical work required under Division 23 with that under Division 26. Coordinate work under Division 23 with work under other Divisions.
- D. Coordinate the work under Division 23 with the work of all other construction trades.
- E. Arrange for pipe spaces, chases, slots, and openings in building structure during progress of construction, to allow for HVAC installations.

1.17 CUTTING AND PATCHING

- A. Accomplish cutting and patching necessary for the installation of work under Division 15. Damage resulting from this work to other work already in place, shall be repaired at Contractor's expense. Where cutting is required, perform work in neat and workmanlike manner. Restore disturbed work to match and blend with existing, using materials compatible with the original. Use mechanics skilled in the particular trades required.
- B. Do not cut structural members without approval.

1.18 PENETRATION OF WATERPROOF CONSTRUCTION

- A. Coordinate the work to minimize penetration of waterproof construction, including roofs, exterior walls, and interior waterproof construction. Where such penetrations are necessary, furnish and install all necessary curbs, sleeves, flashings, fittings and caulking to make penetrations absolutely watertight.

1.19 VIBRATION ISOLATION

- A. Furnish and install vibration isolators, flexible connections, supports, anchors, and/or foundations required to prevent transmission of vibration from equipment, piping, or ductwork to building structure. See Section 230548, VIBRATION CONTROL FOR HVAC PIPING AND EQUIPMENT.

1.20 ACCESSIBILITY

- A. All equipment shall be installed in such a way that all components requiring access (such as panels, disconnect switches, circuit breakers, starters, and accessories) are so located and installed that they may be serviced, reset, replaced, recalibrated, etc., by service technicians in accordance with the Manufacturer's recommendations. If any equipment or components are located in such a position that this Contractor cannot comply with the above, the Contractor shall notify the engineer in writing before equipment is installed.

PART 2 PRODUCTS

2.1 MANUFACTURERS

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

- B. Manufacturers: Subject to compliance with requirements, provide products by the manufacturers specified.

2.2 SLEEVES

- A. Galvanized Steel Pipe: ASTM A53, Type E, Grade B, Schedule 40, galvanized, plain ends.
- B. Stack Sleeve Fittings: Manufactured, cast-iron sleeve with integral clamping flange. Include clamping ring and bolts and nuts for membrane flashing.
 - 1. Underdeck Clamp: Clamping ring with set screws.
- C. Galvanized-Steel Sheet: 0.0239-inch minimum thickness; round tube closed with welded longitudinal joint.

2.3 ESCUTCHEONS

- A. Description: Manufactured wall and ceiling escutcheons and floor plates, with an ID to closely fit around pipe, tube, and insulation of insulated piping and an OD that completely covers opening.
- B. One-Piece, Cast-Brass Type: With set screw.
 - 1. Finish: Polished chrome-plated.
- C. One-Piece, Floor-Plate Type: Cast-iron floor plate.

2.4 GROUT

- A. Description: ASTM C 1107, Grade B, nonshrink and nonmetallic, dry hydraulic-cement grout.
 - 1. Characteristics: Post-hardening, volume-adjusting, nonstaining, noncorrosive, nongaseous, and recommended for interior and exterior applications.
 - 2. Design Mix: 5000-psi, 28-day compressive strength.
 - 3. Packaging: Premixed and factory packaged.

PART 3 EXECUTION

3.1 EQUIPMENT INSTALLATION - COMMON REQUIREMENTS

- A. Install equipment to allow maximum possible headroom unless specific mounting heights are not indicated.
- B. Install equipment level and plumb, parallel and perpendicular to other building systems and components in exposed interior spaces, unless otherwise indicated.
- C. Install mechanical equipment to facilitate service, maintenance, and repair or replacement of components. Connect equipment for ease of disconnecting, with minimum interference to other installations.

- D. Install equipment to allow right of way for piping installed at required slope.

3.2 PAINTING

- A. Damage and Touchup: Repair marred and damaged factory-painted finishes with materials and procedures to match original factory finish.
- B. Provide protective finishes on all materials and equipment. Use coated or corrosion-resistant materials, hardware and fittings throughout the work. Paint bare, untreated ferrous surfaces with rust-inhibiting paint. All exterior components including supports, hangers, vibration isolators, etc., shall be galvanized. All fasteners, nuts, bolts, washers, rods, etc., shall be stainless steel.
- C. Clean surfaces prior to application of insulation, adhesives, coatings, paint, or other finishes.
- D. Provide factory-applied finishes where specified. Unless otherwise indicated factory-applied paints shall be baked enamel with proper pretreatment.
- E. Protect all finishes and restore any finishes damaged as a result of work under Division 23 to their original condition.
- F. The preceding requirements apply to all work, whether exposed or concealed.
- G. Remove all construction marking and writing from exposed equipment, piping and building surfaces. Do not paint manufacturer's labels or tags.
- H. All exposed piping, equipment, etc. shall be painted. All finishes shall have a paint grip finish, including galvanized ductwork. Colors shall be selected by the Engineer and conform to ANSI Standards.
- I. Submit color of factory-finished equipment for approval prior to ordering. Color of finishes shall be as selected by Engineer. All exposed cabinets for equipment (e.g., fin tube radiation, cabinet unit heaters, terminal heating devices, etc.) shall be provided with custom colors as selected by the Engineer.

3.3 ERECTION OF METAL SUPPORTS AND ANCHORAGES

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

3.4 SUPPORTS, HANGERS, AND FOUNDATIONS

- A. Provide supports, hangers, braces, attachments and foundations required for the work. Support and set the work in a thoroughly substantial and workmanlike manner without placing strains on materials, equipment, or building structure, submit shop drawings for approval. Coordinate all work with the requirements of the structural division.
- B. Supports hangers, braces, and attachments shall be standard manufactured items or fabricated structural steel shapes. All interior hangers shall be galvanized or steel with rust inhibiting paint. For uninsulated copper piping/tubing provide copper hanger with wool or felt insert to prevent contact of dissimilar metals. All exterior hangers shall be

constructed of galvanized steel or stainless steel utilizing stainless steel rods, nuts, washers, bolts, etc.

3.5 PROTECTION OF WORK

- A. Protect work, material and equipment from weather and construction operations before and after installation. Properly store and handle all materials and equipment.
- B. Cover temporary openings in piping, ductwork, and equipment to prevent the entrance of water, dirt, debris, or other foreign matter.
- C. Cover or otherwise protect all finishes.
- D. Replace damaged materials, devices, finishes and equipment.

3.6 OPERATION OF EQUIPMENT

- A. Clean all systems and equipment prior to initial operation for testing, balancing, or other purposes. Lubricate, adjust, and test all equipment in accordance with manufacturer's instructions. Do not operate equipment unless all proper safety devices or controls are operational. Provide all maintenance and service for equipment that is authorized for operation during construction.
- B. Provide the services of the manufacturer's factory-trained servicemen or technicians to start up the equipment.
- C. Do not use mechanical systems for temporary services during construction unless authorized in writing by the City. Where such authorization is granted, temporary use of equipment shall in no way limit or otherwise affect warranties or guaranty period of the work. At no time shall any HVAC system/equipment be allowed to run when sanding, grinding, finishing, etc., type activities that create dust.
- D. Upon completion of work, clean and restore all equipment to new conditions; replace expendable items such as filters.
- E. If the mechanical systems are used at any time without written authorization from the City, other than for initial factory start-up and/or testing, balancing, and commissioning, all equipment and duct systems shall be thoroughly cleaned by this Contractor to restore the system and equipment to like-new condition. If the City authorizes equipment start-up for temporary conditioning purpose, the Contractor shall replace filters weekly, insure all safeties/controls are functional, operate the equipment within the specified control sequence set points and manufacturer's recommendations; and protect all equipment from dust, dirt, debris, etc. The City shall be responsible for all internal cleaning (coils, ducts, fans, etc.) as necessary under this condition. The Contractor is still responsible for all external cleaning to restore systems and equipment to like-new conditions.

3.7 IDENTIFICATIONS, FLOW DIAGRAMS, ELECTRICAL DIAGRAMS AND OPERATING INSTRUCTIONS

- A. All items of equipment, including motor starters, terminal control units, etc., shall be furnished with white letters and numbers on black plastic identification plates or aluminum letters and numbers on black engraved aluminum identification plates. Lettering shall be a minimum of 1/4" high. Identification plates shall be securely affixed to each piece of equipment, starters, panels, etc. by screws. Pressure sensitive tape backing is prohibited.

- B. Provide three (3) copies of operating and maintenance instructions for all principal items of equipment furnished. This material shall be bound as a volume of the "Record and Information Booklet" as hereinafter specified. Project shall not be considered "Substantially Completed" until provided.

3.8 WALL AND FLOOR PENETRATIONS

- A. Provide sleeves for pipes and ducts passing through roofs, floors, ceiling, walls, partitions, air handling unit casings, structural members, and other building parts. Sleeves shall extend 2" above finished floor.
- B. Provide escutcheons for sleeved pipes in finished areas.
- C. Piping sleeves:
 - 1. Galvanized steel pipe, standard weight where pipes are exposed and, roofs and concrete and masonry walls. On exterior walls provide anchor flange welded to perimeter.
 - 2. Twenty-two (22) gauge galvanized steel elsewhere (i.e., stud walls).
- D. Ductwork sleeves: 20 gauge galvanized steel at masonry walls, rated walls, at wall penetrations exposed to view, floors and roof.
- E. Penetrations shall be sealed and caulked airtight for sound and air transfer control. Voids where ducts and pipes penetrate floors or other fire-rated assemblies shall be appropriately additionally fire-sealed the full depth with an approved fire sealant (3M or Dow Corning Fire Sealant Foam and Caulk). For piping, provide floor plate.

3.9 RECORD DRAWINGS

- A. Upon completion of the mechanical installations, the Contractor shall deliver to the Architect one complete set of prints of the mechanical contract drawings which shall be legibly marked in red pencil to show all changes and departures of the installation as compared with the original design. They shall be suitable for use in preparation of Record Drawings. Additionally, provide one (1) electronic format (color PDF/scanned image) of all record drawings on a DVD.

3.10 GUARANTEE

- A. Contractor's attention is directed to guarantee obligations contained in the GENERAL CONDITIONS.
- B. The above shall not in any way void or abrogate equipment manufacturer's guarantee or warranty. Certificates of guarantee shall be included in the operations and maintenance manuals. The project shall not be considered "substantially completed" until certifications are included in the Record and Information Booklets.
- C. Unless otherwise indicated, Contractor shall provide two (2) years full factory warranty on parts and labor for all equipment from the time of final acceptance of the mechanical systems by the City. Warranty shall include 24-hour service.

3.11 LUBRICATION

- A. All bearings, motors, and all equipment requiring lubrication shall be provided with accessible fittings for same. Before turning over the equipment to the City, the Contractor shall fully lubricate each item of equipment, shall provide one year's supply of lubricant for each, and shall provide City with complete written lubricating instructions, together with diagram locating the points requiring lubrication. Include this information in the Record and Information Booklet. Project shall not be considered "Substantially Completed" until instructions are included in the Record and Information Booklet.
- B. In general, all motors and equipment shall be provided with grease-lubricated roller or ball bearings with Alemite or equal accessible or extended grease fittings and drain plugs.

3.12 RECORD AND INFORMATION BOOKLET

- A. The Contractor shall have prepared three (3) copies of the Record and Information Booklet and deliver these approved copies of the booklet to the City a minimum of three (3) weeks before Demonstrations. The booklet shall be as specified herein. The booklet must be approved and will not be accepted as final until so stamped. The project shall not be considered "Substantially Completed" until approved.
- B. The booklet shall be bound in a three-ring loose-leaf binder similar to "National" No. 3881 with the following title lettered on the front: "Record and Information Booklet (insert name of the project)". No sheets larger than 8-1/2" x 11" shall be used, except sheets that may be neatly folded to 8-1/2" x 11" and used as a pull-out.
- C. Provide the following data in the booklet:
 - 1. Maintenance operation and lubrication instructions on each piece of equipment furnished.
 - 2. Complete catalog data on each piece of air conditioning equipment furnished including approved shop drawing.
 - 3. Manufacturers' and Contractors' guarantees.
 - 4. Chart form indicating time and type of routine maintenance of ductless split systems, fans, etc. The chart shall also indicate tag number, model number of equipment, location and service. For replacement items such as filters and belts, indicate type, size and quantity of the replaceable items.
 - 5. Provide sales and service representatives' names and phone numbers of all equipment and subcontractors.
 - 6. Provide an electronic data base of all equipment, including model number, location tag/identification label.
 - 7. Provide copies of all start-up reports.
- D. In addition to three (3) hard copies of the data described in Paragraph C, provide one (1) electronic copy in PDF format on DVD(s).

3.13 WIRING DIAGRAMS

- A. Obtain and submit wiring diagrams for all equipment provided under this Contract.
- B. Wiring diagrams shall be provided with Shop Drawings, but not limited to, the following:
 - 1. All equipment.
- C. The Contractor shall submit any additional wiring diagrams as requested by the Engineer.
- D. Provide wiring diagrams for all major mechanical equipment to the Electrical Contractor and the ATC Subcontractor for coordination.

3.14 MECHANICAL INSTALLATIONS

- A. General: Sequence, coordinate, and integrate the various elements of mechanical systems, materials, and equipment including, but not limited to, the following:
 - 1. Coordinate mechanical systems, equipment, and materials installation with other building components.
 - 2. Verify all dimensions by field measurements.
 - 3. Arrange for chases, slots, and openings in other building components during progress of construction, to allow for mechanical installations.
 - 4. Sequence, coordinate, and integrate installations of mechanical materials and equipment for efficient flow of the work.
 - 5. Where mounting heights are not detailed, noted, or dimensioned, install systems, materials, and equipment to provide the maximum headroom possible.
 - 6. Install systems, materials, and equipment to conform with approved submittal data, to greatest extent possible. Conform to arrangements indicated by the Contract Documents, recognizing that portions of the work are shown only in diagrammatic form.
 - 7. Install systems, materials, and equipment level and plumb, parallel and perpendicular to other building systems and components, where installed exposed in finished space.

3.15 CLEANING OF SYSTEMS

- A. Thoroughly clean systems after satisfactory completion of pressure tests and before permanently connecting equipment and other accessory items.
- B. Clean enclosures and mechanical equipment at completion of work.
- C. Pay for labor and materials required to locate and remove obstructions from systems clogged with construction refuse after acceptance. Replace and repair work disturbed during removal of obstructions.
- D. Leave systems clean, and in complete running order.

3.16 ACCESS FOR INSPECTION, CLEANING AND MAINTENANCE

- A. Equipment Clearance: Ventilation equipment shall be installed with sufficient working space for inspection and routine maintenance (e.g., filter replacement and fan belt adjustment and replacement).

END OF SECTION 230500

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SECTION 230505 - HVAC PIPING, FITTINGS AND VALVES

PART 1. GENERAL

1.1. SUMMARY

- A. The conditions of the contract and other general requirements apply to the work specified in this section. All work under this section shall also be subject to the requirements of Division 23 Section, *Common Work Results for HVAC* and Division 01, *General Requirements*.
- B. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2. SYSTEM DESCRIPTION CONDITIONS

- A. Provide all labor and materials necessary to furnish and install all piping systems on this project as herein specified and/or shown on the drawings. Final connections to equipment furnished in other sections of the specifications shall be included under this section.
- B. All piping and insulation installed in ceiling plenums must be plenum rated and comply with NFPA and International Building Code (IBC).
- C. Where more than one piping system material is specified, ensure system components are compatible and joined to ensure the integrity of the system is not jeopardized. Provide necessary joining fittings. Ensure flanges, union, and couplings for servicing are consistently provided.
- D. Use unions, flanges, and couplings downstream of valves and at equipment or apparatus connections. Do not use direct welded or threaded connections to valves, equipment or other apparatus.
- E. Use non-conducting dielectric connections whenever jointing dissimilar metals in open systems.
- F. Provide pipe hangers and supports in accordance with ASTM B31.9 and MSS SP69 unless indicated otherwise.

1.3. QUALITY ASSURANCE

- A. Valves: Manufacturer's name and pressure rating marked on valve body.
- B. Welding Materials and Procedures: Conform to ASME Code and applicable state labor regulation. Provide certificate of compliance from authority having jurisdiction indicating approval of welders.
- C. Welders Certification: In accordance with ASME Section 9.
- D. All grooved joint couplings, fittings, valves, and specialties shall be the products of a single manufacturer. Grooving tools shall be of the same manufacturer as the grooved components.
 - 1. All castings used for coupling housings, fittings, and valve bodies shall be date stamped for quality assurance and traceability.
- E. Maintain one copy of each document on site.

1.4. DELIVERY, STORAGE AND HANDLING

- A. Deliver, store, protect and handle products to site under as hereinbefore specified.
- B. Accept valves on site in shipping containers with labeling in place. Inspect for damage.
- C. Provide temporary end caps and closures on piping and fittings. Maintain in place until installation.
- D. Protect piping systems from entry of foreign materials by temporary covers, completing sections of the work, and isolating parts of completed systems.

1.5. EXTRA MATERIALS

- A. Provide one (1) repacking kit for each size valve.

PART 2. PRODUCTS

2.1. PIPE MATERIALS

- A. All materials, unless otherwise specified, shall be new and of the best quality of their respective kinds, and shall conform to the requirements and ordinances of local, state and insurance authorities having jurisdiction.

1. Refrigeration Piping:

- a. Concealed: Tube Size $\frac{3}{4}$ -inch & Smaller:

ASTM B280, copper tube; Type ACR, soft annealed temper fittings; cast copper-alloy fittings for flared copper tubes; flared joints. Fittings shall be ASME B16.22, wrought copper. Joints shall be bronzed, AWS A5.8, BCUP silver/phosphorous/copper alloy with melting range 1190 to 1480 degrees F.

- b. Concealed: Tube Size $\frac{7}{8}$ inch through 4-1/8inches:

Copper tube, Type ACR, soft annealed temper; wrought-copper, solder-joint fittings; solder joints.

- c. Exposed: Tube Size $\frac{3}{4}$ Inch and Smaller:

Copper pipe, Type ASTM B88, Type K with brazed wrought-copper fittings conforming to ASME B16.22. Filler metal shall be brazing type conform to AWS A5.8.

- d. Exposed: Tube Sizes $\frac{7}{8}$ Inch and Larger:

Copper pipe, Type ASTM B88, Type K with brazed wrought-copper fittings conforming to ASME B16-22. Filler metal shall be brazing type conforming to AWS A5.8.

- e. Soldered Joints: Solder joints using silver-lead solder, ASTM B 32, Grade 96 TS.

- f. Brazed Joints: Braze joints using American Welding Society (AWS) classification BCuP-4 for brazing filler metal.

- g. Flexible connectors: 500-psig (3450-kPa) minimum operating pressure; stainless-steel core and high-tensile stainless-steel-braid covering; dehydrated, pressure tested, minimum 7 inches (180 mm) long.
 - h. Diaphragm Packless Valves:
500-psig (3450-kPa) working pressure and 275 degrees Fahrenheit (135 degrees C) working temperature; globe design with straight-through or angle pattern; forged-brass or bronze body and bonnet, phosphor bronze and stainless-steel diaphragms, rising stem and handwheel, stainless-steel spring, nylon seat disc, and with solder-end connections.
 - i. Packed-Angle Valves: 500-psig (3450-kPa) working pressure and 275 degrees Fahrenheit (135 degrees C) working temperature; forged-brass or bronze body, forged-brass seal caps with copper gasket, back seating, rising stem and seat, molded stem packing, and with solder-end connections.
 - j. Check Valves: Smaller than NPS 1 (DN 25): 400-psig (2760-kPa) operating pressure and 285 degrees Fahrenheit (141 deg Celsius) operating temperature; cast-brass body, with removable piston, polytetrafluoroethylene seat, and stainless-steel spring; globe design. Valve shall be straight-through pattern, with solder-end connections.
 - k. Check Valves: NPS 1 (DN 25) and Larger: 400-psig (2760-kPa) operating pressure and 285 degrees Fahrenheit (141 deg Celsius) operating temperature; cast-bronze body, with cast-bronze or forged-brass bolted bonnet; floating piston with mechanically retained polytetrafluoroethylene seat disc. Valve shall be straight-through or angle pattern, with solder-end connections.
 - l. Service Valves: 500-psig (3450-kPa) pressure rating; forged-brass body with copper stubs, brass caps, removable valve core, integral ball check valve, and with solder-end connections.
 - m. Solenoid Valves: Comply with ARI 760; 250 deg Fahrenheit (121 deg Celsius) temperature rating and 400-psig (2760-kPa) working pressure; forged brass, with polytetrafluoroethylene valve seat, 2-way, straight-through pattern, and solder-end connections; manual operator; fitted with suitable NEMA 250 enclosure of type required by location, with 1/2-inch (16-GRC) conduit adapter and 24-V, normally closed holding coil.
 - n. Pressure-Regulating Valves:

Comply with ARI 770; pilot operated, forged brass or cast bronze, stainless-steel bottom spring, pressure-gage tapings, 24-V dc standard coil, and wrought-copper fittings for solder-end connections; suitable for refrigerant specified.
 - o. Pressure Relief Valves: Straight-through or angle pattern, brass body and disc, neoprene seat, and factory sealed and ASME labeled for standard pressure setting.
2. Cooling Coil A/C Condensate Drain Piping:
- a. Pipe & Fittings: All A/C condensate drain piping, including floor drain piping that is collecting A/C condensate, shall be constructed of Type L

copper tubing, with sweat fittings made with 95-5 solder. Washout plugs (cleanouts) shall be strategically located to allow periodic flush out of system. At a minimum, provide washout plugs at equipment connections and at direction changes of 90 degrees F or greater.

3. Sump Pump Pumped Discharge Piping:

a. Pipe:

2-1/2-inches and smaller - Schedule 40 A53 grade A galvanized steel pipe with threaded ends.

b. Fittings and Joints:

2-1/2-inches and smaller - Malleable iron fittings conforming to ANSI B16.3 Class 150.

c. Check Valves:

2-inches & smaller – 200 lbs. Cast iron body, threaded ends, ASTM A126, carbon steel cap, stainless steel pin, stainless steel disc, EPDM seal, and stainless steel spring ASTM A276. Mueller 303.

B. Copper pipe shall be Revere, Anaconda or Chase with approved solder fittings.

C. Welding fittings for steel pipe shall meet the requirements of ASTM Standard A-23 and shall be standard catalog products. Fittings fabricated by metering and notching pipe will not be accepted.

2.2. PIPE HANGERS

A. All hangers for metallic piping shall be adjustable, wrought clevis type, or adjustable malleable split ring swivel type, having rods with machine threads. Hangers shall be Grinnell Company's Figure 260 for pipe 3/4-inch and larger, and Figure 65 for pipe 2-inches and smaller, or approved equal. For copper piping in direct contact with the hanger, hanger construction shall be copper coated to prevent contact of dissimilar metals similar to Grinnell's Figure CT-65. Hanger spacing and rod sizes for steel and copper pipe shall not be less than the following:

NOMINAL PIPE SIZE IN	STD. STEEL PIPE	MAXIMUM SPAN FT. COPPER TUBE	MINIMUM ROD DIAMETER INCHES OF ASTM A36 STEEL THREADED RODS
3/4 & 1	6	5	3/8
1-1/2	6	8	3/8
2	8	8	3/8

B. Hangers for pipe sizes 1/2 to 1 1/2 inch (13 to 38 mm): Carbon steel, adjustable swivel, split ring.

C. Hangers for cold pipe sizes 2 inches (50 mm) and over: Carbon steel, adjustable, clevis.

- D. Wall support for pipe sizes to 3 inches (76 mm): cast iron hook
- E. Floor support for cold pipe: Cast iron adjustable pipe saddle, lock nut, nipple, floor flange, and concrete pier or steel support.
- F. Copper pipe support: Carbon steel ring, adjustable, copper plated.
- G. Hanger rods: Mild steel threaded both ends, threaded one end, or continuous threaded.

2.3. UNIONS, FLANGES, AND COUPLINGS

- A. Unions in steel pipe 2-inches and smaller shall be malleable iron with brass inserted seats designed for a working pressure of 150 psig.

2.4. ESCUTCHEONS

- A. Provide chromium plated escutcheons properly fitted and secured with set screws on all exposed piping which passes through walls, floors or ceilings of finished spaces.
- B. All escutcheon plates shall be chrome plated spun brass of plain pattern, and shall be set tight on the pipe and to the building surface. Plastic escutcheon plates will not be accepted.

2.5. DIELECTRIC CONNECTIONS:

- A. Furnish and install electrically insulated dielectric waterway fittings, unions or flanges, as manufactured by Victaulic Company Style 47, EPCO Sales, Inc., or approved equal at the following locations:
 - 1. Where steel piping systems join copper piping.
 - 2. Where copper tube connects to domestic water storage tanks, water heaters, heat exchangers, expansion tanks, and other steel vessels.
 - 3. Avoid the installation of steel nipples, cast iron or steel valves and specialties, or other ferrous components in predominately copper piping systems. Where such installation is necessary, isolate the component with dielectric connections. Do not mix steel pipe and copper tube in the same run of pipe or in the same section of a piping system.

2.6. SLEEVES

- A. Sleeves shall be provided around all pipes through walls, floors, ceilings, partitions, roof structure members or other building parts. Sleeves shall be standard weight galvanized iron pipe two sizes larger than the pipe or insulation so that pipe or insulation shall pass through masonry or concrete walls or floors. Provide 20 gauge galvanized steel sheet or galvanized pipe sleeves for all piping passing through frame walls.
- B. Sleeves through floors shall be flush with the floor except for sleeves passing through Equipment Rooms which shall extend ¾-inch above the floor. Refer to Division 23 Section, *Vibration Controls for HVAC, Plumbing and Fire Protection Equipment* for mechanical equipment room penetrations additional requirements. Space between the pipe and sleeve shall be caulked. Escutcheon plates shall be constructed to conceal the ends of sleeves. Each trade shall be responsible for drilling existing floors and walls for necessary sleeve holes. Drilling methods and tools shall be as hereinbefore specified.

- C. Sleeves through walls and floors shall be sealed with a waterproof caulking compound.
- D. Firestop at sleeves that penetrate smoke barriers smoke partitions and/or rated walls/floors.

PART 3. EXECUTION

3.1. GENERAL PIPING INSTALLATION REQUIREMENTS

- A. All pipes shall be cut accurately to measurements established at the building, and shall be worked into place without springing or forcing, properly clearing all windows, doors and other openings. Excessive cutting or other weakening of the building structure to facilitate piping installation will not be permitted. All pipes shall be so installed as to permit free expansion and contraction without causing damage. All horizontal mains shall pitch down in the direction of flow with a grade of not less than 1 inch in 40 feet. All open ends of pipe lines, equipment, etc., shall be properly capped or plugged during installation to keep dirt or other foreign material out of the system. All pipes shall be run parallel with the lines of the building and as close to walls, columns and ceilings as may be practical, with proper pitch. All piping shall be arranged so as not to interfere with removal of other equipment on devices not to block access to doors, windows, manholes, or other access openings. Flanges or unions, as applicable for the type of piping specified, shall be provided in the piping at connections to all items of equipment, coils, etc., and installed so that there will be no interference with the installation of the equipment, ducts, etc. All valves and specialties shall be placed to permit easy operation and access and all valves shall be regulated, packed and glands adjusted at the completion of the work before final acceptance. All piping shall be installed so as to avoid air or liquid pockets throughout the work. Ends of pipe shall be reamed so as to remove all burrs.
- B. All piping shall be graded to convey entrained air to high points where automatic air vents shall be provided. The size of supply and return pipes for each piece of equipment shall in no case be smaller than the outlets in the equipment.
- C. All piping shall be run to provide a minimum clearance of 2-inches between finished covering on such piping and all adjacent work. Group piping wherever practical at common elevations.
- D. All valves, strainers, caps, and other fittings shall be readily accessible.
- E. Spring clamp plates (escutcheons) shall be provided where pipes are exposed in the building and run through walls, floors, or ceilings. Plates shall be chrome plated spun brass of plain pattern, and shall be set tight on the pipe and to the building surface.
- F. If the size of any piping is not clearly evident in the drawings, the Contractor shall request instructions for the Engineer as to the proper sizing. Any changes resulting from the Contractor's failure to request clarification shall be at his expense. Where pipe size discrepancies or conflicts exist in the drawings, the larger pipe size shall govern.
- G. Install all valves with stem upright or horizontal, not inverted.
- H. Where pipe support members are welded to structural building framing, scrape, brush clean, weld and apply one coat of zinc rich primer.
- I. Provide clearance for installation of insulation and access to valves and fittings.
- J. Protect piping systems from entry of foreign materials by temporary covers, completing sections of the work, and isolating parts of completed system.

3.6. REFRIGERANT PIPING AND ACCESSORIES INSTALLATION REQUIREMENTS

- A. Drawing plans, schematics, and diagrams indicate general location and arrangement of piping systems; indicated locations and arrangements were used to size pipe and calculate friction loss, expansion, pump sizing, and other design considerations. Install piping as indicated unless deviations to layout are approved on Shop Drawings.
- B. Install refrigerant piping according to ASHRAE 15.
- C. Install piping in concealed locations unless otherwise indicated and except in equipment rooms and service areas.
- D. Install piping indicated to be exposed and piping in equipment rooms and service areas at right angles or parallel to building walls. Diagonal runs are prohibited unless specifically indicated otherwise. All exposed piping shall be hard copper tubing with brazed joints. Refer to Architectural Contract Documents to determine exposed areas.
- E. Install piping above accessible ceilings to allow sufficient space for ceiling panel removal.
- F. Install piping adjacent to units to allow service and maintenance.
- G. Install piping free of sags and bends.
- H. Install fittings for changes in direction and branch connections.
- I. Select system components with pressure rating equal to or greater than system operating pressure.
- J. Install piping as short and direct as possible, with a minimum number of joints, elbows, and fittings.
- K. Arrange piping to allow inspection and service of refrigeration equipment. Install valves and specialties in accessible locations to allow for service and inspection. Install access doors or panels as specified if valves or equipment requiring maintenance is concealed behind finished surfaces.
- L. Install refrigerant piping in protective conduit where installed below ground.
- M. Install refrigerant piping in rigid or flexible conduit in locations where exposed to mechanical injury.
- N. Slope refrigerant piping as follows:
 - 1. Install horizontal hot-gas discharge piping with a uniform slope downward away from compressor.
 - 2. Install horizontal suction lines with a uniform slope downward to compressor.
 - 3. Install traps and double risers to entrain oil in vertical runs.
 - 4. Liquid lines may be installed level.
- O. When brazing or soldering, remove solenoid-valve coils and sight glasses; also remove valve stems, seats and packing, and accessible internal parts of refrigerant specialties. Do not apply heat near expansion-valve bulb.
- P. Install piping with adequate clearance between pipe and adjacent walls and hangers or between pipes for insulation installation.

- Q. Identify refrigerant piping and valves.
- R. Install sleeves for piping penetrations of walls, ceilings, and floors. Comply with requirements for sleeves specified in Division 23 Section, "Common Work Results for HVAC".
- S. Install sleeve seals for piping penetrations of concrete walls and slabs. Comply with requirements for sleeve seals specified in Division 23 Section, "Common Work Results for HVAC".
- T. Install escutcheons for piping penetrations of walls, ceilings, and floors. Comply with requirements for escutcheons specified in Division 23 Section, "Common Work Results for HVAC".
- U. Install the following pipe attachments:
1. Adjustable steel clevis hangers for individual horizontal runs less than 20 feet (6m) long.
 2. Roller hangers and spring hangers for individual horizontal runs 20 feet (6m) or longer.
 3. Pipe Roller: MSS SP-58, Type 44 for multiple horizontal piping 20 feet (6m) or longer, supported on a trapeze.
 4. Spring hangers to support vertical runs.
 5. Copper-clad hangers and supports for hangers and supports in direct contact with copper pipe.
- V. Install hangers for copper tubing with the following maximum spacing and minimum rod sizes:
1. NPS ½ (DN 15): Maximum span, 60 inches (1500mm); minimum rod size, 1/4-inch (6.4mm).
 2. NPS 5/8 (DN 18): Maximum span, 60 inches (1500mm); minimum rod size, 1/4-inch (6.4mm).
 3. NPS 1 (DN 25): Maximum span, 72 inches (1800mm); minimum rod size, 1/4-inch (6.4mm).
 4. NPS 1-1/4 (DN 32): Maximum span, 96 inches (2400mm); minimum rod size, 3/8 inch (9.5mm).
 5. NPS 1-1/2 (DN 40): Maximum span, 96 inches (2400mm); minimum rod size, 3/8 inch (9.5mm).
 6. NPS 2 (DN 50): Maximum span, 96 inches (2400mm); minimum rod size, 3/8 inch (9.5mm).
- W. Furnish and install complete refrigerant piping systems between the indoor units and outdoor units. Support piping in accordance with Division 23 Section, *HVAC Piping, Fittings, Valves, Etc.* Piping shall be sized as recommended by unit manufacturer taking into account length of vertical and horizontal runs, and refrigerant type. Provide and install dual sets of refrigerant piping on all units required to have dual independent circuits.
- X. Furnish and install all required piping accessories including, but not limited to, thermal expansion valves, Sporlan, or approved equal; Packless isolation valves at condenser and evaporator coil, Henry or approved equal, charging valve with chained seal cap, Henry or approved equal, sight glasses, Henry or approved equal; filter dryer with replaceable cartridge, sporland, or approved equal, liquid line solenoid valve I20V/1/60 Hz., Sporlan, or approved equal. Contractor shall provide traps and double suction risers if required by equipment manufacturer. Pitch piping for proper oil return. Submit shop drawings on all components, and piping arrangements.

- Y. All accessories shall be ARI rated. Furnish required nitrogen and refrigerant to fully test and charge system. Flood piping system with nitrogen when brazing.
- Z. Refrigerant piping shall be Type 1 hard temper (ACR) copper tubing with wrought copper solder fittings. Make joints with silver solder and non-corrosive flux.
- AA. Refrigerant piping shall be cleaned, dehydrated and evacuated. Piping shall be evacuated and held to less than 2.5 mm Hg vacuum for a period of not less than 12 hours without appreciable pressure rise. Vacuum shall then be broken with refrigerant or dry nitrogen and re-evacuated to 2.5 mm Hg vacuum for an additional 12 hours. Piping test to be witnessed by Owner's representative and documented in writing. Submit results of tests to Architect/Engineer.
- BB. All refrigerant/suction lines sets shall be fully insulated. Exterior pipe insulation shall be fully jacketed as specified in Division 23 Section, "HVAC Insulation". Exposed interior pipe insulation shall be fully jacketed as specified in Division 23 Section, "HVAC Insulation".
- CC. Follow ASHRAE 15, latest edition procedures for charging and purging of systems and for disposal of refrigerant.
- DD. Provide replaceable cartridge filter-driers, with isolation valves and valved bypass.
- EE. Locate expansion valve sensing bulb immediately downstream of evaporator on suction line.
- FF. Provide external equalizer piping on expansion valves with refrigerant distributor connected to evaporator.
- GG. Install flexible connectors at right angles to axial movement of compressor, parallel to crankshaft.
- HH. Fully charge completed system with refrigerant after tested.
- II. Provide electrical connection to solenoid valves.
- JJ. All relocated condensing units shall be re-piped, re-charged, tested and made fully operational at time of start-up.
- KK. Install liquid indicators in liquid line leaving condenser, in liquid line leaving, and on leaving side of liquid solenoid valves.
- LL. Install strainers immediately upstream from each automatic valve, including expansion valves, solenoid valves, hot-gas bypass valves, and compressor suction valves.
- MM. Install strainers in main liquid line where multiple expansion valves with integral strainers are used.
- NN. Install strainers in suction line of steel pipe.
- OO. Install moisture-liquid indicators in liquid lines between filter-dryers and thermostatic expansion valves and in liquid line to receiver.
- PP. Install flexible connectors at or near compressors where piping configuration does not absorb vibration.
- QQ. Test and inspect refrigerant piping according to ASME B31.5, Chapter VI.

1. Test refrigerant piping, specialties. Isolate compressor, condenser, evaporator, and safety devices from test pressure.
 2. Test high- and low-pressure side piping of each system at not less than the lower of the design pressure or the setting of pressure relief device protecting high and low side of system.
 - a). System shall maintain test pressure at the manifold gage throughout duration of test.
 - b). Test joints and fittings by brushing a small amount of soap and glycerin solution over joint.
 - c). Fill system with nitrogen to raise a test pressure of 150 psig (1035 kPa) or higher as required by authorities having jurisdiction.
 - d). Remake leaking joints using new materials, and retest until satisfactory results are achieved.
- RR. Adjust thermostatic expansion valve to obtain proper evaporator superheat requirements.
- SS. Adjust high- and low-pressure switch settings to avoid short cycling in response to fluctuating suction pressure.
- TT. Adjust set-point temperature of the conditioned air or chilled-water controllers to the system design temperature.
- UU. Perform the following adjustments before operating the refrigeration system, according to manufacturer's written instructions:
1. Open shutoff valves in condenser water circuit.
 2. Check compressor oil level above center of sight glass.
 3. Open compressor suction and discharge valves.
 4. Open refrigerant valves, except bypass valves that are used for other purposes.
 5. Check compressor-motor alignment, and lubricate motors and bearings.
- VV. Before installing copper tubing other than Type ACR, clean tubing and fittings with trichloroethylene.
- WW. Replace core of filter-dryer after system has been adjusted and design flow rates and pressures are established.
- XX. Charge system using the following procedures:
1. Install core in filter-dryer after leak test but before evacuation.
 2. Evacuate entire refrigerant system with a vacuum pump to a vacuum of 500 micrometers (67 Pa). If vacuum holds for 12 hours, system is ready for charging.
 3. Break vacuum with refrigerant gas, allowing pressure to build up to 2 psig (14 kPa).
 4. Charge system with a new filter-dryer core in charging line. Provide full-operating charge.

3.7. PIPE JOINTS INSTALLATION REQUIREMENTS

- A. Welded Joints: Joints in piping 2-1/2-inches and larger shall be fusion welded. Welding shall be in accordance with recommendations of the American Welding Society. Welding fittings shall conform in physical and chemical properties to the latest revisions of the American Society for Testing Materials.
- B. Qualify welding procedures, welders and operators in accordance with ASME B31.1, or ASME B31.9 as applicable, for shop and project site welding of piping work. Certify welding of piping work using Standard Procedure Specifications by, and welders tested under supervision of, National Certified Pipe Welding Bureau (NCPWB). Submit welders qualifications for approval.
- C. Soldered Joints and Copper Piping: Joints in copper piping shall conform to the following minimum standards.
 - 1. The pipes shall be cut to a length making certain that the ends are square, using a fins hacksaw blade or tube cutter. The ends of all pipes shall be reamed and all burrs removed.
 - 2. The outside end of the pipe and the cut end of the fitting shall be cleaned with steel wool, sand cloth, or steel wire brush. All dark spots shall be removed.
 - 3. The flux shall be applied evenly and sparingly to the outside end of the pipe and the inside of the outer end of the fitting until all surfaces to be jointed are completely covered. The piping and fitting shall be slipped together and reworked several times to insure an even distribution of the flux.
 - 4. The correct amount of solder per joint for each size pipe shall be used in accordance with the manufacturer's recommendations.
 - 5. Solder joints shall be made by using a direct flame from a torch.
 - 6. On pipe sizes larger than 1/4-inch, the fittings and valves in the pipe shall be moved or tapped with a hammer when the solder starts to melt to insure an even distribution of the solder.
 - 7. The excess solder shall be removed while it is still in the plastic state leaving a fillet around the cup of the fitting.
 - 8. Solder joints shall be suitable for working pressure of 100 psig and for working temperature of not less than 250 degrees F. The type of solder and flux used will be submitted for approval. Type 95-5 shall be the minimum standard.
 - 9. Lead and antimony-based solders shall not be used for potable water systems. Brazing and silver solders are acceptable.
- D. Where copper piping joins steel piping, approved bronze adapters shall be used.
- E. Prohibited Connections: No direct weld, soldered, or brazed connections, without unions or flanges, shall be made to valves, strainers, apparatus, or related equipment. Right and left couplings, long threads, or caulking of pipe threads or gasket joints will not be permitted.

3.8. HANGERS, SUPPORTS, INSTALLATION REQUIREMENTS

- A. General: All hangers shall be of an approved type arranged to maintain the required grading

and pitching of lines to prevent vibration and to provide for expansion and contraction. Provide insulation protection shields for insulated piping without saddles. Shield shall be Grinnell Figure 167 or as approved equal.

- B. Spacing: Regardless of spacing, hangers shall be provided at or near all changes in direction, both vertical and horizontal, for all piping. For cast iron soil pipe, one hanger shall be placed at each hub or bell.
- C. Racks and Brackets: All horizontal piping on vertical walls shall be properly supported by suitable racks securely anchored into the wall construction. Where not practical to obtain ceiling anchorage, all piping near walls shall be supported by approved brackets securely anchored into the wall construction. Washer plates (Fib. 60, 60L) and other miscellaneous attachments, fasteners, etc., shall be Grinnell or as approved equal. All exterior hanger and bracket systems in their entirety shall be galvanized.
- D. Pipe Hangers and supports shall be attached to the panel point at the top chord of bar joist or at a location approved by the structural engineer.
- E. Select hangers and components for loads imposed. Secure rods with double nuts.
- F. Support of horizontal piping shall allow for vertical adjustment after installation of piping.
- G. Support overhead piping with clevis hangers.
- H. Do not support all parallel piping from the same joist. Stagger all supports in accordance with the structural engineer's recommendations.
- I. Fabricate and install steel anchors by welding steel shapes, plates, and bars to piping and to structure. Comply with ASME B31.9 and AWS D1.1.
- J. Construct concrete anchors of poured-in-place concrete of dimensions indicated and include embedded fasteners.
- K. Install pipe anchors according to expansion fitting manufacturer's written instructions if expansion fittings are indicated.
- L. Use grout to form flat bearing surfaces for expansion fittings, guides, and anchors installed on or in concrete.

3.9. PIPING IDENTIFICATION INSTALLATION

- A. All piping shall be identified with painted background marked with the name of the service with arrows to indicate flow direction. Color code and system identification shall comply with ANSI Standards and piping identification system shall comply with ASME A13.1-81., scheme for the identification of piping systems and ASHRAE Fundamentals Handbook, latest edition.
- B. Markings shall be plain block letters, stenciled on pipes, and shall be located near each branch connection, near each valve, and at least every 10 feet on straight runs of pipe. Where pipes are adjacent to each other, markings shall be neatly lined up. All markings shall be located in such manner as to be easily legible from the floor. Pipe identification schedule shall be as follows:

OUTSIDE DIAMETER OF PIPE OR COVERING (INCHES)	LENGTH OF COLOR FIELD (INCHES)	SIZE OF LETTERS (INCHES)

1/2 to 1-1/4	8	1/2
1-1/2 to 2	8	3/4
2-1/2 to 6	12	1-1/4

3.10. VALVE IDENTIFICATION REQUIREMENTS

- A. All valves shall be tagged with a numbered tag.
- B. The tags shall be made of 1-inch diameter brass tags fastened to the valve by means of brass chains. Numbers shall agree with valve numbers on diagrammatic herein before specified.

END OF SECTION 230505

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SECTION 230548 - VIBRATION CONTROLS FOR HVAC PIPING AND EQUIPMENT

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. Neoprene waffle type vibration isolation.

1.3 SUBMITTALS

- A. Product Data: For the following:
 - 1. Include rated load, rated deflection, and overload capacity for each vibration isolation device.

1.4 SUMMARY

- A. Provide all labor and materials necessary to furnish and install vibration control systems on this project as herein specified and/or shown on the drawings.
- B. Mount all mechanical equipment on suitable vibration isolators so as to prevent transmission of vibration into or through the building structure.
- C. Isolators shall be stable during stopping and starting of equipment without transverse or eccentric movement of equipment, and shall be designed to resist horizontal forces of equipment which may operate unbalanced.

PART 2 PRODUCTS

2.1 VIBRATION ISOLATORS

- A. Basis-of-Design Product: Subject to compliance with requirements, provide Mason Industries, or a comparable product by one of the following:
 - 1. Amber/Booth Company, Inc.
 - 2. Kinetics Noise Control.
 - 3. Engineer Approved Equal
- B. Pads: Arranged in single or multiple layers of sufficient stiffness for uniform loading over pad area, molded with a nonslip pattern and galvanized-steel baseplates, and factory cut to sizes that match requirements of supported equipment.
 - 1. Resilient Material: Oil- and water-resistant rubber, Mason Super W.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Examine areas and equipment to receive vibration isolation and seismic-control devices for compliance with requirements for installation tolerances and other conditions affecting performance.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 VIBRATION-CONTROL INSTALLATION

- A. Place vibration isolation pads between the slab and the supports for the air-cooled condensing units.

END OF SECTION 230548

SECTION 230553 - IDENTIFICATION FOR HVAC EQUIPMENT

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. Equipment labels.
 - 2. Warning signs and labels.

1.3 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Samples: For color, letter style, and graphic representation required for each identification material and device.
- C. Equipment Label Schedule: Include a listing of all equipment to be labeled with the proposed content for each label.

1.4 COORDINATION

- A. Coordinate installation of identifying devices with completion of covering and painting of surfaces where devices are to be applied.
- B. Coordinate installation of identifying devices with locations of access panels and doors.
- C. Install identifying devices before installing acoustical ceilings and similar concealment.

PART 2 PRODUCTS

2.1 EQUIPMENT LABELS

- A. Plastic Labels for Equipment:
 - 1. Material and Thickness: Multilayer, multicolor, plastic labels for mechanical engraving, 1/8 inch thick, and having predrilled holes for attachment hardware.
 - 2. Letter Color: White.
 - 3. Background Color: Black.
 - 4. Maximum Temperature: Able to withstand temperatures up to 160 deg F.
 - 5. Minimum Label Size: Length and width vary for required label content, but not less than 2-1/2 by 3/4 inch.

6. Minimum Letter Size: 1/4 inch for name of units if viewing distance is less than 24 inches, 1/2 inch for viewing distances up to 72 inches, and proportionately larger lettering for greater viewing distances. Include secondary lettering two-thirds to three-fourths the size of principal lettering.
 7. Fasteners: Stainless-steel rivets or self-tapping screws.
 8. Adhesive: Contact-type permanent adhesive, compatible with label and with substrate.
- B. Label Content: Include equipment's Drawing designation or unique equipment number, Drawing numbers where equipment is indicated (plans, details, and schedules), plus the Specification Section number and title where equipment is specified.
- C. Equipment Label Schedule: For each item of equipment to be labeled, on 8-1/2-by-11-inch (A4) bond paper. Tabulate equipment identification number and identify Drawing numbers where equipment is indicated (plans, details, and schedules), plus the Specification Section number and title where equipment is specified. Equipment schedule shall be included in operation and maintenance data.

2.2 WARNING SIGNS AND LABELS

- A. Material and Thickness: Multilayer, multicolor, plastic labels for mechanical engraving, 1/8 inch thick, and having predrilled holes for attachment hardware.
- B. Letter Color: White.
- C. Background Color: Red.
- D. Maximum Temperature: Able to withstand temperatures up to 160 deg F.
- E. Minimum Label Size: Length and width vary for required label content, but not less than 2-1/2 by 3/4 inch.
- F. Minimum Letter Size: 1/4 inch for name of units if viewing distance is less than 24 inches, 1/2 inch for viewing distances up to 72 inches, and proportionately larger lettering for greater viewing distances. Include secondary lettering two-thirds to three-fourths the size of principal lettering.
- G. Fasteners: Stainless-steel rivets or self-tapping screws.
- H. Adhesive: Contact-type permanent adhesive, compatible with label and with substrate.
- I. Label Content: Include caution and warning information, plus emergency notification instructions.

PART 3 EXECUTION

3.1 PREPARATION

- A. Clean piping and equipment surfaces of substances that could impair bond of identification devices, including dirt, oil, grease, release agents, and incompatible primers, paints, and encapsulants.

3.2 EQUIPMENT LABEL INSTALLATION

- A. Install or permanently fasten labels on each major item of mechanical equipment.
- B. Locate equipment labels where accessible and visible.

END OF SECTION 230553

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SECTION 230719 - HVAC PIPING 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 insulating the following HVAC piping systems:
 - 1. Condensate drain piping, indoors.
 - 2. Refrigerant suction and hot-gas piping, indoors and outdoors.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated. Include thermal conductivity, water-vapor permeance thickness, and jackets (both factory and field applied if any).
- B. Shop Drawings: Include plans, elevations, sections, details, and attachments to other work.
 - 1. Detail application of insulation protective shields, and inserts at hangers for each type of insulation and hanger.
 - 2. Detail insulation application at elbows, fittings, flanges, valves, and specialties for each type of insulation.
 - 3. Detail application of field-applied jackets.

1.4 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For qualified Installer.
- B. Material Test Reports: From a qualified testing agency acceptable to authorities having jurisdiction indicating, interpreting, and certifying test results for compliance of insulation materials, sealers, attachments, cements, and jackets, with requirements indicated. Include dates of tests and test methods employed.
- C. Field quality-control reports.

1.5 QUALITY ASSURANCE

- A. Installer Qualifications: Skilled mechanics who have successfully completed an apprenticeship program or another craft training program certified by the Department of Labor, Bureau of Apprenticeship and Training.
- B. Surface-Burning Characteristics: For insulation and related materials, as determined by testing identical products according to ASTM E 84, by a testing and inspecting agency acceptable to authorities having jurisdiction. Factory label insulation and jacket materials and adhesive,

mastic, tapes, and cement material containers, with appropriate markings of applicable testing agency.

1. Insulation Installed Indoors: Flame-spread index of 25 or less, and smoke-developed index of 50 or less.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Packaging: Insulation material containers shall be marked by manufacturer with appropriate ASTM standard designation, type and grade, and maximum use temperature.

1.7 COORDINATION

- A. Coordinate sizes and locations of supports, hangers, and insulation protection shields specified in Section 230529 "Hangers and Supports for HVAC Piping and Equipment."
- B. Coordinate clearance requirements with piping Installer for piping insulation application. Before preparing piping Shop Drawings, establish and maintain clearance requirements for installation of insulation and field-applied jackets and finishes and for space required for maintenance.

1.8 SCHEDULING

- A. Schedule insulation application after pressure testing systems and, where required, after installing and testing heat tracing. Insulation application may begin on segments that have satisfactory test results.
- B. Complete installation and concealment of plastic materials as rapidly as possible in each area of construction.

PART 2 PRODUCTS

2.1 INSULATION MATERIALS

- A. Comply with requirements in "Piping Insulation Schedule, General," articles for where insulating materials shall be applied.
- B. Products shall not contain asbestos, lead, mercury, or mercury compounds.
- C. Flexible Elastomeric Insulation: Closed-cell, sponge- or expanded-rubber materials. Comply with ASTM C 534, Type I for tubular materials.
 1. Products: Subject to compliance with requirements, provide available products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Aeroflex USA, Inc.; Aerocel.
 - b. Armacell LLC; AP Armaflex.
 - c. K-Flex USA; Insul-Lock, Insul-Tube, and K-FLEX LS.
 - d. Engineer Approved Equal

2.2 ADHESIVES

- A. Materials shall be compatible with insulation materials, jackets, and substrates and for bonding insulation to itself and to surfaces to be insulated unless otherwise indicated.
- B. Flexible Elastomeric and Polyolefin Adhesive: Comply with MIL-A-24179A, Type II, Class I.
 - 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. Aeroflex USA, Inc.; Aero seal.
 - b. Armacell LLC; Armaflex 520 Adhesive.
 - c. Foster Brand, Specialty Construction Brands, Inc., a business of H. B. Fuller Company; 85-75.
 - d. K-Flex USA; R-373 Contact Adhesive.
 - e. Engineer Approved Equal
 - 2. For indoor applications, adhesive shall have a VOC content of 50 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
 - 3. Adhesive shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."

2.3 FIELD-APPLIED JACKETS

- A. Field-applied jackets shall comply with ASTM C 921, Type I, unless otherwise indicated.
- B. PVC Jacket: High-impact-resistant, UV-resistant PVC complying with ASTM D 1784, Class 16354-C; thickness as scheduled; roll stock ready for shop or field cutting and forming. Thickness is indicated in field-applied jacket schedules.
 - 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. Johns Manville; Zeston.
 - b. P.I.C. Plastics, Inc.; FG Series.
 - c. Proto Corporation; LoSmoke.
 - d. Speedline Corporation; SmokeSafe.
 - e. Engineer Approved Equal
 - 2. Adhesive: As recommended by jacket material manufacturer.
 - 3. Color: White.
 - 4. Factory-fabricated fitting covers to match jacket if available; otherwise, field fabricate.

- a. Shapes: 45- and 90-degree, short- and long-radius elbows, tees, valves, flanges, unions, reducers, end caps, soil-pipe hubs, traps and mechanical joints.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Examine substrates and conditions for compliance with requirements for installation tolerances and other conditions affecting performance of insulation application.
 1. Verify that systems to be insulated have been tested and are free of defects.
 2. Verify that surfaces to be insulated are clean and dry.
 3. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Surface Preparation: Clean and dry surfaces to receive insulation. Remove materials that will adversely affect insulation application.
- B. Surface Preparation: Clean and prepare surfaces to be insulated.

3.3 GENERAL INSTALLATION REQUIREMENTS

- A. Install insulation materials, accessories, and finishes with smooth, straight, and even surfaces; free of voids throughout the length of piping including fittings, valves, and specialties.
- B. Install insulation materials, forms, vapor barriers or retarders, jackets, and thicknesses required for each item of pipe system as specified in insulation system schedules.
- C. Install accessories compatible with insulation materials and suitable for the service. Install accessories that do not corrode, soften, or otherwise attack insulation or jacket in either wet or dry state.
- D. Install insulation with longitudinal seams at top and bottom of horizontal runs.
- E. Keep insulation materials dry during application and finishing.
- F. Install insulation with tight longitudinal seams and end joints. Bond seams and joints with adhesive recommended by insulation material manufacturer.
- G. Install insulation with least number of joints practical.
- H. Apply adhesives, mastics, and sealants at manufacturer's recommended coverage rate and wet and dry film thicknesses.
- I. Cut insulation in a manner to avoid compressing insulation more than 75 percent of its nominal thickness.
- J. Finish installation with systems at operating conditions. Repair joint separations and cracking due to thermal movement.

- K. Repair damaged insulation facings by applying same facing material over damaged areas. Extend patches at least 4-inches beyond damaged areas. Adhere, staple, and seal patches similar to butt joints.

3.4 PENETRATIONS

- A. Insulation Installation at Interior Wall and Partition Penetrations (That Are Not Fire Rated): Install insulation continuously through walls and partitions.
- B. Insulation Installation at Fire-Rated Wall and Partition Penetrations: Install insulation continuously through penetrations of fire-rated walls and partitions.
 - 1. Comply with requirements in Section 078413 "Penetration Firestopping" for firestopping and fire-resistive joint sealers.
- C. Insulation Installation at Floor Penetrations:
 - 1. Pipe: Install insulation continuously through floor penetrations.
 - 2. Seal penetrations through fire-rated assemblies. Comply with requirements in Section 078413 "Penetration Firestopping."

3.5 GENERAL PIPE INSULATION INSTALLATION

- A. Requirements in this article generally apply to all insulation materials except where more specific requirements are specified in various pipe insulation material installation articles.
- B. Insulation Installation on Fittings, Valves, Strainers, Flanges, and Unions:
 - 1. Install insulation over fittings, valves, strainers, flanges, unions, and other specialties with continuous thermal and vapor-retarder integrity unless otherwise indicated.
 - 2. Insulate pipe elbows using preformed fitting insulation or mitered fittings made from same material and density as adjacent pipe insulation. Each piece shall be butted tightly against adjoining piece and bonded with adhesive. Fill joints, seams, voids, and irregular surfaces with insulating cement finished to a smooth, hard, and uniform contour that is uniform with adjoining pipe insulation.
 - 3. Insulate tee fittings with preformed fitting insulation or sectional pipe insulation of same material and thickness as used for adjacent pipe. Cut sectional pipe insulation to fit. Butt each section closely to the next and hold in place with tie wire. Bond pieces with adhesive.
 - 4. Insulate flanges and unions using a section of oversized preformed pipe insulation. Overlap adjoining pipe insulation by not less than two times the thickness of pipe insulation, or one pipe diameter, whichever is thicker.
 - 5. Cover segmented insulated surfaces with a layer of finishing cement and coat with a mastic. Install vapor-barrier mastic for below-ambient services and a breather mastic for above-ambient services. Reinforce the mastic with fabric-reinforcing mesh. Trowel the mastic to a smooth and well-shaped contour.
- C. Insulate instrument connections for thermometers, pressure gages, pressure temperature taps, test connections, flow meters, sensors, switches, and transmitters on insulated pipes. Shape

insulation at these connections by tapering it to and around the connection with insulating cement and finish with finishing cement, mastic, and flashing sealant.

3.6 INSTALLATION OF FLEXIBLE ELASTOMERIC INSULATION

- A. Seal longitudinal seams and end joints with manufacturer's recommended adhesive to eliminate openings in insulation that allow passage of air to surface being insulated.
- B. Insulation Installation on Pipe Flanges:
 - 1. Install pipe insulation to outer diameter of pipe flange.
 - 2. Make width of insulation section same as overall width of flange and bolts, plus twice the thickness of pipe insulation.
 - 3. Fill voids between inner circumference of flange insulation and outer circumference of adjacent straight pipe segments with cut sections of sheet insulation of same thickness as pipe insulation.
 - 4. Secure insulation to flanges and seal seams with manufacturer's recommended adhesive to eliminate openings in insulation that allow passage of air to surface being insulated.
- C. Insulation Installation on Pipe Fittings and Elbows:
 - 1. Install mitered sections of pipe insulation.
 - 2. Secure insulation materials and seal seams with manufacturer's recommended adhesive to eliminate openings in insulation that allow passage of air to surface being insulated.
- D. Insulation Installation on Valves and Pipe Specialties:
 - 1. Install preformed valve covers manufactured of same material as pipe insulation when available.
 - 2. When preformed valve covers are not available, install cut sections of pipe and sheet insulation to valve body. Arrange insulation to permit access to packing and to allow valve operation without disturbing insulation.
 - 3. Install insulation to flanges as specified for flange insulation application.
 - 4. Secure insulation to valves and specialties and seal seams with manufacturer's recommended adhesive to eliminate openings in insulation that allow passage of air to surface being insulated.

3.7 FIELD-APPLIED JACKET INSTALLATION

- A. Where PVC jackets are indicated, install with 1-inch overlap at longitudinal seams and end joints; for horizontal applications. Seal with manufacturer's recommended adhesive.
 - 1. Apply two continuous beads of adhesive to seams and joints, one bead under lap and the finish bead along seam and joint edge.

3.8 PIPING INSULATION SCHEDULE, GENERAL

- A. Acceptable preformed pipe and tubular insulation materials and thicknesses are identified for each piping system and pipe size range
- B. All refrigerant piping shall be insulated with 1-1/2" thick insulation.
- C. All condensate piping shall be insulated with 1-inch thick insulation.

END OF SECTION 230719

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SECTION 238126 - 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 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.
- B. Shop Drawings: 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.
 - 2. Wiring Diagrams: For power, signal, and control wiring.
- C. Samples for Initial Selection: For units with factory-applied color finishes.

1.4 INFORMATIONAL SUBMITTALS

- A. Field quality-control reports.
- B. Warranty: Sample of special warranty.

1.5 CLOSEOUT SUBMITTALS

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

1.6 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
 - 1. Filters: One set for each evaporator unit.

1.7 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. ASHRAE Compliance:

1. Fabricate and label refrigeration system to comply with ASHRAE 15, "Safety Standard for Refrigeration Systems."
 - C. ASHRAE/IESNA Compliance: Applicable requirements in ASHRAE/IESNA 90.1.
- 1.8 COORDINATION
- A. Coordinate sizes and locations of equipment supports with actual equipment provided.
- 1.9 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: Five year from date of Substantial Completion.
 - b. For Parts: Five years from date of Substantial Completion.
 - c. For Labor: Five years 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:
- B. Basis-of-Design Product: Subject to compliance with requirements, provide product or comparable product by one of the following:
 1. Daikin, Inc.
 2. Mitsubishi Electric & Electronics USA, Inc.; HVAC Advanced Products Division.
 3. Trane; a business of American Standard companies.
 4. SAMSUNG

2.2 EVAPORATOR UNITS (5 TONS OR LESS)

- A. Wall-Mounted/Ceiling Mounted, Evaporator-Fan Components:
 1. Cabinet: Enameled steel with removable panels on front and ends in color selected by Architect, and discharge drain pans with drain connection.
 2. Refrigerant Coil: Copper tube, with mechanically bonded aluminum fins and thermal-expansion valve. Comply with ARI 206/110.
 3. Fan: Direct drive, centrifugal.
 4. Fan Motors:

- a. Comply with NEMA designation, temperature rating, service factor, enclosure type, and efficiency requirements specified in Section 230513 "Common Motor Requirements for HVAC Equipment."
 - b. Multitapped, multispeed with internal thermal protection and permanent lubrication.
 - c. Enclosure Type: Totally enclosed, fan cooled.
 - d. NEMA Premium (TM) efficient motors as defined in NEMA MG 1.
 - e. Controllers, Electrical Devices, and Wiring: Comply with requirements for electrical devices and connections specified in electrical Sections.
 - f. Mount unit-mounted disconnect switches on interior of unit.
5. Airstream Surfaces: Surfaces in contact with the airstream shall comply with requirements in ASHRAE 62.1.
6. Condensate Drain Pans:
- a. Fabricated with one percent slope in at least two planes to collect condensate from cooling coils (including coil piping connections, coil headers, and return bends), and to direct water toward drain connection.
 - 1) Length: Extend drain pan downstream from leaving face to comply with ASHRAE 62.1.
 - 2) Depth: A minimum of 1-inch deep.
 - b. Single-wall, galvanized -steel sheet.
 - c. Drain Connection: Located at lowest point of pan and sized to prevent overflow. Terminate with threaded nipple on one end of pan.
 - 1) Minimum Connection Size: 1-inch
 - d. Pan-Top Surface Coating: Asphaltic waterproofing compound.
7. Air Filtration Section:
- a. General Requirements for Air Filtration Section:
 - 1) Comply with NFPA 90A.
 - 2) Minimum Arrestance: According to ASHRAE 52.1 and MERV according to ASHRAE 52.2.
 - 3) Filter-Holding Frames: Arranged for flat or angular orientation, with access doors on both sides of unit. Filters shall be removable from one side or lifted out from access plenum.
 - b. Disposable Panel Filters:
 - 1) Factory-fabricated, viscous-coated, flat-panel type.
 - 2) Thickness: 1-inch.
 - 3) Arrestance according to ASHRAE 52.1: 80.
 - 4) Merv according to ASHRAE 52.2: 5.
 - 5) Media: Interlaced glass fibers sprayed with nonflammable adhesive .

- 6) Frame: Galvanized steel, with metal grid on outlet side, steel rod grid on inlet side, and hinged; with pull and retaining handles.

2.3 CONDENSING UNITS (5 TONS OR LESS)

A. Air-Cooled, Compressor-Condenser Components:

1. Casing: Steel, finished with baked enamel in color selected by Architect, with removable panels for access to controls, weep holes for water drainage, and mounting holes in base. Provide brass service valves, fittings, and gage ports on exterior of casing.
2. 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. Two-speed compressor motor with manual-reset high-pressure switch and automatic-reset low-pressure switch.
 - c. Refrigerant Charge: R-410A.
 - d. Refrigerant Coil: Copper tube, with mechanically bonded aluminum fins and liquid subcooler. Comply with ARI 206/110.
3. Fan: Aluminum-propeller type, directly connected to motor.
4. Motor: Permanently lubricated, with integral thermal-overload protection.
5. Low Ambient Kit: Permits operation down to 17 deg F.
6. Mounting Base: Polyethylene.

2.4 ACCESSORIES

- A. Wall mounted remote controller with temperature sensor: Hardwired unit to control compressor and evaporator fan, with the following features:
 1. Compressor time delay.
 2. 24-hour time control of system stop and start.
 3. Liquid-crystal display indicating temperature, set-point temperature, time setting, operating mode, and fan speed.
 4. Fan-speed selection including auto setting.
- 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. Automatic condensate removal pump.

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.
- C. Install compressor-condenser components as indicated on the drawings by manufacturer. Anchor units to supports with removable, cadmium-plated fasteners.
- D. Equipment Mounting:
 - 1. Comply with requirements for vibration isolation and seismic control devices specified in Section 230548 "Vibration and Seismic Controls for HVAC."
- E. Install and connect precharged refrigerant tubing to component's quick-connect fittings. Install tubing to allow access to unit.

3.2 FIELD QUALITY CONTROL

- A. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect, test, and adjust components, assemblies, and equipment installations, including connections.
- B. Perform tests and inspections.
 - 1. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect components, assemblies, and equipment installations, including connections, and to assist in testing.
- C. Tests and Inspections:
 - 1. Leak Test: After installation, charge system and test for leaks. Repair leaks and retest until no leaks exist.
 - 2. Operational Test: After electrical circuitry has been energized, start units to confirm proper motor rotation and unit operation.
 - 3. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.
- D. Remove and replace malfunctioning units and retest as specified above.
- E. Prepare test and inspection reports.

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 City's maintenance personnel to adjust, operate, and maintain units.

END OF SECTION 238126

SECTION 260501 - GENERAL ELECTRICAL REQUIREMENTS

PART 1 GENERAL

1.1 GENERAL

- A. Provide all labor, materials, equipment and services necessary for and incidental to the complete installation and operation of all electrical work.
- B. All work under this Division is subject to the General Conditions and Special Requirements for the entire contract.
- C. Unless otherwise specified, all shop drawings and submissions required under Division 26 shall be made to, and acceptances and approvals made by, the ENGINEER.
- D. Conform to the requirements of all rules, regulations, and codes of local, state, and federal authorities having jurisdiction. Conform to the National Electrical Code and all NECA – National Electrical Installation Standards (NEIS).
- E. Perform the work in a first-class, substantial, and workmanlike manner. Any materials installed which do not present an orderly and neat workmanlike appearance shall be removed and replaced when so directed by the Engineer, at the Contractor's expense.
- F. Coordinate the work of all trades.
- G. Arrange conduit, wiring, equipment, and other work generally as shown, providing proper clearances and access. Carefully examine all contract drawings and fit the work in each location without substantial alteration. Where departures are proposed because of field conditions or other causes, prepare and submit detailed drawings for approval in accordance with "Submittals" specified below. The right is reserved to make reasonable changes in location of equipment, conduit, and wiring up to the time of rough-in or fabrication.
- H. The contract drawings are generally diagrammatic and all offsets, bends, fittings, and accessories are not necessarily shown. Provide all such items as may be required to fit the work to the conditions.
- I. Be responsible for all construction means, methods, techniques, procedures, and phasing sequences used in the work. Furnish all tools, equipment and materials necessary to properly perform the work in a first class, substantial, and workmanlike manner, in accordance with the full intent and meaning of the Contract Documents.
- J. The Contractor shall provide other work and services not otherwise included in the Contract Documents that are customarily forwarded in accordance with generally-accepted construction practices.

1.2 PERMITS, INSPECTIONS, AND FEES

- A. The Contractor shall obtain and pay for all charges and fees, and deliver all permits, licenses, certificates of inspection, etc., required by the authorities having jurisdiction. Deliver inspection, approval, and other certificates to the City prior to final acceptance of the work.
- B. File necessary plans, prepare documents, give proper notices, and obtain necessary approvals.
- C. Permits and fees shall comply with the General Requirements of the Specification.

- D. Notify Inspection Authorities to schedule inspections of work. All work shall be subject to field inspections.
- E. Notify Architect in advance of scheduled inspections.
- F. An electrical foreman, superintendent or other supervisor shall be in attendance for all scheduled inspections.
- G. The Contractor shall provide an electrical certificate from an independent electrical inspection agency approved by the City and the State of Maryland Fire Marshal. The Contractor shall submit certificate prior to final payment invoice. The Contractor shall pay all fees, including filing fees.

1.3 ELECTRICAL WORK UNDER OTHER DIVISIONS

A. Mechanical Equipment and Systems

- 1. In general, power wiring and motor starting equipment for mechanical equipment and systems are furnished and installed under Electrical Division 26.
- 2. Certain mechanical units contain starters, contacts, transformers, fuses, wiring, etc., required for fans, pumps, etc., furnished with the equipment from the factory. When this equipment is supplied from the factory, the Contractor must supply power circuit(s) to the unit and a disconnecting means. Coordinate with Contractor so that one, and only one, set of starters, fuses, switches, etc., is provided and installed.
- 3. In general, control and interlock equipment for HVAC systems (including associated wiring, conduit, transformers, relays, contacts, etc.) is furnished under Mechanical Divisions. Contractor shall install and connect all such equipment as necessary.
- 4. Controls, wiring, conduit, transformers, etc., for smoke, fire, and motor-operated dampers are provided by Mechanical. Electrical shall install and connect all such equipment.

B. Architectural Equipment: In general, any electrically operated or controlled equipment furnished under architectural divisions shall be supplied with control wiring, transformers, contacts, etc. Contractor shall provide power circuits to such equipment and install all electrical control equipment related thereto.

C. Carefully review the contract documents and coordinate the electrical work under the various Divisions.

1.4 CONTRACTOR QUALIFICATION

- A. Contractor performing work under this Division shall be pre-qualified for Baltimore City contracts.
- B. Contractor is any individual, partnership, corporation, or firm performing work by Contract or subcontract on this project.
- C. Acceptance of a subcontractor will not relieve the Contractor of any contractual requirements or his responsibility to supervise and coordinate the various trades.
- D. Supervisory Qualifications: The electrical work on the project shall be under the direct supervision of a licensed Master Electrician.

1.5 FIRE SAFE MATERIALS

- A. Unless otherwise indicated, materials and equipment shall conform to UL, NFPA, or ASTM Standards for Fire Safety with Smoke and Fire Hazard Rating not exceeding flame spread of 25 and smoke developed of 50.

1.6 REFERENCED STANDARDS, CODES, ORDINANCES AND SPECIFICATIONS

- A. Specifications, Codes and Standards listed below are included as part of this specification, latest edition.

ADA	Americans with Disabilities Act
ANSI	American National Standards Institute
ASHRAE	American Society of Heating, Refrigerating and Air Conditioning Engineers
ASME	American Society of Mechanical Engineers
ASTM	American Society for Testing and Materials
AP	Allegheny Power
IBC	International Building Code
CABO	Council of American Building Officials
FM	Factory Mutual
IEEE	Institute of Electrical and Electronics Engineers
MOSHA	Maryland Occupational Safety & Health Administration
NEC	National Electrical Code
NECA	National Electrical Contractors Association
NEMA	National Electrical Manufacturers Association
NFPA	National Fire Protection Association
OSHA	Occupational Safety & Health Administration
UL	Underwriters Laboratories

- B. All electrical equipment and materials shall comply with the Codes and Standards listed in the latest edition of IEEE Standard 241, *Electric Power Systems in Commercial Buildings*, Chapter 1, Section 1.6, entitled "Codes and Standards".

- C. Comply with all Codes applicable to the work:

1. Bidders shall inform themselves of all local and state codes and regulations.

2. In case of conflict between Contract Documents and governing Codes, the most stringent shall take precedence. Where, in any specific case, different sections of any applicable codes or when Drawings and Specifications specify different materials, methods of Construction, or other requirements, the most restrictive shall govern.
 3. Where Contract Documents exceed minimum Code requirements, and are permitted under the Code, the Contract Documents take precedence and shall govern.
 4. No extra payment will be allowed for work or changes required by local Code enforcement authorities.
- D. Underwriters Laboratories Labels shall apply to all materials and devices, etc., except specified items not covered by existing UL Standards.
- E. Conflicts with applicable regulations:
1. Resolve at Contractor's expense.
 2. Prepare and submit details of alternate construction:
 - a. Acceptable solution of conflict.
 - b. List of substitute materials:

For approval of inspecting authorities.
For approval of Engineer.
- F. Comply with all NECA's National Electrical Installation Standards (NEIS), including NECA 1-2000 "Standard Practices for Good Workmanship in Electrical Contracting".

1.7 INTERPRETATION OF DOCUMENTS

- A. Any discrepancies between Drawings, Specifications, Drawings and Specifications, or within Drawing and Specifications shall be promptly brought to the attention of the City during the bidding period. No allowance shall subsequently be made to the Contractor by reason of his failure to have brought said discrepancies to the attention of the City during the bidding period or of any error on the Contractor's part.
- B. The locations of products shown on Drawings are approximate. The Contractor shall place the devices to eliminate all interference with above-ceiling ducts, piping, etc. Where any doubt exists, the exact location shall be determined by the City.
- C. All general trades and existing conditions shall be checked before installing any outlets, power wiring, etc.
- D. Equipment sizes shown on the Drawings are estimated. Before installing any wire or conduit, the Contractor shall obtain the exact equipment requirements and install wire, conduit, or other item of the correct size for the equipment actually installed. However, wire and conduit sizes shown on the Drawings shall be taken as a minimum and shall not be reduced without written approval from the City.
- E. Where variances occur between the drawings and specifications or within either document itself, the item or arrangement of better quality, greater quality, or higher cost shall be included in the Contract Price. The Engineer will decide on the item and manner in which the work shall be installed.

- F. Contract Drawings are generally diagrammatic and all offsets, fittings, transitions, and accessories are not necessarily shown. Furnish and install all such items as may be required to fit the work to the conditions encountered. Arrange conduits, equipment, and other work generally as shown on the Contract Drawings, providing proper clearance and access. Where departures are proposed because of field conditions or other causes, prepare and submit detailed Shop Drawings for approval in accordance with "submittals" specified below. The right is reserved to make reasonable changes in location of equipment, piping, and ductwork, up to the time of rough-in or fabrication.
- G. Work not specifically outlined, but reasonably incidental to the completion of the work, shall be included without additional compensation from the City.

PART 2 PRODUCTS

2.1 MATERIALS AND EQUIPMENT

- A. Material and equipment installed as a part of the permanent installation shall be new, unless otherwise indicated or specified, and shall be approved by the Underwriters' Laboratories, Inc., for installation in each particular case where standards have been established.
- B. Where material or equipment is identified by proprietary name, model number, and/or manufacturer, furnish the named item or equivalent thereof, subject to acceptance.
- C. Material submissions shall conform to requirements outlined in SUBMITTALS, REVIEW, AND ACCEPTANCE.
- D. The Contractor shall submit manufacturers indicated in the Specification or approved equal. Submit all data necessary to determine suitability of substituted items for approval.
- E. All items of equipment furnished shall have a service record of at least five (5) years.

2.2 SUBSTITUTIONS

- A. Refer to Section 012500 Substitution Procedures

2.3 SUBMITTALS, REVIEW, AND ACCEPTANCE

- A. General:

1. The equipment, material, installation, workmanship, arrangement of work, final instruction, and final documentation is subject to review and acceptance. No substitution will be permitted after acceptance of equipment or materials except where such substitution is considered by the Engineer to be in the best interest of the City. Submit for review in clear and legible form the following documents:
 - a. Material and Equipment List
 - b. Descriptive Data
 - c. Shop Drawings
 - d. Installation and Coordination Drawings
 - e. Contractor As-Built Drawings

- f. Owner Instructions and Manuals
 - g. Construction Phasing and Outage Schedule
2. Prepare all submittals specifically for this project and stamp each submittal in a form indicating that the documents have been Contractor reviewed, are complete, and are in compliance with the requirements of the plans and specifications. Each submittal item shall be clearly identified and numbered. Each submittal shall contain a complete schedule of Manufacturer's part numbers and quantity listings of all supplied components. Each proposed item shall be highlighted and tagged with a star, an arrow, etc., including all options and accessories.
 3. Coordinate the installation requirements and any mechanical requirements for the equipment submitted. Submittals will be reviewed for general compliance with design concept in accordance with the contract documents. The Contractor is responsible for the correctness of all submittals. Reviews will not verify dimensions, quantities, or other details.
 4. Identify all submittals, indicating the intended application, location, or service of the submitted item. Refer to specification sections or paragraphs where applicable. Clearly indicate the exact type, model number, size, and special features of the proposed item. Clearly list on the first page of the Submittal all differences between the specified item and the proposed item. The Contractor shall be responsible for corrective action (or replacement with the specified item) while maintaining the specification requirements, if differences have not been clearly indicated in the submittal. Submittals of a general nature will not be acceptable.
 5. Submit actual operating conditions or characteristics for all equipment where required capacities are indicated. Factory order forms showing only required capacities will not be acceptable. Indicate all options used to meet the specifications. It is not the responsibility of the Engineer or City to make selections of factory options other than colors. Submittals lacking proper selection of factory options or special features required by the specification shall be RETURNED WITHOUT REVIEW.
 6. Acceptance will not constitute waiver of contract requirements unless deviations are specifically indicated and clearly noted.
 7. Documents of general form indicating options shall be clearly marked to show what is specifically proposed for this project.
 8. Submittals NOT IN COMPLIANCE with the requirements of this section will be RETURNED WITHOUT REVIEW.
- B. Material, Equipment, Manufacturer and Subcontractor List: Within 45 calendar days after the award of contract, submit a complete MATERIAL, EQUIPMENT, MANUFACTURER AND SUBCONTRACTOR LIST for preliminary review. List all proposed materials and equipment, the associated proposed Manufacturer, and any proposed subcontractors. After the receipt of reviewed Material and Equipment List, submit complete Shop Drawings for approval. List all materials and equipment, indicating manufacturer, type, class, model, curves, and other general identifying information. Submittals shall be specific for each building as contained in the individual building Specifications and Drawings.
- C. Upon approval of the List of Materials, the Contractor shall prepare a complete Master Submittal Register, listing all products and materials that will be submitted for approval. Items shall be listed by referenced specification paragraph in ascending order. This master list shall be included with each submittal, updated to reflect the status of approval for each item, and shall

highlight the items pertaining to the submittal. A suggested Submittal Register Format is shown below:

SUBMITTAL REGISTER					
Item/Material	Ref'd Spec. Paragraph	Specified or Substitute	Submittal Date	Status	Remarks

- D. No Shop Drawing Submittals will be considered for approval until the complete List of Subcontractors and the complete List of Materials/Manufacturers and Equipment have been approved.
- E. Descriptive Data: After acceptance of the MATERIAL and EQUIPMENT LIST, submit additional DESCRIPTIVE DATA for all items. Data shall consist of specifications, data sheets, samples, capacity ratings, performance curves, operating characteristics, catalog cuts, dimensional drawings, installation instructions, and any other information necessary to indicate complete compliance with the contract documents. Where several ratings or sizes are shown or available, clearly indicate the exact size or rating relating to the particular device being proposed.
- F. Submit complete descriptive data for all items. Data shall consist of Specifications, data sheets, samples, capacity ratings, performance curves, operating characteristics, catalog cuts, dimensional drawings, wiring diagrams, specific electrical/wiring requirements and connections including control and interlock wiring, installation instructions, and any other information necessary to indicate complete compliance with the Contract Documents. Edit submittal data specifically for application to this project.
- G. Shop Drawings shall be submitted and approved for all materials and equipment prior to installation. If any material and/or equipment is installed prior to receipt by the Contractor of approved Shop Drawings, the Contractor is liable for its replacement at no additional cost to the City.
- H. Data submitted shall include information on all materials and equipment to demonstrate compliance with the Contract Drawings and Specifications. Where installation procedures or any part thereof are required to be in accordance with manufacturer's recommendations, furnish printed copies of the recommendations prior to installation. Installation of the item shall not proceed until recommendations are received. Failure to furnish recommendations shall be cause for rejection of the equipment or material.
- I. Any deviation of submitted material or equipment from the Contract Drawings or Specifications shall be clearly marked in red ink on Submittals, and itemized in a transmittal letter, in order to receive consideration for approval.
- J. Approval of material or equipment submittals containing deviations not specifically identified by Contractor shall not relieve the Contractor from compliance with specified requirements.
- K. All major items of mechanical equipment shall be the latest standard catalog products of reputable manufacturers. Where two (2) or more items of the same kind of equipment are required, they shall be the products of a single manufacturer.

- L. Thoroughly review and stamp all submittals to indicate compliance with Contract requirements prior to submission. Coordinate installation requirements and any electrical requirements for equipment submitted. Contractor shall be responsible for correctness of all submittals.
- M. Submittals will be reviewed for general compliance with design concept in accordance with Contract Documents, but dimensions, quantities, or other details will not be verified.
- N. Increase, by the quantity listed below, the number of electrical related Shop Drawings, product data, and samples submitted, to allow for required distribution plus two copies of each submittal required, which will be retained by the Electrical Consulting Engineer.
1. Shop Drawings - Initial Submittal: 1 additional blue- or black-line print.
 2. Shop Drawings - Final Submittal: 1 additional blue- or black-line print.
 3. Product Data: 1 additional copy of each item.
- O. Additional copies may be required by individual sections of these Specifications.
- P. Shop Drawings:
1. Prepare and submit SHOP DRAWINGS AND/OR DIAGRAMS for all specially fabricated items, modifications to standard items, specially designed systems where detailed design is not shown on the contract drawings, or where the proposed installation differs from that shown on the contract drawings.
 2. Shop drawings shall include plans, elevations, sections, mounting details of component parts, point to point interconnection diagrams, elementary diagrams, single line diagrams, and any other drawings necessary to show the fabrication and connection of the complete item or system.
 3. Shop drawings shall be provided for, but not limited to the following items:
 - Basic Electrical Materials
 - Circuit Breakers
 - Conduit and Surface Raceway
 - Contractor and Subcontractor Qualifications
 - Controllers & Control Devices
 - Disconnects
 - Electrical Connection Coordination Schedule
 - Equipment Connections
 - Equipment Pads
 - Firestopping
 - Fuses
 - Ground Conductors
 - Identification System
 - Lamps
 - Lighting Control Equipment
 - Lighting Fixtures
 - Low Voltage Fuses
 - Material and Equipment List
 - Motor Starters
 - Outlet Boxes
 - Panelboards
 - Receptacles
 - Record and Information Booklet
 - Safety Switches

Schedule of Values
Sleeves, Hangers, Supports
Submittal Schedule
Surge Suppression Devices
Tests and Reports
Wiring Devices
Wiring Diagrams

- Q. The Contractor, additionally, shall submit for approval any other shop drawings as required by the Architect. No item listed above shall be delivered to the site, or installed, until approved. After the proposed materials have been approved, no substitution will be permitted except where approved by the Engineer.
- R. The Contractor shall prepare and submit a Detail Schedule of Values indicating the Contract costs for the major work items. The Contractor shall provide additional detail and information as requested by the Engineer.
- S. The Contractor shall prepare and submit a complete Submittal Schedule. The Schedule shall include a listing of all Submittals, Shop Drawings, and Coordination Drawings.

2.4 COORDINATION DRAWINGS

- A. Prepare, submit, and use composite installation and coordination drawings to assure proper coordination and installation of the work. Drawings shall include, but not be limited to the following:
1. Telecommunication Rooms indicating data rack assemblies, panels, etc.
 2. Electrical Rooms indicating switchboard assemblies, transformer, equipment pads, panels, etc.
 3. Mechanical Equipment Rooms, including panels, transformers, starters, equipment, etc.
- B. Draw plans to a scale not less than 1/4 inch equals one foot. Include plans of the proposed work, showing all equipment, major elements, conduit, and wiring in the areas involved. Fully dimension all work, horizontally and vertically. Show coordination with other work including piping, ductwork and other mechanical work, walls, doors, ceilings, columns, beams, joists, and other architectural and structural work.
- C. Identify all equipment and devices on wiring diagrams. Where field connections are shown to factory-wired terminals, furnish manufacturer's literature showing internal wiring.
- D. Prepare, submit, and use scaled layout drawings indicating dimensions, clearances, and actual equipment dimensions. Layout drawing shall include, but not be limited to the following:
1. Pad-mounted equipment and equipment connections.
 2. Underground conduits, ductbanks, manholes, handholes, and building penetrations.

2.5 RECORD DRAWINGS

- A. As the work progresses, record on a set of white prints the installed locations, sizes of electric feeders, equipment, etc. Upon completion of the work, submit one (1) complete set of white prints with "As-Built" information neatly recorded thereon in red ink. Use other colors to distinguish between variations in separate categories of the work. Note related change-order

- numbers where applicable. Provide electronic copies to the City and architect at the completion of the project.
- B. Write step-by-step detailed instructions for turn-on, turn-off, seasonal changeover, and periodic checks of all systems and equipment. Include all precautions and warnings.
 - C. Prepare a list of the manufacturers of all major equipment, their local service representative and procedures for obtaining service.
 - D. Post one (1) copy of all instructions, lists, charts, and diagrams at the equipment or where indicated, mounted under glass or approved plastic cover.
 - E. Furnish to the City two (2) copies of the Manufacturer's installation and operations instructions, and an electronic copy. Include replacement parts lists where applicable. Also include copies of all posted instructions, lists and charts. Assemble the material in one or more heavy duty 8-1/2" x 11" loose leaf binders with tab separators. Submit for approval before final delivery. Binder shall be labeled on spine and on cover with Project Name.
 - F. Deliver all instruction materials to the City prior to the formal instruction period.
 - G. Deliver two (2) complete sets of all approved submittals to the City for filing, including electronic copies.
 - H. Prepare record documents in accordance with the requirements in the specifications. In addition to the requirements specified, indicate installed conditions for:
 - 1. Major raceway systems, size and location, for both exterior and interior; locations of control devices; distribution and branch electrical circuitry; and circuit breaker size and arrangements.
 - 2. Equipment locations (exposed and concealed), dimensioned from prominent building lines.
 - 3. Approved Substitutions, Contract Modifications, and actual equipment and materials installed.
 - I. The Contractor shall keep at the site at all times during construction, one set of up-to-date Contract prints for the express purpose of showing any and all changes made during construction. The Contractor shall make the prints showing each change and shall incorporate all changes in "Record/As-Built Drawings" to be submitted to the Engineer upon completion of the project.
 - J. The Contractor shall show proof of up-to-date record drawings to the City prior to submitting monthly invoice.
 - K. The Contractor shall conform to all drawings, including all revisions, addendums, alternates, change orders, deletions, existing conditions, and as-built conditions without extra cost to the City.

2.6 DEMONSTRATION AND OPERATING INSTRUCTIONS

- A. Furnish the necessary technicians, skilled workers, and helpers to operate the electrical systems and equipment of the entire project. The Contractor shall provide a minimum of three 2-hour sessions of system demonstration and operation for each system including, but not limited to: lighting controls, switchboards, generator, transfer switches.

- B. Where specified in technical sections, provide longer periods required for specialized equipment.
- C. Contractor shall provide start-up of all systems in an orderly, organized, and coordinated manner to ensure that all systems are functioning as designed. The Contractor shall provide a detailed start-up, testing, and demonstration plan for all systems in a coordinated manner that is documented in writing at least 45 days prior to system start-up. Start-up, testing and demonstration plans shall include detailed point-by-point checklists that clearly show that systems are, in fact, functioning as designed. Instruct the City or designated personnel in operation, maintenance, lubrication, and adjustment of systems and equipment.
- D. The Operating and Maintenance Manual shall be available at the time of the instructions, for use by Instructors and City personnel.
- E. Videotape each instruction session, including both the sessions specified above and added sessions required in technical sections for specialized equipment. Provide one complete set of DVD video disks with each Operating and Maintenance Manual.
- F. Schedule the general and specialized instruction periods for a time agreed upon by the City and Engineer. All operation training and demonstrations shall be complete prior to City acceptance of any given system.

PART 3 EXECUTION

3.1 EXAMINATION OF SITE, SURVEYS, AND MEASUREMENTS

- A. Examine the site, determine all conditions and circumstances under which the work must be performed, and make all necessary allowances for same. No additional cost to the City shall be permitted for Contractor's failure to do so.
- B. Examine the site and observe the conditions under which the work will be done or other circumstances which will affect the contemplated work. No allowance will be made subsequently in this connection for any error or negligence on the Contractor's part.
- C. The Contractor shall base all measurements, both horizontal and vertical, from established benchmarks. All work shall agree with these established lines and levels. Verify all measurements at the site and check the correctness of same as related to the work.
- D. Any discovery of discrepancy between actual measurements and those indicated which prevents following good practice or the intent of the Drawings and Specifications shall be brought to the attention of the City's Representative. Work shall not proceed until receiving instructions from the City's Representative.
- E. The Contractor shall follow Drawings in laying out the work and check Drawings of other trades to verify spaces in which work will be installed. Maintain maximum headroom and space conditions at all points. Where headroom or space conditions appear inadequate, the City's Representative shall be notified before proceeding with the installation.
- F. To prevent conflict with the work of other trades and for proper execution of the work, the Contractor, as directed by the City's Representative, shall make the necessary modifications in the layout as needed, at no extra charge to the City.
- G. The Contractor shall be solely responsible for the proper arrangement of his conduit and equipment.

- H. The Engineer shall make all final decisions as to any conditions that require the changing of any work.
- I. The Contractor shall have competent supervision on the site at all times to lay out, check, coordinate, and supervise the installation of all electrical work and be responsible for the accuracy thereof. He shall plan the installation of all electrical work, giving consideration to the work of other trades, to prevent interference.
- J. The Contractor shall determine the location, size, etc., of all chases, sleeve openings, etc., required for the proper installation of the electrical work and see that such are provided. All chases, sleeves, openings, etc., shall be set prior to erection of new work to prevent delay in the progress of other work or trades.
- K. Conditions and/or situations that prevent the proper installation of any equipment or item where shown on the Drawings shall be called to the attention of the Engineer for instructions.
- L. The Contractor shall have equipment shipped or fabricated in sections of suitable size for entering the building and being removed from the finished building in the future, if necessary.
- M. The Contractor shall fully investigate all peculiarities and space limitations for all materials and equipment.
- N. Outlet, pull, and junction boxes and other appliances that require operation, examination, adjustment, servicing or maintenance shall be readily accessible.
- O. The Contractor shall take all field measurements necessary for this work and shall assume responsibility for their accuracy.
- P. The Contractor shall coordinate the electrical work with all other sub-contractors. All work shall be so arranged that there will be no delay in the proper installation and completion of any part or parts of electrical equipment. All electrical work shall be installed in proper sequence with other trades without any unnecessary delay.
- Q. The Drawings are to some extent diagrammatic and indicate the general arrangement of the equipment, the runs of conduit, and the manner of connection.
- R. The Contractor shall confer with all sub-contractors engaged in the construction of the project, regarding the work that may, in any way, affect his installation. Whenever interference occurs, before installing any of the work in question, the Contractor shall consult with all sub-contractors and shall come to an agreement with them as to the exact location and level of his conduit parts of his equipment.
- S. The Contractor shall be responsible for determining exact property lines and area of work. The Contractor shall not install any equipment or conduits outside of the property lines and/or area of work without written direction from the City. Any work indicated diagrammatically on the Contract Documents to be installed beyond the property lines and/or area of work shall be verified with the City prior to installation.

3.2 GENERAL RESPONSIBILITIES

- A. The Contractor shall be responsible for systems and related damages possible, and shall hold harmless the City, the Architect and his consultants from malfunction of systems and equipment installed under this Contract as defined in the laws of the State of Maryland pertaining to real property for the period of time as defined by such laws.

- B. It is the intent of these Specifications to fully cover without exception all required labor and materials so that the finished work will be delivered to the City in a complete and satisfactory working installation. Excavation, wiring, distribution, etc., shall be performed in compliance with the Contract Documents.
- C. Work not specifically outlined, but reasonably incidental to the completion of the work, shall be included without additional compensation from the City.
- D. Conflicting points in the Specifications or on the Drawings shall be called to the attention of the Architect prior to the execution of the Contract.

3.3 STORAGE AND PROTECTION OF EQUIPMENT

- A. All electrical equipment to be used in the construction shall be properly stored and protected against the elements. All equipment shall be stored under cover, and shall not be stored at the construction site on the ground, in mud, water, snow, rain, sleet or dust. Large diameter cables may be stored on reels with weatherproof materials. Such weatherproof materials shall be heavy-duty, securely fastened and made impervious to the elements.
- B. Conventional electrical construction materials such as building wire, outlet and junction boxes, wiring devices, conduit, lighting fixtures, fittings, etc., shall be stored in construction buildings, covered trailers or portable covered warehouses. Any equipment subject to damage or corrosion from excessive moisture shall be stored in dry, heated areas. Any equipment containing plastic or material subject to damage caused by excessive heat or sunlight shall be stored to prevent such damage. This includes plastic ducts and lenses.
- C. Switchboard, motor controllers, panelboards, breakers, emergency lighting, and supervisory equipment, if delivered to the construction site before the building is under cover, shall be warehoused and protected as follows: All gear and equipment shall be covered and protected from the elements and other damage and shall be stored in a clean, dry, heated atmosphere, under cover.
- D. All gear and equipment delivered to the construction site after the building is under cover shall be protected as described above and in addition shall be provided with auxiliary heat to prevent condensation damage. The gear shall also be protected against damage caused by installation of any building systems and equipment; or damage caused by carelessness of workmen who are installing equipment connected to or adjacent to the above electrical equipment.
- E. Equipment damaged as a result of the above conditions shall be properly repaired at the Contractor's expense or shall be replaced at the Contractor's expense, if, in the opinion of the Engineer the equipment has been damaged to such an extent it cannot operate properly after repairs are made.
- F. All electrical enclosures exposed to construction damages such as paint spots, spackling or plaster spatter, grout splashes, waterproofing compound, tar spots or runs and pipe covering compound splashes, shall be completely covered and protected against damage.
- G. In the event leakage into the building of any foreign material or fluid occurs or may occur, the Contractor shall take all steps as described above to protect any and all equipment.
- H. After connections to electrical equipment are complete and the equipment is ready for operation, all construction debris shall be removed from all enclosures. Such debris includes dust, dirt, wire clippings, tape and insulation removed in order to make the connection.

3.4 ELECTRICAL INSTALLATIONS

- A. General: Sequence, coordinate, and integrate the various elements of electrical systems, materials, and equipment. Comply with the following requirements:
1. Coordinate electrical systems, equipment, materials, and installation with landscape/irrigation contractor(s).
 2. Verify all dimensions by field measurements.
 3. Install systems, materials, and equipment to conform with approved submittal data, including coordination drawings, to greatest extent possible. Conform to arrangements indicated by the Contract Documents, recognizing that portions of the Work are shown only in diagrammatic form. Where coordination requirements conflict with individual system requirements, refer conflict to the Engineer.
 4. Install systems, materials, and equipment level and plumb, parallel and perpendicular to other building systems and components where installed exposed in finished spaces.
 5. Install electrical equipment to facilitate servicing, maintenance, and repair or replacement of equipment components. As much as practical, connect equipment for ease of disconnecting, with minimum of interference with other installations. All equipment and disconnects shall maintain proper working space to conform to NEC.
 6. Install systems, materials, and equipment giving right-of-way priority to systems that require installation at a specified slope.
 7. Arrange for chases, slots and openings in other building components during progress of construction, to allow for electrical installation.
 8. Space, coordinate, and integrate installations of electrical materials and equipment for efficient flow of the work.

3.5 SUPERVISION AND COORDINATION

- A. Provide complete supervision, direction, scheduling and coordination of all work under the contract, including that of subcontractors, using full attention and the best skill. Be responsible for all work and make all subcontractors, suppliers and manufacturers fully aware of all requirements of the contract.
- B. Coordinate the rough-in of all work performed under Mechanical & Electrical Divisions.
- C. The Contractor shall coordinate all electrical rough-ins with approved shop drawings and coordination drawings. Any rough-in installed without complete coordination shall be at the Contractor's risk and expense.
- D. Coordinate the installation of all necessary rough-in of work, sleeves, anchors and supports for conduit, wiring, and other work performed under Divisions Mechanical and Electrical Divisions.
- E. Coordinate the spacing and arrangement of lighting fixtures, diffusers, grilles and access panels in ceilings to establish a symmetrical pattern.
- F. Where a discrepancy exists within the Specifications or drawings or between the Specifications and Drawings, the more stringent (or costly) requirement shall apply until a clarification can be obtained from the Engineer. Failure to clarify such discrepancies with the Engineer will not relieve the Contractor of the responsibility of conforming to the requirements of the Contract.

- G. Failure of the Contractor to obtain a full and complete set of Contract Documents (either before or after bidding) will not relieve the Contractor of the responsibility of complying with the intent of the Contract Documents.
- H. To insure proper electrical coordination between the electrical components supplied under the Electrical Divisions and the equipment supplied under the Mechanical Divisions, a schedule shall be submitted, prior to start of work, for review by the Engineer with the following column headings:

1.Equip. or Item	2. HP or KVA	3.Voltage and Phase	4. Power Factor	5. Capacitor	6.Motor Starter	7.Discon.	8.Controls	9.Remarks
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Description of Column Headings:

1. List all the approved equipment furnished under Mechanical Division that requires electrical connections and designate the equipment as it appears in the Mechanical Divisions. Indicate the quantity, if more than one, in parentheses of identical equipment being supplied.
 2. Indicate the supplied horsepower of the equipment listed under Column No. 1. If equipment listed has more than one motor, indicate each motor and its respective horsepower. Indicate the kVA rating for all other equipment requiring an electrical connection, unless the electrical connection is for a control circuit only.
 3. Indicate the voltage and phase requirements for equipment listed under Column No. 1. If more than one electrical circuit or voltage is required for the listed equipment, it shall be so indicated. Indicate wiring required for connection, including all phase, neutral, and ground conductors.
 4. Indicate the power factor rating for all motors listed under Column No. 2.
 5. Where a capacitor is to be provided, indicate specification it is supplied under and indicate the KVAR size for any capacitor provided under Division 26.
 6. Where a motor starter is required, indicate the specification division it is supplied under and the type of motor starter; across-the-line, reversible, variable speed, two speed-single winding, etc. Indicate in Column No. 9 if the motor starter provided under Division 26 is not compatible with the motor specified.
 7. Where a disconnect switch is required by the National Electric Code or by the contract documents for the equipment listed under Column No. 1, indicate under which Division the disconnect switch is supplied.
 8. Indicate the Division under which the controls for the equipment listed under Column No. 1 are provided.
 9. Indicate any discrepancies between what is indicated in the contract documents and what is actually being provided.
- I. The Contractor shall fully coordinate the electrical connections to all equipment prior to installations, with the approved Shop Drawings and the trades involved. Coordination shall include voltage, phases, quantity and size of wiring, device sizes, terminations, rough-in work, and other coordination for a complete installation.
 - J. Coordinate Division 26 work with all trades.
 - K. Install work with proper clearances and access. Carefully examine all contract drawings and fit the work in each location without substantial alteration. Where departures are proposed or required, submit detailed drawings for acceptance. The right is reserved to make reasonable changes in location of equipment, conduit and wiring up to the time of rough-in or fabrication.

- L. Coordinate light switch locations with door swings prior to rough-in. No switches permitted behind doors.
- M. Coordinate electrical work with architectural items and equipment. Typical equipment refers to, but is not limited to, the following:
 - 1. Countertops, Casework and Cabinets.
 - 2. Fume and Exhaust Hoods.
 - 3. Kitchen equipment.
 - 4. Do not install outlets, switches, etc., behind casework, cabinets, etc.
 - 5. Data, phone, and other low voltage system outlets shall be mounted above the counter tops to match power outlets in the same areas.
 - 6. Coordinate counter top outlets with drilling of casework/counters.
 - 7. Coordinate surface raceways and outlets above and below counters with approved casework shop drawings to avoid conflicts with sinks and other appurtenances.
 - 8. Verify lab/kitchen equipment nameplates and connection requirements prior to rough-in.
 - 9. Shop equipment connections, including busways.
- N. This Contractor shall make all system connections required to equipment furnished and installed under other divisions. Connections shall be complete in all respects to render this equipment functional to its fullest intent. The Contractor shall make all system connections required to equipment furnished under other Divisions. Circuits shall be extended to all equipment which is incidental to, but not necessarily shown, for equipment specified under other divisions such as magnetic flow meters, ATC panels, liquid level controls, leak detection systems, etc. Connections shall be complete in all respects to render this equipment functional to its fullest extent.
- O. It shall be the responsibility of the Contractor to obtain complete instructions for connections.

3.6 GUARANTEE

- A. Guarantee obligations shall be as hereinbefore specified in the GENERAL AND SPECIAL CONDITIONS of these specifications, except as follows:
 - 1. Guarantee the complete electrical system free from all mechanical and electrical defects for the period of two (2) years beginning from the day of final acceptance of the work by the City.
 - 2. Also, during the guarantee period, be responsible for the proper adjustments of all systems, equipment and apparatus installed by the Contractor and do all work necessary to ensure efficient and proper functioning of the systems and equipment.
 - 3. Upon receipt of notice from the City of failure of any part of the electrical installation during the guarantee period, new replacement parts shall be furnished and installed promptly at no cost.

4. Warranty From the Manufacturer: Contractor shall obtain all warranty papers and records from the Original Equipment Manufacturer according to their warranty policy and deliver the same to the City. Contractor shall fulfill all the Original Manufacturer's requirements to validate the warranty as offered by the Original Equipment Manufacturer.
- B. Provide 24-hour service for any and all warranty problems experience in the operation of the equipment provided.
- C. Any equipment or system in need of warranty work whether during regular hours or on an emergency basis, shall be immediately serviced and repaired. The warranty work and guarantee shall include all parts and labor and shall be furnished at no cost to the City.
- D. The Contractor shall guarantee to make good any and all defects in his work, exclusive of lamps, which may develop due to defective workmanship or materials, within one year from the date of final acceptance of the work by the City.
- E. In addition to the warranty and correction of work obligations contained in the General and supplementary Conditions, correct the work of the system as embraced by the Specification, free from Mechanical and Electrical defects for the warranty period beginning from the day of acceptance of the building by the Architect for the beneficial use of the City.
- F. During the warranty period, take responsibility for the proper adjustments of systems, equipment and apparatus installed and perform work necessary to ensure the efficient and proper functioning of the systems and equipment.
- G. Certain items of equipment hereinafter specified shall be guaranteed for a longer time than the general warranty period. These guarantees shall be strictly adhered to and the Contractor shall be responsible for service or replacement required in connection with guarantee of these items. These guarantees shall commence on the same date as the final acceptance by the Architect.
- H. Submission of a bid proposal for this Project warrants that the Contractor has reviewed the Contract Documents and has found them free from ambiguities and sufficient for the construction and proper operation of systems installed for this project. If discrepancies are found, have them clarified by Addendum.
- I. It is possible that certain areas of the building or certain systems will be accepted at a time different than as specified. The date of acceptance by the Architect for beneficial use of the City for these building areas or systems will be adjusted accordingly.

3.7 SCHEDULING OF WORK

- A. The Contractor shall not be permitted to do any work in any area of any occupied building during normal hours, except in areas specifically assigned.
- B. Coordination of work by the Contractor is essential such that power outages are kept to a minimum in quantity and duration. All required outages shall be approved by the City for optimum time scheduling. Written notice of not less than 15 calendar days shall precede all power outages.

3.8 DEMONSTRATION

- A. As a part of this contract, the Contractor shall provide for the services of equipment manufacturers or their established representatives to demonstrate to selected maintenance personnel the correct operation, safety and maintenance of all electrical equipment under this contract.

3.9 PAINTING AND FINISHES

- A. Provide protective finishes on all materials and equipment. Use coated or corrosion-resistant materials, hardware and fittings throughout the work. Paint bare, untreated ferrous surfaces with rust-inhibiting paint. All exterior components including supports, hangers, nuts, bolts, washers, vibration isolators, etc., shall be galvanized or stainless steel.
- B. Clean surfaces prior to application of coatings, paint, or other finishes.
- C. Provide factory-applied finishes where specified. Unless otherwise indicated factory-applied paints shall be baked enamel with proper pre-treatment.
- D. Protect all finishes and restore any finishes damaged as a result of work under Division 26 to their original condition.
- E. The preceding requirements apply to all work, whether exposed or concealed.
- F. Remove all construction marking and writing from exposed equipment, conduit, and building surfaces. Do not paint manufacturer's labels or tags.
- G. All exposed conduit, etc., shall be painted, except in electrical rooms, mechanical rooms, storage rooms, and crawl spaces. Colors shall be selected by the Architect and conform to ANSI Standards.
- H. Submit color of factory-finished equipment for approval prior to ordering.

3.10 PROTECTION OF WORK

- A. Protect work, material and equipment from weather and construction operations before and after installation. Properly store and handle all materials and equipment.
- B. Cover temporary openings in conduit and equipment to prevent the entrance of water, dirt, debris, or other foreign matter.
- C. Cover or otherwise protect all finishes.
- D. Replace damaged materials, devices, finishes and equipment.

3.11 OPERATION OF EQUIPMENT

- A. Clean all systems and equipment prior to initial operation for testing, retesting, or other purposes. Set, adjust, and test all equipment in accordance with manufacturer's instructions. Do not operate equipment unless all proper safety devices or controls are operational. Provide all maintenance and service for equipment that is authorized for operation during construction.
- B. Where specified, or otherwise required, provide the services of the manufacturer's factory-trained servicemen or technicians to start up the equipment.
- C. Do not use electrical systems for temporary services during construction unless authorized in writing by the City. Where such authorization is granted, temporary use of equipment shall in no way limit or otherwise affect warranties or guaranty period of the work.
- D. Upon completion of work, clean and restore all equipment to new conditions; replace expendable items such as filters.

3.12 TESTING AND ADJUSTMENT

- A. Perform all tests which are specified or required to demonstrate that the work is installed and operating properly. Where formal tests are required, give proper notices and perform all necessary preliminary tests to assure that the work is complete and ready for final test.
- B. Adjust all systems, equipment and controls to operate in a safe, efficient and stable manner.
- C. On all circuits, 600 volts or less, provide circuits that are free from ground faults, short circuits and open circuits.
- D. Other tests of a specific nature for special equipment shall be as specified under the respective equipment.

3.13 IDENTIFICATIONS, ELECTRICAL DIAGRAMS AND OPERATING INSTRUCTIONS

- A. Contractor shall submit for approval schematic diagrams of each electrical system installed in the building. Diagrams shall indicate device location, service, type, make, model number and the identification number of each device in the particular system. Following approval by all authorities, the diagrams shall be framed, mounted under glass and hung in each Main Equipment Room where directed. Contractor shall deliver the tracing or sepia from which the diagrams were reproduced to the City.
- B. All equipment shall be plainly tagged.
- C. All items of equipment, including motor starters, panels, etc., shall be furnished with white letters and numbers on black plastic identification plates or aluminum letters and numbers on black engraved aluminum identification plates. Lettering shall be a minimum of 1/4" high. Identification plates shall be securely affixed to each piece of equipment, starters, panels, etc., by screws or adhesive (Tuff-Bond #TB2 or as approved equal). Pressure sensitive tape backing is prohibited.
- D. Provide three (3) copies of operating and maintenance instructions for all principal items of equipment furnished. This material shall be bound as a volume of the "Record and Information Booklet" as hereinafter specified.
- E. Provide at least 24 hours of straight time instruction to the operating personnel. This instruction period shall consist of not less than three (3) consecutive 8-hour days. Time of instruction shall be designated by the City. Provide two VHS video taped copies of all instructional periods/demonstrations.

3.14 RECORD DRAWINGS AND SPECIFICATIONS

- A. Upon completion of the Electrical installations, the Contractor shall deliver to the Engineer one complete set of prints of the Electrical Contract Drawings which shall be legibly marked in red pencil to show all Addenda, approved Shop Drawings, Change Orders, changes and departures of the installation as compared with the original design. They shall be suitable for use in preparation of Record Drawings. Provide electronic copies of each.
- B. The Contractor shall provide a record specification including all Addenda and other modifications. Record substantial variations in actual work performed. Identify all substitutions.

3.15 RECORD AND INFORMATION BOOKLET

- A. The Contractor shall have prepared three (3) copies of the Record and Information Booklet as well as an electronic copy and deliver these copies of the booklet to the City. The booklet shall

be as specified herein. The booklet must be approved and will not be accepted as final until so stamped.

- B. The booklet shall be bound in a three-ring loose-leaf binder similar to "National" No. 3881 with the following title lettered on the front and on the spine of the binder: "Record and Information Booklet (insert name of the project)". No sheets larger than 8-1/2" x 11" shall be used, except sheets that may be neatly folded to 8-1/2" x 11" and used as a pull-out. An Index will include the section tabs for each subject included. If more than one binder is required, print covers and spines with Volume numbers. Include in the front of every binder an index to all binders.
1. Internally subdivide the binder contents with permanent page dividers, logically organized as described below; with tab titling clearly printed under reinforced laminated plastic tabs.
 2. Contents: Prepare a Table of Contents for each volume, with each product or system description identified, typed on white paper.
 3. Part 1: Directory, listing names, addresses, and telephone numbers of Electrical Engineers; Contractor; Electrical Subcontractors; and major Electrical equipment suppliers. Provide sales and service representative names and phone numbers of all equipment.
 4. Part 2: Operation and Maintenance Instructions, arranged by Specification Section. For each category, identify names, addresses, and telephone numbers of Subcontractors and suppliers. Identify the following:
 - a. Significant design criteria.
 - b. List of equipment. Complete record of material list. Catalog brochures and product data for all components. Include all submittal comments, and corrected catalog data and shop drawings on each piece of equipment and each system.
 - c. Parts list for each component, including recommended spare parts list. Include motor starter overload schedules.
 - d. Operating instructions, including sequence of operation.
 - 1) Description of function, normal operating characteristics and limitations, engineering data and tests, and complete nomenclature and commercial numbers of replacement parts. Provide a description of each system installed.
 - 2) Manufacturer's printed operating procedures to include start-up, break-in, and routine and normal operating instructions; control, stopping.
 - e. Maintenance instructions for equipment and systems. Detailed checkout procedures to insure operation of systems and gear, including recommended cleaning methods and materials and special precautions identifying detrimental agents.
 - f. Servicing, diagnostic and troubleshooting instructions and procedures for systems and major equipment.
 - g. Recommended preventative maintenance program, including a list of items requiring inspection and servicing. Provide Chart Form indicating time and type

of routine and preventative maintenance of electrical equipment, etc. The chart shall also indicate tag number, model number of equipment, location and service.

- 1) For replacement items, indicate type, size and quantity of the replaceable items.
 - 2) Provide lubrication schedule, including type, grade, temperature range and frequency.
 - 3) Provide a list of each type of lighting fixture lamp used, lamp fixture used, and source.
 - 4) Include estimated mean time between failures for major parts.
- h. Wiring Diagrams, Block Diagrams, and Assembly Drawings.
- i. Panelboard Circuit Directory for each panelboard, including Panel Name, Panel Location, Panel Ratings, spare circuit breakers, spaces for additional circuit breakers.
- j. List of equipment keys turned over to the City.
5. Part 3: Project Documents and Certificates, including the following:
- a. Shop Drawings and Product Data. Record Documents of the systems.
 - b. Photocopies of certificates.
 - c. Photocopies of Manufacturers' and Contractors' warranties, guarantees.
 - d. Test Reports: Copies of the approved results of all tests required under all sections of specifications.
 - e. Inspection Certificates.
 - f. Manufacturer's Reports: Copies of the approved results of all tests required under all sections of specifications.
6. Provide one copy (DVD video disk) of video instruction session with each booklet set. Label video disk with all pertinent information.
7. Submit one copy of completed volumes in final form 15 days prior to final inspection. This copy will be returned with Engineer comments. Revise content of documents as required prior to final submittal.
8. Submit final volumes revised, within ten days after final inspection.
- C. Upon completion of the project, the Contractor shall furnish the City a complete list of suppliers of equipment for parts and maintenance purposes. The list shall include the name, address, and telephone number of the parts and maintenance firm on a single 8-1/2" x 11" sheet of paper.
- D. This item shall include the furnishing of a complete list of equipment installed on the project, including the Manufacturer's name, the make and model number of the equipment, and address and telephone number of the nearest supplier who stocks maintenance and/or replacement parts. The list should be submitted along with as-built drawings and be typed in an organized manner.

3.16 INSTALLATION AND COORDINATION DRAWINGS

- A. In congested areas, prepare, submit, and use composite installation and coordination drawings to assure proper coordination and installation of work. Drawings shall include, but not be limited, to the following: Complete Electrical Drawings showing coordination with lights, electrical equipment, mechanical, plumbing, HVAC, structural, and architectural elements and provision for access.
- B. Draw plans to a scale not less than 3/8-inch equals one foot. Include plans, sections, and elevations of proposed work, showing all equipment and conduit in areas involved. Fully dimension all work including lighting fixtures, conduits, pullboxes, panelboards, and other electrical work, walls, doors, ceilings, columns, beams, joists, mechanical equipment, and other architectural and structural work.
- C. Identify all equipment and devices on wiring diagrams and schematics. Where field connections are shown to factory-wired terminals, include manufacturer's literature showing internal wiring.

END OF SECTION 260501

SECTION 260519 - 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.

PART 2 PRODUCTS

2.1 CONDUCTORS AND CABLES

- A. Manufacturers: Subject to compliance with requirements, provide products by the following provide products by one of the following:
 - 1. Alpha Wire.
 - 2. General Cable Technologies Corporation.
 - 3. Southwire Incorporated.
- B. Copper Conductors: Comply with NEMA WC 70/ICEA S-95-658.
- C. Conductor Insulation: Comply with NEMA WC 70/ICEA S-95-658 for Type THHN-2-THWN-2.

2.2 CONNECTORS AND SPLICES

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Hubbell Power Systems, Inc.
 - 2. Ideal Industries, Inc.
 - 3. Ilsco; a branch of Bardes Corporation.
 - 4. O-Z/Gedney; a brand of the EGS Electrical Group.
 - 5. 3M; Electrical Markets Division.
- B. 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.
- C. Minimum conductor size No. 12 AWG for power circuits and No. 14 AWG for control circuits.

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 below Slabs-on-Grade, and Underground: Type THHN-2-THWN-2, single conductors in raceway.
- E. Branch Circuits Concealed in Ceilings, Walls, and Partitions: Type THHN-2-THWN-2, single conductors in raceway.
- F. Branch Circuits below Slabs-on-Grade, and Underground: Type THHN-2-THWN-2, single conductors in raceway.
- G. 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. Complete raceway installation between conductor and cable termination points according to Section 260533 "Raceways and Boxes for Electrical Systems" prior to pulling conductors and cables.
- B. 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.
- C. Use pulling means, including fish tape, cable, rope, and basket-weave wire/cable grips, that will not damage cables or raceway.

- D. Install exposed cables parallel and perpendicular to surfaces of exposed structural members, and follow surface contours where possible.
- E. Support cables according to 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 (150 mm) of slack.

3.5 IDENTIFICATION

- A. Identify and color-code conductors and cables according to Section 260553 "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 NEUTRAL CONDUCTORS

- A. Shared neutral conductors are not acceptable. Provide dedicated neutral conductor for each circuit phase conductor requiring a neutral conductor.

3.7 CONDUCTORS AMPERE CAPACITY DE-RATING

- A. Do not combine current carrying conductors in single conduit raceway or wireway that would require more than 80% derating.

3.8 VOLTAGE DROP

- A. Maintain less than 3% voltage drop on all branch circuits. Increase corresponding conduit and conductor sizes to accommodate voltage drop. Increase 20 amp branch circuit conductor size as follows:

HOME RUN LENGTH AND WIRE SIZE		CIRCUIT LENGTH AND WIRE SIZE	
120 Volt		120 Volt	
0 – 60'	#12	0 – 100'	#12
60 – 100'	#10	100' & Up	#10
100' & Up	#8		

Circuit length is wire length between first and last outlet on circuit. Home run length is wire length between first outlet and panelboard. Where size of conductors are increased by NEC for circuit rating

ensure termination provisions of equipment connected to circuits are listed suitable for conductor sizes involved. Increase conduit sizes to accommodate increased sizes of conductors.

- B. Increase corresponding conduit and conductors' sizes for circuits greater than 20 amps to maintain less than stated voltage drop.

END OF SECTION 260519

SECTION 260526 - 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 systems and equipment.

1.3 ACTION SUBMITTALS

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

1.4 INFORMATIONAL SUBMITTALS

- A. Informational Submittals: Plans showing dimensioned as-built locations of grounding features specified in "Field Quality Control" Article, including the following:
 - 1. Test reports.

1.5 QUALITY ASSURANCE

- A. Comply with UL 467 for grounding and bonding materials and equipment.

PART 2 PRODUCTS

2.1 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. Tinned Conductors: ASTM B 33.
 - 4. Bonding Cable: 28 kcmil, 14 strands of No. 17 AWG conductor, 1/4 inch (6 mm) in diameter.
 - 5. Bonding Conductor: No. 4 or No. 6 AWG, stranded conductor.
 - 6. Bonding Jumper: Copper tape, braided conductors terminated with copper ferrules; 1-5/8 inches (41 mm) wide and 1/16 inch (1.6 mm) thick.

7. Tinned Bonding Jumper: Tinned-copper tape, braided conductors terminated with copper ferrules; 1-5/8 inches (41 mm) wide and 1/16 inch (1.6 mm) thick.

2.2 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, pressure type with at least two bolts.
 1. Pipe Connectors: Clamp type, sized for pipe.
- 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. 8 AWG and smaller, and stranded conductors for No. 6 AWG and larger unless otherwise indicated.
- B. Conductor Terminations and Connections:
 1. Pipe and Equipment Grounding Conductor Terminations: Bolted connectors.
 2. Connections to Structural Steel: Welded connectors.

3.2 EQUIPMENT GROUNDING

- A. Install insulated equipment grounding conductors with all feeders and branch circuits.
- B. Install insulated equipment grounding conductors with the following items, in addition to those required by NFPA 70:
 1. Feeders and branch circuits.
 2. Lighting circuits.
 3. Receptacle circuits.
 4. Single-phase motor and appliance branch circuits.
 5. Three-phase motor and appliance branch circuits.
 6. Flexible raceway runs.

- C. Signal and Communication Equipment: In addition to grounding and bonding required by NFPA 70, provide a separate grounding system complying with requirements in TIA/ATIS J-STD-607-A.
 - 1. For telephone, alarm, voice and data, and other communication equipment, provide No. 4 AWG minimum insulated grounding conductor in raceway from grounding electrode system to each service location, terminal cabinet, wiring closet, and central equipment location.

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.

3.4 LABELING

- A. Comply with requirements in Section 260553 "Identification for Electrical Systems" for instruction signs. The label or its text shall be green.
- B. Install labels at the telecommunications bonding conductor and grounding equalizer and at the grounding electrode conductor where exposed.
 - 1. Label Text: "If this connector or cable is loose or if it must be removed for any reason, notify the facility manager."

3.5 FIELD QUALITY CONTROL

- A. Testing Agency to Perform Tests and Inspections:
 - 1. After installing grounding system but before permanent electrical circuits have been energized, test for compliance with requirements.
 - 2. Inspect physical and mechanical condition. Verify tightness of accessible, bolted, electrical connections with a calibrated torque wrench according to manufacturer's written instructions.
- B. Grounding system will be considered defective if it does not pass tests and inspections.
- C. Prepare test and inspection reports.

- D. Report measured ground resistances that exceed the following values:
 - 1. Power and Lighting Equipment or System with Capacity of 500 kVA and Less: 10 ohms.
- E. Excessive Ground Resistance: If resistance to ground exceeds specified values, notify Engineer promptly and include recommendations to reduce ground resistance.

END OF SECTION 260526

SECTION 260528 – ELECTRICAL FIRESTOPPING

PART 1 GENERAL

1.1 SUMMARY

A. Section includes:

1. Through-penetration firestopping in fire rated construction.
2. Through-penetration smoke-stopping in smoke partitions.

B. Related items: Raceway seals and manufactured electrical devices: Refer to Division 26 “Basis Electrical Materials and Methods”.

1.2 REFERENCES

A. Underwriters Laboratories

1. UL Fire Resistance Directory
 - a. Through-penetration firestop devices (XHCR)
 - b. Fire resistance rating (BXUV)
 - c. Through-penetration firestop systems (XHEZ)
 - d. Fill, void, or cavity material (XHHW)

B. American Society for Testing and Materials Standards: ASTM E 814-88: Standard Test Method for Fire Tests of Through-Penetration Firestops.

1.3 DEFINITIONS

A. Assembly: Particular arrangement of materials specific to given type of construction described or detailed in referenced documents.

B. Barriers: Time-rated fire walls, smoke barrier walls, time rated ceiling/floor assemblies and structural floors.

C. Firestopping: Methods and materials applied in penetrations and unprotected openings to limit spread of heat, fire, gasses and smoke.

D. Penetration: Opening or foreign material passing through or into barrier or structural floor such that full thickness of rated materials is not obtained.

E. System: Specific products and applications, classified and numbered by Underwriters Laboratories, Inc. to close specific barrier penetrations.

F. Sleeve: Metal fabrication or pipe section extended through thickness of barrier and used to permanently guard penetration. Sleeves are described as part of penetrating system in other sections and may or may not be required.

1.4 SYSTEM DESCRIPTION

A. Design Requirements

1. Fire-rated construction: Maintain barrier and structural floor fire resistance ratings including resistance to cold smoke at all penetrations, connections with other surfaces or types of construction, at separations required to permit building movement and sound or vibration absorption.
2. Smoke barrier construction: Maintain barrier and structural floor resistance to cold smoke at all penetrations, connections with other surfaces and types of construction and at all separations required to permit building movement and sound or vibration absorption.

1.5 SUBMITTALS

A. Submit in accordance with Division 26 "Basis Electrical Materials and Methods", unless otherwise indicated.

B. Product data: Manufacturer's specifications and technical data including the following:

1. Detailed specification of construction and fabrication.
2. Manufacturer's installation instructions.

C. Shop drawings: Indicate dimensions, description of materials and finishes, general construction, specific modifications, component connections, anchorage methods, hardware, and installation procedures, plus the following specific requirements.

1. Details of each proposed assembly identifying intended products and applicable UL system number, or UL classified devices.
2. Manufacturer or manufacturer's representative shall provide qualified engineering judgment and drawings relating to non-standard applications as needed.

D. Quality control submittals: Statement of qualifications.

E. Applicators' qualifications statement: List past projects indicating required experience.

1.6 QUALITY ASSURANCE

A. Installer's qualifications: Fire experienced in installation or application of systems similar in complexity to those required for this project, plus the following:

1. Acceptable to or licensed by manufacturer, State or local authority where applicable.
2. At least 2 years' experience with systems.
3. Successfully completed at least 5 comparable scale projects using this system.

B. Local and State regulatory requirements: Submit forms or acceptance for proposed assemblies not conforming to specific UL Firestop System numbers, or UL classified devices.

C. Materials shall have been tested to provide fire rating at least equal to that of the construction.

D. Manufacturer shall be a member of the International Firestop Council (IFC).

1.7 DELIVERY, STORAGE, AND HANDLING

A. Packing and shipping:

1. Deliver products in original unopened packaging with legible manufacturer's identification.
2. Coordinate delivery with scheduled installation date, allow minimum storage at site.

B. Storage and protection: Store materials in a clean, dry, ventilated location. Protect from soiling, abuse, moisture and freezing when required. Follow manufacturer's instructions.

1.8 PROJECT CONDITIONS

A. Existing conditions:

1. Verify existing conditions and substrates before starting work. Correct unsatisfactory conditions before proceeding.
2. Proceed with installation only after penetrations of the substrate and supporting brackets have been installed.

B. Environmental requirements:

1. Furnish adequate ventilation if using solvent.
2. Furnish forced air ventilation during installation if required by manufacturer.
3. Keep flammable materials away from sparks or flame.
4. Provide masking and drop cloths to prevent contamination of adjacent surfaces by firestopping materials.

1.9 GUARANTEE

A. Submit copies of written guarantee agreeing to repair or replace joint sealers which fall in joint adhesion, extrusion resistance, migration resistance, or general durability or appear to deteriorate in any other manner not clearly specified by submitted manufacturer's data as an inherent quality of the material for the exposure indicated. The guarantee period shall be two year from date of substantial completion unless otherwise noted.

PART 2 PRODUCT

2.1 MANUFACTURERS

A. Subject to compliance with requirements, manufacturers offering products that may be incorporated into the work include, but are not limited to, the following:

1. Hilti.
2. Nelson.

2.2 THROUGH-PENETRATION FIRESTOPPING OF FIRE-RATED CONSTRUCTION

- A. Systems of devices listed in the UL Fire Resistance Directory under categories XHCR and XHEZ may be used, providing that it conforms to the construction type, penetrant type, annular space requirements and fire rating involved in each separate instance, and that the system be symmetrical for wall applications. Systems or devices must be asbestos-free.
1. Additional requirements: Withstand the passage of cold smoke either as an inherent property of the system, or by the use of a separate product included as a part of the UL system or device, and designed to perform this function.
 2. Acceptable manufacturers and products.
 - a. Those listed in the UL Fire Resistance directory for the UL System involved and as further defined in the System and Applications Schedule in Part 3.6 of this section.
 - b. All firestopping products must be from a single manufacturer. All trades shall use products from the same manufacturer unless otherwise noted.

2.3 SMOKE-STOPPING AT SMOKE PARTITIONS

- A. Through-penetration smoke-stopping: Any system complying with the requirements for through-penetration firestopping in fire-rated construction, as specified in The Systems and Applications Schedule in Part 3.6 of this section, is acceptable, provided that the system includes the specified smoke seal or will provide a smoke seal. The length of time of the fire resistance may be disregarded.

2.4 ACCESSORIES

- A. Fill, void or cavity materials: As classified under category XHHW in the UL Fire Resistance Directory.
- B. Forming materials: As classified under category XHKU in the UL Fire Resistance Directory.
- C. Sleeves: Minimum 24 MSG galvanized steel, 12" diameter or smaller steel pipe. Sleeve shall project 1/2" from each surface of the floor/wall. Size as recommended by firestop manufacturer.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verification of conditions: Examine areas and conditions under which work is to be performed and identify conditions detrimental to proper or timely completion.
1. Verify barrier penetrations are properly sized and in suitable condition for application of materials.
 2. Do not proceed until unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Clean surfaces to be in contact with penetration seal materials of dirt, grease, oil, loose materials, rust, or other substances that may affect proper fitting, adhesion, or the required fire resistance.

3.3 INSTALLATION

- A. Install penetration seal materials in accordance with printed instructions of the UL Fire Resistance Directory and in accordance with manufacturer's instruction.
- B. Seal holes or voids made by penetrations to ensure an effective smoke barrier.
- C. Protect materials from damage on surfaces subject to traffic.
- D. When large openings are created in walls or floors to permit installation of conduits, cable tray, or other items, close unused portions of opening with firestopping materials tested for the application. See UL Fire Resistance Directory or Paragraph 2.2 of this document.
- E. Install smoke stopping as specified for firestopping.
- F. Provide sleeves the full thickness of the assembly being penetrated and cut sleeves to a length of 1-inch more than the over-all thickness of the penetration, or as recommended by the firestop manufacturer.
- G. All holes and voids shall be sealed the same day they are made.

3.4 FIELD QUALITY CONTROL

- A. Examine penetration sealed areas to ensure proper installation before concealing or enclosing areas.
- B. Keep areas of work accessible until inspection by applicable code authorities.
- C. Perform under this section patching and repairing of firestopping caused by cutting or penetration by other trades.

3.5 ADJUSTING AND CLEANING

- A. Clean up spills of liquid components.
- B. Neatly cut and trim materials as required.
- C. Remove equipment, materials and debris, leaving area in undamaged, clean condition.

3.6 SYSTEMS AND APPLICATION SCHEDULES*

SEE NEXT PAGE.

PENETRATING ITEM	CONCRETE	GYPSUM	WOOD FLOOR/ CEILING
Metal Pipe	CAJ1001 CP25S/L, CP25N/S CAJ1006 CS-195+, FS-195+ CAJ1007 FS-195+, 1"& 2" Wide CAJ1009 2000, 2000+, 2003 CAJ1010 2000, 2000+, 2003 CAJ1012 2000, 2000+, 2003 CAJ1013 2000, 2000+, 2003 CAJ1014 2000, 2000+, 2003 CAJ1015 2000, 2000+, 2003 CAJ1017 FD 150 CAJ1021 FD 150 CAJ1027 MPS-2+ CAJ1044 CP 25WB+ CAJ1052 CP 25S/L, CP 25N/S CAJ1058 2000, 2000+, 2003 CAJ1060 2000, 2000+, 2003 CAJ1063 2000, 2000+, 2003 CAJ1066 CP 25N/S,CP 25S/L, CP 25WB+ CAJ1091 CP 25N/S,CP 25S/L, CP 25WB+ CAJ1092 CP 25WB+ CAJ1112 FS-195+ CAJ1160 CP 25S/L, CP 25N/S CAJ1175 CP 25WB+ CAJ1176 CP 25WB+ CAJ1188 2000+ CBJ1020 CS-195+, FS-195+ CBJ1021 CS-195+, MPS-2+ CBJ1031 2001 CBJ1032 2001 FA1002 CP 25WB+ WJ1010 CP 25WB+ WJ1023 2001	WL1001 CP 25 WL1002 FS-195+ WL1003 CP 25WB+,CP 25N/S WL1008 2000+ WL1009 2000+ WL1010 2000+ WL1016 CP 25WB+ WL1017 CP 25WB+,CP 25N/S WL1032 CP 25WB+,CP 25N/S WL1036 FD 150 WL1037 CS-195+,FS-195+ WL1067 CP 25N/S WL1073 CP 25WB+ WL1080 MPS-2+ WL1082 2000+	FC1002 CP 25 FC1003 2000,2000+,20003 FC1006 CP 25WB+
Non-Metallic	CAJ2001 FS-195+, 1"& 2" WIDE, PPD'S CAJ2002 FS-195+ CAJ2003 CS-195+, FS-195+ CAJ2005 FS-195+ CAJ2006 FS-195+ CAJ2013 FS-195+	WL2002 FS-195+, PPD'S WL2003 FS-195+ WL2004 FS-195+ WL2005 FS-195+ 4' WIDE WL2006 FS-195+ WL2013 FS-195+ WL2031 CS-195+, FS-	FC2002 FS-195+, PPD'S FC2007 FS-195+, PPD'S FC2008 FS-195+ FC2009 FS-195+, PPD'S

PENETRATING ITEM	CONCRETE	GYPSUM	WOOD FLOOR/ CEILING
	CAJ2019 2000, 2000+, 2003 CAJ2027 FS-195+, CP 25N/S, CP 25S/L, CP 25WB+ CAJ2028 FS-195, MPS-2+ CAJ2029 FS-195+, PPD'S CAJ2030 CS-195+, FS-195+ CAJ2040 FS-195+, CP 25WB+ CAJ2044 FS-195+, CP 25N/S, CP 25S/L CP 25 WB+ CAJ2090 FS-195+ CAJ2177 FS-195+, PPD'S FA2001 FS-195+, PPD'S FS2002 CS-195+, FS-195+, MPS-2+, PPD'S FA2011 FS-195+ WJ2012 FS-195+ 1" WIDE	195+ WL2032 CS-195+, FS- 195+ WL2033 FS-195+ WL2073 FS-195+ 1" WIDE	FC2024 FS-195+ FC2026 FS-195+ FC2028 FS-195+, 1' & 2" WIDE, PPD'S
Insulated Cable	CAJ3001 CP 25N/S, CP 25S/L CAJ3005 CS 195+, FS-195+ CAJ3007 2001 CAJ3009 2000, 2000+, 2003 CAJ3010 2000, 2000+, 2003 CAJ3011 2001 CAJ3014 FD 150 CAJ3015 FD 150 CAJ3021 MPS-2+ CAJ3029 2000, 2000+, 2003 CAJ3030 CP 25WB+ CAJ3031 CP 25N/S, CP 25S/L CAJ3041 2000, 2000+, 2003 CAJ3044 CS-195+, FS-195+ CAJ3058 FS-195+, MPS-2+ CAJ3071 CP 25N/S, CP 25S/L CAJ3074 CP 25N/S, CP 25S/L CAJ3075 2001 CAJ3080 CP 25WB+ CBJ3016 CS-195+, FS-195+ CBJ3017 CS-195+, MPS-2+ FA3001 CP 25WB+ FB3004 CS-195+, MP WJ3015 2001	WL3001 CP 25, MPS-2+ WL3008 2000+ WL3009 2000+ WL3015 CP 25WB+, CP 25N/S WL3022 2000+ WL3030 FS-195+ WL3031 MPS-2+ WL3032 CP 25WB+ WL3041 2000+ WL3051 CP 25N/S WL3056 CP25N/S WL3062 CP 25WB+	FC3001 CP 25S/L, CP 25N/S FC3002 2000+ FC3003 2000, 2000+, 20003 FC3007 CP 25WB+, MPS-2+ FC3008 FS-195+

PENETRATING ITEM	CONCRETE	GYPSUM	WOOD FLOOR/ CEILING
	WJ3016 2001		
Mixed Penetrating Items Combos	CAJ8001 CS-195+ FS-195+ CAJ8003 2000, 2000+, 20003 CAJ8004 2000, 2000+, 20003 CAJ8006 2001 CAJ8013 FS-195+, CP 25 CBJ8004 CS-195, FS-195+ CBJ8005 CS-195+, MPS-2+ CBJ8008 2001 FA8001 FS-195+, CP 25WB+	WL8002 CS-195+, FS-195+	

* Underwriter's Laboratories, Inc., Fire Resistance Directory.

END OF SECTION 260528

SECTION 260533 - 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. Surface raceways.
 - 3. Boxes, enclosures, and cabinets.

1.3 DEFINITIONS

- A. GRC: Galvanized rigid steel conduit.
- B. IMC: Intermediate metal conduit.

1.4 ACTION SUBMITTALS

- A. Product Data: For surface raceways, wireways and fittings, floor boxes, hinged-cover enclosures, and cabinets.
- B. Shop Drawings: For custom enclosures and cabinets. Include plans, elevations, sections, and attachment details.

1.5 INFORMATIONAL SUBMITTALS

- A. Coordination Drawings: Conduit routing plans, drawn to scale, on which the following items are shown and coordinated with each other, using input from installers of items involved:
 - 1. Structural members in paths of conduit groups with common supports.
 - 2. HVAC and plumbing items and Engineerural features in paths of conduit groups with common supports.

PART 2 PRODUCTS

2.1 METAL CONDUITS, TUBING, AND FITTINGS

- A. Manufacturers: Subject to compliance with requirements, provide products by the following provide products by one of the following:
 - 1. Allied Tube & Conduit; a Tyco International Ltd. Co.
 - 2. O-Z/Gedney; a brand of EGS Electrical Group.

3. Robroy Industries.
 4. Thomas & Betts Corporation.
 5. 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. IMC: Comply with ANSI C80.6 and UL 1242.
- 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. Fittings for EMT:
 - a. Material: Steel.
 - b. Type: Compression.
 2. 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.
- I. Joint Compound for IMC, GRC: Approved, as defined in NFPA 70, by authorities having jurisdiction for use in conduit assemblies, and compounded for use to lubricate and protect threaded conduit joints from corrosion and to enhance their conductivity.
- 2.2 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. Prime coated, ready for field painting.
- 2.3 BOXES, ENCLOSURES, AND CABINETS
- A. Manufacturers: Subject to compliance with requirements, provide products by the following provide products by one of the following:
1. Cooper Technologies Company; Cooper Crouse-Hinds.
 2. EGS/Appleton Electric.
 3. Hoffman; a Pentair company.
 4. Hubbell Incorporated; Killark Division.
 5. O-Z/Gedney; a brand of EGS Electrical Group.

6. RACO; a Hubbell Company.
 7. Robroy Industries.
 8. Spring City Electrical Manufacturing Company.
 9. Thomas & Betts Corporation.
- 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, ferrous alloy Type FD, with gasketed cover.
- E. Luminaire Outlet Boxes: Nonadjustable, designed for attachment of luminaire weighing 50 lb (23 kg). Outlet boxes designed for attachment of luminaires weighing more than 50 lb (23 kg) 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 (100 mm square by 60 mm deep).
- J. Gangable boxes are prohibited.

PART 3 EXECUTION

3.1 RACEWAY APPLICATION

- A. Outdoors: Apply raceway products as specified below:
1. Exposed Conduit: GRC IMC.
 2. Concealed Conduit, Aboveground: GRC IMC.
 3. Connection to Vibrating Equipment (Including Hydraulic, Pneumatic, Electric Solenoid, or Motor-Driven Equipment): LFMC.
- B. Indoors: Apply raceway products as specified below unless otherwise indicated:
1. Exposed, Not Subject to Physical Damage: EMT.
 2. Exposed and Subject to Physical Damage: GRC IMC. Raceway locations include the following:
 - a. Corridors used for traffic of mechanized carts, forklifts, and pallet-handling units.

- b. Mechanical rooms.
- 3. Concealed in Ceilings and Interior Walls and Partitions: EMT.
- 4. Connection to Vibrating Equipment (Including Hydraulic, Pneumatic, Electric Solenoid, or Motor-Driven Equipment): FMC, except use LFMC in damp or wet locations.
- 5. Damp or Wet Locations: GRC IMC.
- C. Minimum Raceway Size: 3/4-inch (21-mm) trade size.
- D. Raceway Fittings: Compatible with raceways and suitable for use and location.
 - 1. Rigid and Intermediate Steel Conduit: Use threaded rigid steel conduit fittings unless otherwise indicated. Comply with NEMA FB 2.10.
 - 2. EMT: Use compression, steel fittings. Comply with NEMA FB 2.10.
 - 3. Flexible Conduit: Use only fittings listed for use with flexible conduit. Comply with NEMA FB 2.20.
- E. Do not install aluminum conduits.
- F. Install surface raceways only where indicated on Drawings.

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. Keep raceways at least 6 inches (150 mm) away from parallel runs of flues and steam or hot-water pipes. Install horizontal raceway runs above water and steam piping.
- C. Complete raceway installation before starting conductor installation.
- D. Arrange stub-ups so curved portions of bends are not visible above finished slab.
- E. 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 (300 mm) of changes in direction.
- F. Conceal conduit and EMT within finished walls and ceilings. Install conduits parallel or perpendicular to building lines.
- G. Conceal rigid steel conduit below slabs on grade. Do not embed raceways in slabs.
- H. Support conduit within 12 inches (300 mm) of enclosures to which attached.
- I. Stub-ups to Above Recessed Ceilings:
 - 1. Use EMT, IMC, or RMC for raceways.
 - 2. Use a conduit bushing or insulated fitting to terminate stub-ups not terminated in hubs or in an enclosure.

- J. Threaded Conduit Joints, Exposed to Wet, Damp, Corrosive, or Outdoor Conditions or Under Slabs on Grade: Apply listed compound to threads of raceway and fittings before making up joints. Follow compound manufacturer's written instructions.
- K. Raceway Terminations at Locations Subject to Moisture or Vibration: Use insulating bushings to protect conductors including conductors smaller than No. 4 AWG.
- L. 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 (35mm) trade size and insulated throat metal bushings on 1-1/2-inch (41-mm) trade size and larger conduits terminated with locknuts. Install insulated throat metal grounding bushings on conduits.
- M. Install raceways square to the enclosure and terminate at enclosures with locknuts. Install locknuts hand tight plus 1/4 turn more.
- N. 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.
- O. Cut conduit perpendicular to the length. For conduits 2-inch (53-mm) trade size and larger, use roll cutter or a guide to make cut straight and perpendicular to the length.
- P. Install pull wires in empty raceways. Use polypropylene or monofilament plastic line with not less than 200-lb (90-kg) tensile strength. Leave at least 12 inches (300 mm) of slack at each end of pull wire.
- Q. Surface Raceways:
 - 1. Install surface raceway with a minimum 2-inch (50-mm) radius control at bend points.
 - 2. Secure surface raceway with screws or other anchor-type devices at intervals not exceeding 48 inches (1200 mm) 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.
- R. Expansion-Joint Fittings:
 - 1. Install in each run of aboveground RMC and EMT conduit that is located where environmental temperature change may exceed 100 deg F (55 deg C) and that has straight-run length that exceeds 100 feet (30 m).
 - 2. Install type and quantity of fittings that accommodate temperature change listed for each of the following locations:
 - a. Outdoor Locations Not Exposed to Direct Sunlight: 125 deg F (70 deg C) temperature change.
 - b. Outdoor Locations Exposed to Direct Sunlight: 155 deg F (86 deg C) temperature change.
 - c. Indoor Spaces Connected with Outdoors without Physical Separation: 125 deg F (70 deg C) temperature change.
 - d. Attics: 135 deg F (75 deg C) temperature change.

3. Install fitting(s) that provide expansion and contraction for at least 0.00041 inch per foot of length of straight run per deg F (0.06 mm per meter of length of straight run per deg C) of temperature change for PVC conduits. Install fitting(s) that provide expansion and contraction for at least 0.000078 inch per foot of length of straight run per deg F (0.0115 mm per meter of length of straight run per deg C) of temperature change for metal conduits.
 4. Install expansion fittings at all locations where conduits cross building or structure expansion joints.
 5. Install each expansion-joint fitting with position, mounting, and piston setting selected according to manufacturer's written instructions for conditions at specific location at time of installation. Install conduit supports to allow for expansion movement.
- S. Flexible Conduit Connections: Comply with NEMA RV 3. Use a maximum of 72 inches (1830 mm) of flexible conduit for recessed and semirecessed luminaires, equipment subject to vibration, noise transmission, or movement; and for 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.
- T. Mount boxes at heights indicated. 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.
- U. 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.
- V. Horizontally separate boxes mounted on opposite sides of walls so they are not in the same vertical channel.
- W. Locate boxes so that cover or plate will not span different building finishes.
- X. 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.
- Y. Fasten junction and pull boxes to or support from building structure. Do not support boxes by conduits.
- 3.3 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 or paint finishes with matching touchup coating recommended by manufacturer.

END OF SECTION 260533

SECTION 260553 - **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. Underground-line warning tape.
 - 5. Warning labels and signs.
 - 6. Instruction signs.
 - 7. Equipment identification labels.
 - 8. Miscellaneous identification products.

1.3 ACTION SUBMITTALS

- A. Product Data: For each electrical identification product indicated.
- B. Samples: For each type of label and sign to illustrate size, colors, lettering style, mounting provisions, and graphic features of identification products.
- C. Identification Schedule: An index of nomenclature of electrical equipment and system components used in identification signs and labels.

1.4 QUALITY ASSURANCE

- A. Comply with ANSI A13.1 and IEEE C2.
- B. Comply with NFPA 70.
- C. Comply with 29 CFR 1910.144 and 29 CFR 1910.145.
- D. Comply with ANSI Z535.4 for safety signs and labels.
- E. Adhesive-attached labeling materials, including label stocks, laminating adhesives, and inks used by label printers, shall comply with UL 969.

1.5 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.

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. Black letters on an orange field <Insert color scheme>.
 - 2. Legend: Indicate voltage and system or service type.
- C. Vinyl Labels for Raceways Carrying Circuits at 600 V or Less: Preprinted, flexible label laminated with a clear, weather- and chemical-resistant coating and matching wraparound clear adhesive tape for securing ends of legend label.

2.2 CONDUCTOR IDENTIFICATION MATERIALS

- A. Self-Adhesive, Self-Laminating Polyester Labels: Preprinted 3-mil- (0.08-mm-) thick flexible label with acrylic pressure-sensitive adhesive that provides a clear, weather- and chemical-resistant, self-laminating, protective shield over the legend. Labels sized to fit the conductor diameter such that the clear shield overlaps the entire printed legend.
- B. Marker Tapes: Vinyl or vinyl-cloth, self-adhesive wraparound type, with circuit identification legend machine printed by thermal transfer or equivalent process.

2.3 UNDERGROUND-LINE WARNING TAPE

- A. Tape:
 - 1. Recommended by manufacturer for the method of installation and suitable to identify and locate underground electrical and communications utility lines.
 - 2. Printing on tape shall be permanent and shall not be damaged by burial operations.
 - 3. Tape material and ink shall be chemically inert, and not subject to degrading when exposed to acids, alkalis, and other destructive substances commonly found in soils.

B. Color and Printing:

1. Comply with ANSI Z535.1 through ANSI Z535.5.
2. Inscriptions for Red-Colored Tapes: ELECTRIC LINE, HIGH VOLTAGE,
3. Inscriptions for Orange-Colored Tapes: TELEPHONE CABLE, CATV CABLE, COMMUNICATIONS CABLE, OPTICAL FIBER CABLE.

C. Tag: Type IID <Insert drawing designation>:

1. Reinforced, detectable three-layer laminate, consisting of a printed pigmented woven scrim, a solid aluminum-foil core, and a clear protective film that allows inspection of the continuity of the conductive core, bright-colored, continuous-printed on one side with the inscription of the utility, compounded for direct-burial service.
2. Overall Thickness: 8 mils (0.2 mm).
3. Foil Core Thickness: 0.35 mil (0.00889 mm).
4. Weight: 34 lb/1000 sq. ft. (16.6 kg/100 sq. m).
5. 3-Inch (75-mm)Tensile According to ASTM D 882: 300 lbf (1334 N), and 12,500 psi (86.1 MPa).

2.4 WARNING LABELS AND SIGNS

A. Comply with NFPA 70 and 29 CFR 1910.145.

B. Baked-Enamel Warning Signs:

1. Preprinted aluminum signs, punched or drilled for fasteners, with colors, legend, and size required for application.
2. 1/4-inch (6.4-mm) grommets in corners for mounting.
3. Nominal size, 7 by 10 inches (180 by 250 mm).

C. Warning label and sign shall include, but are not limited to, the following legends:

1. Multiple Power Source Warning: "DANGER - ELECTRICAL SHOCK HAZARD - EQUIPMENT HAS MULTIPLE POWER SOURCES."
2. Workspace Clearance Warning: "WARNING - OSHA REGULATION - AREA IN FRONT OF ELECTRICAL EQUIPMENT MUST BE KEPT CLEAR FOR 36 INCHES (915 MM)."

2.5 INSTRUCTION SIGNS

A. Engraved, laminated acrylic or melamine plastic, minimum 1/16 inch (1.6 mm) thick for signs up to 20 sq. inches (129 sq. cm) and 1/8 inch (3.2 mm) thick for larger sizes.

1. Engraved legend with black letters on white face.
2. Punched or drilled for mechanical fasteners.

3. Framed with mitered acrylic molding and arranged for attachment at applicable equipment.

2.6 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 (10 mm).
- B. Stenciled Legend: In nonfading, waterproof, black ink or paint. Minimum letter height shall be 1 inch (25 mm).

2.7 CABLE TIES

- A. Plenum-Rated Cable Ties: Self extinguishing, UV stabilized, one piece, self locking.
 1. Minimum Width: 3/16 inch (5 mm).
 2. Tensile Strength at 73 deg F (23 deg C), According to ASTM D 638: 7000 psi (48.2 MPa).
 3. UL 94 Flame Rating: 94V-0.
 4. Temperature Range: Minus 50 to plus 284 deg F (Minus 46 to plus 140 deg C).
 5. Color: Black.

2.8 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. Self-Adhesive Identification Products: Clean surfaces before application, using materials and methods recommended by manufacturer of identification device.
- E. Attach signs and plastic labels with mechanical fasteners appropriate to the location and substrate.
- F. Attach plastic raceway labels with clear vinyl tape with adhesive appropriate to the location and substrate.

- G. 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-foot (15-m) maximum intervals in straight runs, and at 25-foot (7.6-m) maximum intervals in congested areas.
- H. 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.
- I. Underground-Line Warning Tape: During backfilling of trenches install continuous underground-line warning tape directly above line at 6 to 8 inches (150 to 200 mm) below finished grade. Use multiple tapes where width of multiple lines installed in a common trench or concrete envelope exceeds 16 inches (400 mm) overall.
- J. Painted Identification: Comply with requirements in painting Sections for surface preparation and paint application.

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 or field applied for sizes larger than No. 8 AWG, if authorities having jurisdiction permit.
 - b. Colors for 208/120-V Circuits:
 - 1) Phase A: Black.
 - 2) Phase B: Red.
 - 3) Phase C: Blue.
 - 4) Neutral: White, Ground: Green
 - c. Field-Applied, Color-Coding Conductor Tape: Apply in half-lapped turns for a minimum distance of 6 inches (150 mm) from terminal points and in boxes where splices or taps are made. Apply last two turns of tape with no tension to prevent possible unwinding. Locate bands to avoid obscuring factory cable markings.
- C. Install instructional sign including the color-code for grounded and ungrounded conductors using adhesive-film-type labels.

- D. Locations of Underground Lines: Identify with underground-line warning tape for power, lighting, communication, and control wiring and optical fiber cable.
1. Install underground-line warning tape for both direct-buried cables and cables in raceway.
- E. Warning Labels for Indoor Cabinets, Boxes, and Enclosures for Power and Lighting: Baked-enamel warning signs.
1. Comply with 29 CFR 1910.145.
 2. Identify system voltage with black letters on an orange background.
 3. Apply to exterior of door, cover, or other access.
 4. For equipment with multiple power or control sources, apply to door or cover of equipment including, but not limited to, the following:
 - a. Controls with external control power connections.
- F. Operating Instruction Signs: Install instruction signs to facilitate proper operation and maintenance of electrical systems and items to which they connect. Install instruction signs with approved legend where instructions are needed for system or equipment operation.
- G. 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- (13-mm-) high letters on 1-1/2-inch- (38-mm-) high label; where two lines of text are required, use labels 2 inches (50 mm) 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. Unless provided with self-adhesive means of attachment, 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. Push-button stations.
- h. Contactors.

END OF SECTION 260553

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SECTION 262416 - PANELBOARDS

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. Lighting and appliance branch-circuit panelboards.
 - 2. Load centers.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of panelboard, switching and overcurrent protective device, transient voltage suppression device, accessory, and component indicated. Include dimensions and manufacturers' technical data on features, performance, electrical characteristics, ratings, and finishes.
- B. Shop Drawings: For each panelboard and related equipment.
 - 1. Include dimensioned plans, elevations, sections, and details. Show tabulations of installed devices, equipment features, and ratings.
 - 2. Detail enclosure types and details for types other than NEMA 250, Type 1.
 - 3. Detail bus configuration, current, and voltage ratings.
 - 4. Short-circuit current rating of panelboards and overcurrent protective devices.
 - 5. Detail features, characteristics, ratings, and factory settings of individual overcurrent protective devices and auxiliary components.
 - 6. Include wiring diagrams for power, signal, and control wiring.
 - 7. Include time-current coordination curves for each type and rating of overcurrent protective device included in panelboards. Submit on translucent log-log graft paper; include selectable ranges for each type of overcurrent protective device.

1.4 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For qualified testing agency.
- B. Field Quality-Control Reports:
 - 1. Test procedures used.
 - 2. Test results that comply with requirements.

3. Results of failed tests and corrective action taken to achieve test results that comply with requirements.

- C. Panelboard Schedules: For installation in panelboards. Submit final versions after load balancing.

1.5 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data: For panelboards and components to include in emergency, operation, and maintenance manuals. In addition to items specified in Section 017820 "Operation and Maintenance Data," include the following:
 1. Manufacturer's written instructions for testing and adjusting overcurrent protective devices.
 2. Time-current curves, including selectable ranges for each type of overcurrent protective device that allows adjustments.

1.6 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
 1. Keys: Two spares for each type of panelboard cabinet lock.
 2. Circuit Breakers Including GFCI and Ground Fault Equipment Protection (GFEP) Types: Two spares for each panelboard.

1.7 QUALITY ASSURANCE

- A. Testing Agency Qualifications: Member company of NETA or an NRTL.
 1. Testing Agency's Field Supervisor: Currently certified by NETA to supervise on-site testing.
- B. Source Limitations: Obtain panelboards, overcurrent protective devices, components, and accessories from single source from single manufacturer.
- C. Product Selection for Restricted Space: Drawings indicate maximum dimensions for panelboards including clearances between panelboards and adjacent surfaces and other items. Comply with indicated maximum dimensions.
- D. 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.
- E. Comply with NEMA PB 1.
- F. Comply with NFPA 70.

1.8 DELIVERY, STORAGE, AND HANDLING

- A. Remove loose packing and flammable materials from inside panelboards; install temporary electric heating (250 W per panelboard) to prevent condensation.
- B. Handle and prepare panelboards for installation according to NEMA PB 1.

1.9 PROJECT CONDITIONS

A. Environmental Limitations:

1. Do not deliver or install panelboards until spaces are enclosed and weathertight, wet work in spaces is complete and dry, work above panelboards is complete, and temporary HVAC system is operating and maintaining ambient temperature and humidity conditions at occupancy levels during the remainder of the construction period.
2. Rate equipment for continuous operation under the following conditions unless otherwise indicated:
 - a. Ambient Temperature: Not exceeding 23 deg F (minus 5 deg C) to plus 104 deg F (plus 40 deg C).
 - b. Altitude: Not exceeding 6600 feet (2000 m).

B. Service Conditions: NEMA PB 1, usual service conditions, as follows:

1. Ambient temperatures within limits specified.
2. Altitude not exceeding 6600 feet (2000 m).

1.10 COORDINATION

- A. Coordinate layout and installation of panelboards and components with other construction that penetrates walls or is supported by them, including electrical and other types of equipment, raceways, piping, encumbrances to workspace clearance requirements, and adjacent surfaces. Maintain required workspace clearances and required clearances for equipment access doors and panels.

1.11 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace transient voltage suppression devices that fail in materials or workmanship within specified warranty period.
1. Warranty Period: Five years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 GENERAL REQUIREMENTS FOR PANELBOARDS

A. Enclosures: Flush- and surface-mounted cabinets.

1. Rated for environmental conditions at installed location.
 - a. Indoor Dry and Clean Locations: NEMA 250, Type 1.
2. Finishes:
 - a. Panels and Trim: Steel, factory finished immediately after cleaning and pretreating with manufacturer's standard two-coat, baked-on finish consisting of prime coat and thermosetting topcoat.

- b. Back Boxes: Same finish as panels and trim.
- 3. Directory Card: Inside panelboard door, mounted in metal frame with transparent protective cover.
- B. Incoming Mains Location: Top and bottom.
- C. Phase, Neutral, and Ground Buses:
 - 1. Material: Hard-drawn copper, 98 percent conductivity.
 - 2. Equipment Ground Bus: Adequate for feeder and branch-circuit equipment grounding conductors; bonded to box.
 - 3. Isolated Ground Bus: Adequate for branch-circuit isolated ground conductors; insulated from box.
 - 4. Extra-Capacity Neutral Bus: Neutral bus rated 200 percent of phase bus and UL listed as suitable for nonlinear loads.
- D. Conductor Connectors: Suitable for use with conductor material and sizes.
 - 1. Material: Hard-drawn copper, 98 percent conductivity.
 - 2. Main and Neutral Lugs: Compression type.
 - 3. Ground Lugs and Bus-Configured Terminators: Compression type.
 - 4. Feed-Through Lugs: Compression type, suitable for use with conductor material. Locate at opposite end of bus from incoming lugs or main device.
 - 5. Subfeed (Double) Lugs: Compression type suitable for use with conductor material. Locate at same end of bus as incoming lugs or main device.
 - 6. Extra-Capacity Neutral Lugs: Rated 200 percent of phase lugs mounted on extra-capacity neutral bus.
- E. Future Devices: Mounting brackets, bus connections, filler plates, and necessary appurtenances required for future installation of devices.
- F. Panelboard Short-Circuit Current Rating: Fully rated to interrupt symmetrical short-circuit current available at terminals.

2.2 LIGHTING AND APPLIANCE BRANCH-CIRCUIT PANELBOARDS

- A. Basis-of-Design Product: Subject to compliance with requirements, provide Square D; a brand of Schneider Electric or comparable product by one of the following:
 - 1. General Electric Company; GE Consumer & Industrial - Electrical Distribution.
 - 2. Siemens Energy & Automation, Inc.
 - 3. Eaton Electrical Inc. Cutler-Hammer Business Unit.
- B. Panelboards: NEMA PB 1, lighting and appliance branch-circuit type.

- C. Mains: Circuit breaker or lugs only, as indicated.
- D. Branch Overcurrent Protective Devices: Bolt-on circuit breakers, replaceable without disturbing adjacent units.
- E. Column-Type Panelboards: Narrow gutter extension, with cover, to overhead junction box equipped with ground and neutral terminal buses.

2.3 DISCONNECTING AND OVERCURRENT PROTECTIVE DEVICES

- A. Basis-of-Design Product: Subject to compliance with requirements, provide Square D; a brand of Schneider Electric or comparable product 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.
- B. Molded-Case Circuit Breaker (MCCB): Comply with UL 489, with interrupting capacity to meet available fault currents.
 - 1. 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 100A through 225A, field adjustable short-time and continuous current setting for frame sizes 250A and larger.
 - 2. Adjustable Instantaneous-Trip Circuit Breakers: Magnetic trip element with front-mounted, field-adjustable trip setting.
 - 3. GFCI Circuit Breakers: Single- and two-pole configurations with Class A ground-fault protection (6-mA trip).
 - 4. Ground-Fault Equipment Protection (GFEP) Circuit Breakers: Class B ground-fault protection (30-mA trip).
 - 5. Arc-Fault Circuit Interrupter (AFCI) Circuit Breakers: Comply with UL 1699; 120/240-V, single-pole configuration.
 - 6. Molded-Case Circuit-Breaker (MCCB) Features and Accessories:
 - a. Standard frame sizes, trip ratings, and number of poles.
 - b. Lugs: Compression style, suitable for number, size, trip ratings, and conductor materials.
 - c. Application Listing: Appropriate for application; Type SWD for switching fluorescent lighting loads; Type HID for feeding fluorescent and high-intensity discharge (HID) lighting circuits.
 - d. Shunt Trip: 120 -V trip coil energized from separate circuit, set to trip at 55 percent of rated voltage.
 - e. Multipole units enclosed in a single housing or factory assembled to operate as a single unit.

- f. Handle Clamp: Loose attachment, for holding circuit-breaker handle in on position.

2.4 ACCESSORY COMPONENTS AND FEATURES

- A. Accessory Set: Include tools and miscellaneous items required for overcurrent protective device test, inspection, maintenance, and operation per manufacturer's recommendations.
- B. Portable Test Set: Provide for testing functions of solid-state trip devices without removing from panelboard. Include relay and meter test plugs suitable for testing panelboard meters and switchboard class relays.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Receive, inspect, handle, and store panelboards according to NEMA PB 1.1.
- B. Examine panelboards before installation. Reject panelboards that are damaged or rusted or have been subjected to water saturation.
- C. Examine elements and surfaces to receive panelboards for compliance with installation tolerances and other conditions affecting performance of the Work.
- D. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Install panelboards and accessories according to NEMA PB 1.1.
- B. Temporary Lifting Provisions: Remove temporary lifting eyes, channels, and brackets and temporary blocking of moving parts from panelboards.
- C. Comply with mounting and anchoring requirements specified in Section 260548 "Seismic Controls for Electrical Systems."
- D. Mount top of trim 90 inches (2286 mm) above finished floor unless otherwise indicated.
- E. Mount panelboard cabinet plumb and rigid without distortion of box. Mount recessed panelboards with fronts uniformly flush with wall finish and mating with back box.
- F. Install overcurrent protective devices and controllers not already factory installed.
1. Set field-adjustable, circuit-breaker trip ranges.
- G. Install filler plates in unused spaces.
- H. Stub four 1-inch (27-GRC) empty conduits from panelboard into accessible ceiling space or space designated to be ceiling space in the future. Stub four 1-inch (27-GRC) empty conduits into raised floor space or below slab not on grade.
- I. Arrange conductors in gutters into groups and bundle and wrap with wire ties after completing load balancing.
- J. Comply with NECA 1.

3.3 IDENTIFICATION

- A. Identify field-installed conductors, interconnecting wiring, and components; provide warning signs complying with Section 260553 "Identification for Electrical Systems."
- B. Create a directory to indicate installed circuit loads after balancing panelboard loads; incorporate City's final room designations. Obtain approval before installing. Use a computer or typewriter to create directory; handwritten directories are not acceptable.
- C. Panelboard Nameplates: Label each panelboard with a nameplate complying with requirements for identification specified in Section 260553 "Identification for Electrical Systems."
- D. Device Nameplates: Label each branch circuit device in distribution panelboards with a nameplate complying with requirements for identification specified in Section 260553 "Identification for Electrical Systems."

3.4 FIELD QUALITY CONTROL

- A. Testing Agency: Engage a qualified testing agency to perform tests and inspections.
- B. Perform tests and inspections.
 - 1. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect components, assemblies, and equipment installations, including connections, and to assist in testing.
- C. Acceptance Testing Preparation:
 - 1. Test insulation resistance for each panelboard bus, component, connecting supply, feeder, and control circuit.
 - 2. Test continuity of each circuit.
- D. Tests and Inspections:
 - 1. Perform each visual and mechanical inspection and electrical test stated in NETA Acceptance Testing Specification. Certify compliance with test parameters.
 - 2. Correct malfunctioning units on-site, where possible, and retest to demonstrate compliance; otherwise, replace with new units and retest.
- E. Panelboards will be considered defective if they do not pass tests and inspections.
- F. Prepare test and inspection reports, including a certified report that identifies panelboards included. Include notation of deficiencies detected, remedial action taken, and observations after remedial action.

3.5 ADJUSTING

- A. Adjust moving parts and operable component to function smoothly, and lubricate as recommended by manufacturer.
- B. Set field-adjustable circuit-breaker trip ranges as specified in Section 260573 "Overcurrent Protective Device Coordination Study."

- C. Load Balancing: After Substantial Completion, but not more than 60 days after Final Acceptance, measure load balancing and make circuit changes.
1. Measure as directed during period of normal system loading.
 2. Perform load-balancing circuit changes outside normal occupancy/working schedule of the facility and at time directed. Avoid disrupting critical 24-hour services such as fax machines and on-line data processing, computing, transmitting, and receiving equipment.
 3. After circuit changes, recheck loads during normal load period. Record all load readings before and after changes and submit test records.
 4. Tolerance: Difference exceeding 20 percent between phase loads, within a panelboard, is not acceptable. Rebalance and recheck as necessary to meet this minimum requirement.

END OF SECTION 262416

SECTION 262726 - 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. This Section includes the following:
 - 1. Receptacles, receptacles with integral GFCI, and associated device plates.
 - 2. Snap switches.
 - 3. 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.

1.4 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Shop Drawings: List of legends and description of materials and process used for premarking wall plates.
- C. Field quality-control test reports.
- D. Operation and Maintenance Data: For wiring devices to include in all manufacturers' packing label warnings and instruction manuals that include labeling conditions.

1.5 QUALITY ASSURANCE

- A. Source Limitations: Obtain each type of wiring device and associated wall plate through one source from a single manufacturer. Insofar as they are available, obtain all wiring devices and associated wall plates from a single manufacturer and one source.
- B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
- C. Comply with NFPA 70.

1.6 COORDINATION

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

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Subject to compliance with requirements manufacturers offering products that may be incorporated into the work include, but are not limited to, the following available manufacturers' names:
 - 1. Cooper Wiring Devices; a division of Cooper Industries, Inc. (Cooper).
 - 2. Hubbell Incorporated; Wiring Device-Kellems (Hubbell).
 - 3. Leviton Mfg. Company Inc. (Leviton).
 - 4. Pass & Seymour/Legrand; Wiring Devices & Accessories (Pass & Seymour).

2.2 STRAIGHT BLADE RECEPTACLES

- A. Convenience Receptacles, 125 V, 20 A: Comply with NEMA WD 1, NEMA WD 6 configuration 5-20R, and UL 498.
 - 1. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Cooper; 5351 (single), 5352 (duplex).
 - b. Hubbell; HBL5351 (single), CR5352 (duplex).
 - c. Leviton; 5891 (single), 5352 (duplex).
 - d. Pass & Seymour; 5381 (single), 5352 (duplex).
- B. Tamper-Resistant Convenience Receptacles, 125 V, 20 A: Comply with NEMA WD 1, NEMA WD 6 configuration 5-20R, and UL 498.
 - 1. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Cooper; TR8300.
 - b. Hubbell; HBL8300SG.
 - c. Leviton; 8300-SGG.
 - d. Pass & Seymour; 63H.

2.3 GFCI RECEPTACLES

- A. General Description: Straight blade, feed-through type. Comply with NEMA WD 1, NEMA WD 6, UL 498, and UL 943, Class A, and include indicator light that is lighted when device is tripped.
- B. Duplex GFCI Convenience Receptacles, 125 V, 20 A:
 - 1. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Cooper; GF20.
 - b. Pass & Seymour; 2084.

2.4 CORD AND PLUG SETS

- A. Description: Match voltage and current ratings and number of conductors to requirements of equipment being connected.
 - 1. Cord: Rubber-insulated, stranded-copper conductors, with Type SOW-A jacket; with green-insulated grounding conductor and equipment-rating ampacity plus a minimum of 30 percent.
 - 2. Plug: Nylon body and integral cable-clamping jaws. Match cord and receptacle type for connection.

2.5 SNAP SWITCHES

- A. Comply with NEMA WD 1 and UL 20.
- B. Switches, 120/277 V, 20 A:
 - 1. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Cooper; 2221 (single pole), 2222 (two pole), 2223 (three way), 2224 (four way).
 - b. Hubbell; CS1221 (single pole), CS1222 (two pole), CS1223 (three way), CS1224 (four way).
 - c. Leviton; 1221-2 (single pole), 1222-2 (two pole), 1223-2 (three way), 1224-2 (four way).
 - d. Pass & Seymour; 20AC1 (single pole), 20AC2 (two pole), 20AC3 (three way), 20AC4 (four way).
- C. Pilot Light Switches, 20 A:
 - 1. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Cooper; 2221PL for 120 V and 277 V.
 - b. Hubbell; HPL1221PL for 120 V and 277 V.

- c. Leviton; 1221-PLR for 120 V, 1221-7PLR for 277 V.
 - d. Pass & Seymour; PS20AC1-PLR for 120 V.
 - 2. Description: Single pole, with neon-lighted handle, illuminated when switch is "ON."
- D. Single-Pole, Double-Throw, Momentary Contact, Center-Off Switches, 120/277 V, 20 A; for use with mechanically held lighting contactors.
 - 1. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Wattstopper; LVS-1.
 - b. Cooper; 1995.
 - c. Hubbell; HBL1557.
 - d. Leviton; 1257.
 - e. Pass & Seymour; 1251.

2.6 WALL PLATES

- A. Single and combination types to match corresponding wiring devices.
 - 1. Plate-Securing Screws: Metal with head color to match plate finish.
 - 2. Material for Finished Spaces: 0.035-inch- (1-mm-) thick, satin-finished stainless steel or per Engineer.
 - 3. Material for Unfinished Spaces: Galvanized steel.
 - 4. Material for Damp Locations: Thermoplastic with spring-loaded lift cover, and listed and labeled for use in "wet locations."
- B. Wet-Location, Weatherproof Cover Plates: NEMA 250, complying with type 3R weather-resistant, die-cast aluminum with lockable cover. Cover shall be weather proof-in-use type per NEC requirements.

2.7 MULTIOUTLET ASSEMBLIES

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - 1. Hubbell Incorporated; Wiring Device-Kellems.
 - 2. Wiremold Company (The).
- B. Components of Assemblies: Products from a single manufacturer designed for use as a complete, matching assembly of raceways and receptacles. Provide in lengths indicated on the Drawings, with wiring devices in quantities and spacing indicated. Provide suitable device plates and standard receptacle plates. Provide complete with all fittings and accessories required for a complete system.

- C. Raceway material: Metal with manufacturer's standard finish. Provide power and telecommunications wiring to all devices indicated as multioutlet assemblies. Feed locations and wiring runs shall be configured such that 40 percent full capacities are not exceeded.
- D. Raceways shall be provided with full length divider for separation of power and communications devices of and wiring.
- E. Devices shall be type and color as previously specified. Label, circuit number on inside of plate of each power device.

2.8 FINISHES

- A. Color: Wiring device catalog numbers in Section Text do not designate device color.
 - 1. Wiring Devices Connected to Normal Power System: As selected by Engineer, unless otherwise indicated or required by NFPA 70 or device listing.

PART 3 EXECUTION

3.1 INSTALLATION

- A. Comply with NECA 1, including the mounting heights listed in that standard, unless otherwise noted.
- B. Coordination with Other Trades:
 - 1. Take steps to insure that devices and their boxes are protected. 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 the 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 just 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.
- D. Device Installation:
 - 1. Replace all devices that have been in temporary use during construction or that show signs that they 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 (152 mm) in length.
5. When there is a choice, use side wiring with binding-head screw terminals. Wrap solid conductor tightly clockwise, 2/3 to 3/4 of the way around terminal screw.
6. Use a torque screwdriver when a torque is recommended or required by the 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 Types

1. Provide tamper-resistant devices and plates in Holding Cell and adjacent Toilet Room.

F. Receptacle Orientation:

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

G. 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.

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

I. Adjust locations of floor service outlets and service poles to suit arrangement of partitions and furnishings.

3.2 IDENTIFICATION

A. Comply with Division 26 Section "Identification for Electrical Systems."

1. Receptacles: Identify panelboard and circuit number from which served. Use hot, stamped or engraved machine printing with black-filled lettering on face of plate, and durable wire markers or tags inside outlet boxes.

3.3 FIELD QUALITY CONTROL

A. Perform tests and inspections and prepare test reports.

1. Test Instruments: Use instruments that comply with UL 1436.

2. Test Instrument for Convenience Receptacles: Digital wiring analyzer with digital readout or illuminated LED indicators of measurement.
- B. 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 6 percent or higher is not acceptable.
 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. The 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.

END OF SECTION 262726

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SECTION 262813 – 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 enclosed controllers.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated. Include construction details, material, dimensions, descriptions of individual components. Include the following for each fuse type indicated:

- 1. Ambient Temperature Adjustment Information: If ratings of fuses have been adjusted to accommodate ambient temperatures, provide list of fuses with adjusted ratings.
 - a. For each fuse having adjusted ratings, include location of fuse, original fuse rating, local ambient temperature, and adjusted fuse rating.
 - b. Provide manufacturer's technical data on which ambient temperature adjustment calculations are based.
- 2. Dimensions and manufacturer's technical data on features, performance, electrical characteristics, and ratings.
- 3. Current-limitation curves for fuses with current-limiting characteristics.
- 4. Time-current coordination curves (average melt) and current-limitation curves (instantaneous peak let-through current) for each type and rating of fuse.
- 5. Coordination charts and tables and related data.

1.4 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data: For fuses to include in emergency, operation, and maintenance manuals. In addition to items specified in Section 017823 "Operation and Maintenance Data," include the following:

- 1. Ambient temperature adjustment information.
- 2. Current-limitation curves for fuses with current-limiting characteristics.
- 3. Time-current coordination curves (average melt) and current-limitation curves (instantaneous peak let-through current) for each type and rating of fuse.
- 4. Coordination charts and tables and related data.

1.5 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
 - 1. Fuses: Equal to 10 percent of quantity installed for each size and type, but no fewer than two of each size and type.

1.6 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.

1.7 COORDINATION

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

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.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine fuses before installation. Reject fuses that are moisture damaged or physically damaged.

- B. Examine holders to receive fuses for compliance with installation tolerances and other conditions affecting performance, such as rejection features.
- C. Examine utilization equipment nameplates and installation instructions. Install fuses of sizes and with characteristics appropriate for each piece of equipment.
- D. Evaluate ambient temperatures to determine if fuse rating adjustment factors must be applied to fuse ratings.
- E. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 FUSE APPLICATIONS

- A. Cartridge Fuses:
 - 1. Service Entrance: Class RK1, time delay.
 - 2. Feeders: Class RK1, time delay.
 - 3. Motor Branch Circuits: Class RK1 time delay.
 - 4. Other Branch Circuits: Class RK1, time delay.
 - 5. Control Circuits: Class CC, fast acting.

3.3 INSTALLATION

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

3.4 IDENTIFICATION

- A. Install labels complying with requirements for identification specified in Section 260553 "Identification 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 262813

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SECTION 262816 - 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. Include evidence of NRTL listing for series rating of installed devices.
 - 5. Detail features, characteristics, ratings, and factory settings of individual overcurrent protective devices, accessories, and auxiliary components.
 - 6. Include time-current coordination curves (average melt) for each type and rating of overcurrent protective device; include selectable ranges for each type of overcurrent protective device.

- 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 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data: For enclosed switches and circuit breakers to include in emergency, operation, and maintenance manuals. In addition to items specified in Section 017823 "Operation and Maintenance Data," include the following:
 - 1. Manufacturer's written instructions for testing and adjusting enclosed switches and circuit breakers.
 - 2. Time-current coordination curves (average melt) for each type and rating of overcurrent protective device; include selectable ranges for each type of overcurrent protective device.

1.6 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
 - 1. Fuses: Equal to 10 percent of quantity installed for each size and type, but no fewer than three of each size and type.
 - 2. Fuse Pullers: Two for each size and type.

1.7 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. 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.

1.8 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.

PART 2 PRODUCTS

2.1 FUSIBLE SWITCHES

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Eaton Electrical Inc.; Cutler-Hammer Business Unit.

2. Siemens Energy & Automation, Inc.
 3. Square D; a brand of Schneider Electric.
- B. Type HD, Heavy Duty, Single Throw, 600-V ac, 1200 A and Smaller: UL 98 and NEMA KS 1, horsepower rated, with clips or bolt pads to accommodate specified 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. Lugs: Mechanical type, suitable for number, size, and conductor material.
 5. Service-Rated Switches: Labeled for use as service equipment.

2.2 NONFUSIBLE SWITCHES

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
1. Eaton Electrical Inc.; Cutler-Hammer Business Unit.
 2. Siemens Energy & Automation, Inc.
 3. Square D; a brand of Schneider Electric.
- B. Type HD, Heavy Duty, Single Throw, 600-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 ground conductors.
 2. Neutral Kit: Internally mounted; insulated, capable of being grounded and bonded; labeled for copper neutral conductors.
 3. Lugs: Mechanical type, suitable for number, size, and conductor material.

2.3 MOLDED-CASE CIRCUIT BREAKERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
1. Eaton Electrical Inc.; Cutler-Hammer Business Unit.

2. Siemens Energy & Automation, Inc.
 3. 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. Adjustable, Instantaneous-Trip Circuit Breakers: Magnetic trip element with front-mounted, field-adjustable trip setting.
- E. Current-Limiting Circuit Breakers: Frame sizes 400 A and smaller, and let-through ratings less than NEMA FU 1, RK-5.
- F. 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.

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.
- 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 ADJUSTING

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

- B. Set field-adjustable circuit-breaker trip ranges.

END OF SECTION 262816

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SECTION 262913 - 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. Product Data: For each type of enclosed controller. Include manufacturer's technical data on features, performance, electrical characteristics, ratings, and enclosure types and finishes.
- B. 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. Listed and labeled for integrated short-circuit current (withstand) rating of OCPDs in combination controllers by an NRTL acceptable to authorities having jurisdiction.

- f. Features, characteristics, ratings, and factory settings of individual OCPDs in combination controllers.

2. Wiring Diagrams: For power, signal, and control wiring.

1.5 INFORMATIONAL SUBMITTALS

- A. Field quality-control reports.
- B. Load-Current and Overload-Relay Heater List: Compile after motors have been installed, and arrange to demonstrate that selection of heaters suits actual motor nameplate full-load currents.
- C. Load-Current and List of Settings of Adjustable Overload Relays: Compile after motors have been installed, and arrange to demonstrate that switch settings for motor running overload protection suit actual motors to be protected.

1.6 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data: For enclosed controllers to include in emergency, operation, and maintenance manuals. In addition to items specified in Section 017823 "Operation and Maintenance Data," include the following:
 1. Routine maintenance requirements for enclosed controllers and installed components.
 2. Manufacturer's written instructions for testing and adjusting circuit breaker and MCP trip settings.
 3. Manufacturer's written instructions for setting field-adjustable overload relays.
 4. Manufacturer's written instructions for testing, adjusting, and reprogramming reduced-voltage solid-state controllers.

1.7 MATERIALS MAINTENANCE SUBMITTALS

- A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
 1. Fuses for Fused Switches: Equal to 10 percent of quantity installed for each size and type, but no fewer than three of each size and type.
 2. Control Power Fuses: Equal to 10 percent of quantity installed for each size and type, but no fewer than two of each size and type.
 3. Indicating Lights: Two of each type and color installed.
 4. Auxiliary Contacts: Furnish one spare(s) for each size and type of magnetic controller installed.
 5. Power Contacts: Furnish three spares for each size and type of magnetic contactor installed.

1.8 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 NFPA 70.

1.9 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.

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. Manufacturers: Subject to compliance with requirements, provide products by one of the following
 - a. Eaton Electrical Inc.; Cutler-Hammer Business Unit.
 - b. Rockwell Automation, Inc.; Allen-Bradley brand.
 - c. Siemens Energy & Automation, Inc.
 - d. Square D; a brand of Schneider Electric.
 - 2. Configuration: Nonreversing.
 - 3. Surface mounting.
 - 4. Green 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. Manufacturers: Subject to compliance with requirements, provide products by one of the following
 - a. Eaton Electrical Inc.; Cutler-Hammer Business Unit.
 - b. Rockwell Automation, Inc.; Allen-Bradley brand.
 - c. Siemens Energy & Automation, Inc.
 - d. 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; bimetallic type.
 4. Surface mounting.
 5. Green pilot light.
- D. Magnetic Controllers: Full voltage, across the line, electrically held.
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Eaton Electrical Inc.; Cutler-Hammer Business Unit.
 - b. Rockwell Automation, Inc.; Allen-Bradley brand.
 - c. Siemens Energy & Automation, Inc.
 - d. Square D; a brand of Schneider Electric.
 2. Configuration: Nonreversing.
 3. Contactor Coils: Pressure-encapsulated type with coil transient suppressors.
 - 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: 120 V ac; obtained from integral CPT, with primary and secondary fuses of sufficient capacity to operate integral devices and remotely located pilot, indicating, and control devices.
 - a. CPT Spare Capacity: 50 VA.
 6. Bimetallic 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.
 - d. Ambient compensated.
 - e. Automatic resetting.
 7. External overload reset push button.

2.2 ACCESSORIES

- A. General Requirements for Control Circuit and Pilot Devices: NEMA ICS 5; factory installed in controller enclosure cover.
 - 1. Push Buttons, Pilot Lights, and Selector Switches: Heavy duty, oiltight type.
 - a. Push Buttons: Recessed Shielded types.
 - b. Pilot Lights: LED types.
 - c. Selector Switches: Rotary type.
- B. 2 Normally open +2 normally closed auxiliary contacts.

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 "Hangers and Supports."
- 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 262813 "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 260553 "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. Install wiring between enclosed controllers and remote devices and facility's central control system.
- B. Bundle, train, and support wiring in enclosures.
- C. 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 FIELD QUALITY CONTROL

- A. Tests and Inspections:
 - 1. Inspect controllers, wiring, components, connections, and equipment installation.
 - 2. Test insulation resistance for each enclosed-controller element, component, connecting motor supply, feeder, and control circuits.
 - 3. Test continuity of each circuit.
 - 4. Verify that voltages at controller locations are within plus or minus 10 percent of motor nameplate rated voltages. If outside this range for any motor, notify Architect before starting the motor(s).
 - 5. Test each motor for proper phase rotation.
 - 6. Perform each electrical test and visual and mechanical inspection stated in NETA Acceptance Testing Specification. Certify compliance with test parameters.
 - 7. Correct malfunctioning units on-site, where possible, and retest to demonstrate compliance; otherwise, replace with new units and retest.
 - 8. Test and adjust controls, remote monitoring, and safeties. Replace damaged and malfunctioning controls and equipment.
- B. Enclosed controllers will be considered defective if they do not pass tests and inspections.

- C. Prepare test and inspection reports including a certified report that identifies enclosed controllers and that describes scanning results. Include notation of deficiencies detected, remedial action taken, and observations after remedial action.

3.6 ADJUSTING

- A. Set field-adjustable switches, auxiliary relays, time-delay relays, timers, and overload-relay pickup and trip ranges.
- B. Adjust overload-relay heaters or settings if power factor correction capacitors are connected to the load side of the overload relays.
- C. Adjust the trip settings of MCPs and thermal-magnetic circuit breakers with adjustable instantaneous trip elements. Initially adjust to six times the motor nameplate full-load ampere ratings and attempt to start motors several times, allowing for motor cooldown between starts. If tripping occurs on motor inrush, adjust settings in increments until motors start without tripping. Do not exceed eight times the motor full-load amperes (or 11 times for NEMA Premium Efficient motors if required). Where these maximum settings do not allow starting of a motor, notify Architect before increasing settings.
- D. Set field-adjustable circuit-breaker trip ranges.

3.7 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.

3.8 DEMONSTRATION

- A. Train City's maintenance personnel to adjust, operate, and maintain enclosed controllers.

END OF SECTION 262913

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SECTION 265100 – INTERIOR LIGHTING

PART 1 GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Interior lighting fixtures, lamps, and drivers/ballasts.
2. Lighting fixture supports.

B. Related Sections:

1. Division 26 Section "Lighting Control Devices" for automatic control of lighting, including time switches, photoelectric relays, occupancy sensors, and multipole lighting relays and contactors.
2. Division 26 Section "Wiring Devices" for manual wall-box dimmers.

1.3 REFERENCES

- A. The following references are useful in specifying interior lighting. Other references may be needed for design purposes.

American National Standards Institute

ANSI C82.1-2004: For Lamp Ballast - Line Frequency Fluorescent Lamp Ballast

ANSI C82.11-2002: High-Frequency Fluorescent Lamp Ballasts

ASTM International

ASTM A 580/A 580M-06: Specification for Stainless Steel Wire

ASTM A 641/A 641M-03: Specification for Zinc-Coated (Galvanized) Carbon Steel Wire

Code of Federal Regulations

29 CFR - Labor, Chapter XVII - Occupational Safety and Health Administration, Department of Labor, Part 1910 - "Occupational Safety and Health Standards," Subpart A - "General," Section 1910.7 - "Definition and Requirements for a Nationally Recognized Testing Laboratory." 2006.

47 CFR - Telecommunication, Chapter I - Federal Communications Commission, Part 18 - "Industrial, Scientific, and Medical Equipment," Subpart C - "Technical Standards." 2005.

The Institute of Electrical and Electronics Engineers, Inc.

IEEE C62.41.1-2002: Guide on the Surge Environment in Low-Voltage (1000 V and Less) AC Power Circuits (ANSI)

IEEE C62.41.2-2002: Recommended Practice on Characterization of Surges in Low-Voltage (1000 V and Less) AC Power Circuits (ANSI)

Military Specification and Standards (U.S. Department of Defense)

MIL-STD-461E-1999: Requirements for the Control of Electromagnetic Interference Characteristics of Subsystems and Equipment

National Electrical Manufacturers Association

NEMA 250-2003: Enclosures for Electrical Equipment (1000 Volts Maximum)

NEMA LE 4-2006: Recessed Luminaires, Ceiling Compatibility

NEMA LE 5-2001: Procedure for Determining Luminaire Efficacy Ratings for Fluorescent Luminaire

NFPA

NFPA 70-2005: National Electrical Code

NFPA 101-2006: Life Safety Code

Underwriters Laboratories Inc.

UL 924-2006: Emergency Lighting and Power Equipment

UL 935-2001: Fluorescent Lamp Ballasts

UL 1598-2004 (Rev. 2006): Luminaires

1.4 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 driver/ballast housing if provided.
- G. LED: Light-Emitting Diode.

1.5 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. Emergency lighting units including battery and charger.
 3. Driver/Ballast, including BF.
 4. Energy-efficiency data.
 5. Life, output (lumens, CCT, and CRI), and energy-efficiency data for lamps.
 6. 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, drivers/ballasts, and accessories identical to those indicated for the lighting fixture as applied in this Project.
 - a. Manufacturer Certified Data: Photometric data shall be certified by a manufacturer's laboratory with a current accreditation under the National Voluntary Laboratory Accreditation Program for Energy Efficient Lighting Products.
- 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.
 2. Wiring Diagrams: For power, signal, and control wiring.
- C. Samples: For each lighting fixture where indicated in Lighting Fixture Schedule. Each Sample shall include the following:
1. Lamps and drivers/ballasts, installed.
 2. Cords and plugs.
- D. Installation instructions.
- E. Coordination Drawings: Reflected ceiling plan(s) and other details, drawn to scale, on which the following items are shown and coordinated with each other, using input from installers of the items involved:
1. Lighting fixtures.
 2. Suspended ceiling components.
 3. Ceiling-mounted projectors.
 4. Other items in finished ceiling including the following:
 - a. Air outlets and inlets.

- b. Speakers.
 - c. Sprinklers.
 - d. Smoke and fire detectors.
 - e. Occupancy sensors.
 - f. Access panels.
- F. Product Certificates: For each type of driver/ballast for bi-level and dimmer-controlled fixtures, from manufacturer.
- G. Field quality-control reports.
- H. Operation and Maintenance Data: For lighting equipment and fixtures to include in emergency, operation, and maintenance manuals.
- 1. Provide a list of all lamp types used on Project; use ANSI and manufacturers' codes.
- I. Warranty: Sample of special warranty.
- 1.6 QUALITY ASSURANCE
- A. Luminaire Photometric Data Testing Laboratory Qualifications: Provided by manufacturers' laboratories that are accredited under the National Volunteer Laboratory Accreditation Program for Energy Efficient Lighting Products.
- 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.
- D. FM Global Compliance: Lighting fixtures for hazardous locations shall be listed and labeled for indicated class and division of hazard by FM Global.
- E. NECA/IESNA Compliance: Comply with NECA/IESNA 500-2006 Standard, INSTALLING INDOOR COMMERCIAL LIGHTING SYSTEMS (ANSI).
- F. NFPA 101 Compliance: Comply with visibility and luminance requirements for exit signs.
- G. Installer: All Installers shall have not less than five (5) years experience in the installation of lighting fixtures of the type and quality shown.
- H. UL Compliance: Comply with UL Standards, including UL 486A and B, pertaining to interior lighting fixtures. Provide interior lighting fixtures and components which are UL-listed and labeled.
- I. CBM Labels: Provide fluorescent lamp ballasts which comply with Certified Ballasts Manufacturer's Association Standards and carry the CBM label.
- 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 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 for Emergency Lighting Unit Batteries: 10 years from date of Substantial Completion. Full warranty shall apply for first year, and prorated warranty for the remaining nine years.
 2. Warranty Period for Emergency Fluorescent Ballast and Self-Powered Exit Sign Batteries: Seven years from date of Substantial Completion. Full warranty shall apply for first year, and prorated warranty for the remaining six years.
- B. Special Warranty for Drivers/Ballasts: Manufacturer's standard form in which driver/ballast manufacturer agrees to repair or replace drivers/ballasts that fail in materials or workmanship within specified warranty period.
1. Warranty Period for Electronic Drivers/Ballasts: Five years from date of Substantial Completion.
- C. Special Warranty for T5 and T8 Fluorescent Lamps: Manufacturer's standard form, made out to Owner and signed by lamp manufacturer agreeing to replace lamps that fail in materials or workmanship, F.O.B. the nearest shipping point to Project Site, within specified warranty period indicated below:
1. Warranty Period: Two years from date of Substantial Completion.

1.9 EXTRA MATERIALS

- A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
1. Lamps: 10 for every 100 of each type and rating installed. Furnish at least one of each type.
 2. Plastic Diffusers and Lenses: One for every 100 of each type and rating installed. Furnish at least one of each type.
 3. Fluorescent-fixture-mounted, emergency battery pack: One for every 20 emergency lighting unit.
 4. Drivers/Ballasts: Five (5) for every 100 of each type and rating installed. Furnish at least two (2) of each type.
 5. Globes and Guards: One for every 20 of each type and rating installed. Furnish at least one of each type.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include product(s) indicated on Drawings and Specifications.

2.2 GENERAL REQUIREMENTS FOR LIGHTING FIXTURES AND COMPONENTS

- A. Recessed Fixtures: Comply with NEMA LE 4 for ceiling compatibility for recessed fixtures.
- B. LED Fixtures: comply with UL 8750. Test according to IESNA LM-79-2008 and IESNA LM-80-2008, in addition to ANSI C78.377-2008.
- C. Metal Parts: Free of burrs and sharp corners and edges.
- D. Sheet Metal Components: Steel unless otherwise indicated. Form and support to prevent warping and sagging.
- E. 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.
- F. 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 (3.175 mm) minimum unless otherwise indicated.
 - b. UV stabilized.
 2. Glass: Annealed crystal glass unless otherwise indicated.
- G. Factory-Applied Labels: Comply with UL 1598. Include recommended lamps and drivers/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 driver/ballast characteristics:
 - a. "USE ONLY" and include specific lamp type.
 - b. Lamp diameter code (T-4, T-5, T-8, etc.), tube configuration (twin, quad, triple, etc.), base type, and nominal wattage for fluorescent luminaires.
 - c. Lamp type, wattage, bulb type and coating.
 - d. Start type (programmed start, instant start, etc.) for fluorescent luminaires.
 - e. CCT and CRI for all luminaires.

2.3 LED LUMINAIRES

- A. An LED luminaire consists of LED light engine and driver, heat-sink, fixture housing, and optic assembly where applicable.
1. Temperature: Minimum starting temperature of -20 deg C (-4 deg F), maximum operating temperature of 70 deg C (158 deg F).
 2. Lamp and Lumen Maintenance: Plus 50,000 hours rated life at greater than 70% lumen maintenance.
 3. CRI and CCT: 3500 deg K CRI and greater than 80 CRI.
 4. Dimming capability: 0-10 volt analog dimming.
 5. Photometric Data and Test Reports: Comply with IESNA LM-79-08, IESNA LM-80-08, and ANSI C78.377-08.
 6. Radio Frequency Interference: Comply with CAP 106B Telecommunications (Control of Interference) Regulations.
 7. Luminaires and components thereof shall comply with UL 8750 Standard of Safety.
 8. Five-year Warranty on Luminaire including LED light engine and driver.
 9. Power Factor: 90 percent minimum.
 10. Total Harmonic Distortion Rating: Less than 10 percent.
 11. RoHS compliant.
 12. Sound Rating: Class A.
 13. Overload, short circuit, and thermal protection.
 14. Transient Voltage Protection: Rated to withstand 2.5kV of transient line surge.
 15. LED electronic drivers shall be manufactured by Advance, Universal, Osram, Eldoled, Lutron, or approved equal.
 16. LED luminaires shall be listed with the Design Lights Consortium or Energy Star Qualified Products lists.

2.4 LIGHTING FIXTURE SUPPORT COMPONENTS

- A. Comply with Division 26 Section "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 (13-mm) steel tubing with swivel ball fittings and ceiling canopy. Finish same as fixture.
- C. Twin-Stem Hangers: Two, 1/2-inch (13-mm) 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 (2.68 mm).

- E. Wires for Humid Spaces: ASTM A 580/A 580M, Composition 302 or 304, annealed stainless steel, 12 gage (2.68 mm).
- F. Rod Hangers: 3/16-inch (5-mm) 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 Drivers/Ballasts: Distance between the driver/ballast and fixture shall not exceed that recommended by driver/ballast manufacturer. Verify, with driver/ballast manufacturers, maximum distance between driver/ballast and luminaire.
- C. Lay-in Ceiling Lighting Fixtures Supports:
 - 1. Install ceiling support system rods or wires, independent of the ceiling suspension devices, for each fixture. Locate not more than 6 inches (150 mm) 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 (20-mm) metal channels spanning and secured to ceiling tees.
 - 4. Install at least one independent support rod or wire from structure to a tab on lighting fixture. Wire or rod shall have breaking strength of the weight of fixture at a safety factor of 3.
- D. Suspended Lighting Fixture Support:
 - 1. Pendants and Rods: Where longer than 48 inches (1200 mm), 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 Division 26 Section "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 Division 26 Section "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 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 265100

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SECTION 283111 – FIRE ALARM SYSTEM

PART 1 GENERAL

1.1 SCOPE OF WORK

- A. This specification provides the requirements for the installation, programming and configuration of an extension of the existing Honeywell Fire Alarm System. The system shall include, but not be limited to: modifications to existing fire alarm annunciator panel, automatic and manually activated alarm initiating and indicating peripheral devices and appliances, conduit, wire and accessories required to furnish a complete and operational Fire Alarm System.
- B. The work covered by this section of the Specifications shall include all labor, equipment, materials and services to furnish and install a complete and operational extension of the existing Fire Alarm System. It shall be complete with all necessary hardware, software and memory specifically tailored for this installation. It shall be possible to permanently modify the software on site by using an integral or a plug-in programmer.
- C. Provide a complete UL listed Fire Alarm System per Baltimore City requirements.

1.2 GENERAL REQUIREMENTS

- A. The requirements of the Contract Documents, including the General and Supplementary General Condition and Division 1 - General Requirements shall apply to the work of this section.
- B. At the time of bid, all exceptions taken to these Specifications, all variances from these Specifications and all substitutions of operating capabilities or equipment called for in these Specifications shall be listed in writing and forwarded to the Engineer. Any such exception, variances or substitutions that were not listed at the time of bid and are identified in the submittal, shall be grounds for immediate disapproval without comment.
- C. Furnish and install complete Fire Alarm System Additions as described herein and as shown on the plans; to be wired, connected, and left in first class operating condition. Include sufficient control unit, annunciator, manual stations, automatic fire detectors, smoke detectors, audible and visible notification appliances, wiring, terminations, electrical boxes, and all other necessary material for a complete operating system.
 - 1. Existing Fire Alarm Equipment: Shall be re-used and maintained fully operational.
 - 2. Test system prior to performing any modifications and report any defects, etc. to the owner in writing. Any defects, malfunctions of the system not reported in advance of performing work shall be the responsibility of the contractor to correct.

1.3 RELATED SECTIONS

- A. Division 26 - Electrical

1.4 RELATED DOCUMENTS

- A. Secure permits and approvals prior to installation.
- B. Prior to commencement and after completion of work, notify authorities having jurisdiction.
- C. Submit letter of approval for installation before requesting acceptance of system.

1.5 REFERENCES

- A. The equipment and installation shall comply with the current provisions of the following standards:
1. National Electric Code, Article 760.
 2. National Fire Protection Association Standards:
 - a. NFPA72 National Fire Alarm Code
 - b. NFPA101 Life Safety Code
 3. Local and State Building Codes.
 4. Local Authorities Having Jurisdiction.
 5. Underwriters Laboratories Inc.: The system and all components shall be listed by Underwriters Laboratories Inc. for use in fire protective signaling system under the following standards as applicable:
 - a. UL 864/UOJZ, APOU - Control Units for Fire Protective Signaling Systems.
 - b. UL 268 - Smoke Detectors for Fire Protective Signaling Systems.
 - c. UL 268A - Smoke Detectors for Duct Applications.
 - d. UL 217 - Smoke Detectors Single Station.
 - e. UL 521 - Heat Detectors for Fire Protective Signaling Systems.
 - f. UL 228 - Door Holders for Fire Protective Signaling Systems.
 - g. UL 464 - Audible Signaling Appliances.
 - h. UL 1638 - Visual Signaling Appliances.
 - i. UL 38 - Manually Activated Signaling Boxes.
 - j. UL 346 - Waterflow Indicators for Fire Protective Signaling Systems.
 - k. UL 1971 - Standard for Signaling Devices for the Hearing Impaired.
 - l. UL 1481 - Power Supplies for Fire Protective Signaling Systems.
 - m. UL 1711 - Amplifiers for Fire Protective Signaling Systems.
 6. Americans with Disabilities Act (ADA)
 7. International Standards Organization (ISO)
 - a. ISO-9000
 - b. ISO-9001

1.6 SYSTEM DESCRIPTION

- A. The Fire Alarm System Additions supplied under this specification shall be a microprocessor-based network system. All control panel assemblies and connected field appliances shall be both designed and manufactured by the same company, and shall be tested and cross-listed as compatible to ensure that a fully functioning Fire Alarm System is installed.

1.7 SUBMITTALS

- A. **Product Data:** The Contractor shall submit three (3) complete sets of documentation within 30 calendar days after award of purchase order. Indicated in the documentation will be the type, size, rating, style, catalog number, manufacturers' names, photos, and/or catalog data sheets for all items proposed to meet these specifications. The proposed equipment shall be subject to the review by the Engineer and no equipment shall be ordered or installed on the premises without that review. The Contractor shall provide hourly service rates and semi-annual inspection prices, performed by a factory trained and authorized personnel, for this installed Fire Alarm System with the submittal. Proof of that training and authorization of the servicing factory trained and authorized personnel shall be included in the submittal. These hourly service rates shall be guaranteed for a one year period unless otherwise specified.
- B. **Shop Drawings:** A complete set of Shop Drawings, one for each unit sub-assembly which requires that a field wire be connected to it, shall be supplied. The Shop Drawings shall be reproduced electronically from a Master Copy supplied by the manufacturer in digital format.
- C. **Samples:** Two samples of each filed connected device (smoke detectors, intelligent modules, horn, strobes, and/or speakers) shall be provided to the contractor for their familiarization.
- D. **Provide shop drawings as follows:**
 - 1. Single line riser diagram showing all equipment and type, number and size of all conductors.
- E. All and any information and data (such as drawings showing device locations and types, riser diagrams, diagrams, approvals, test data, etc.) required by local authorities.
- F. **Close-out Submittals:** Three (3) copies of the following Manual shall be delivered to the Building Owner's representative at the time of system acceptance. The close out submittals shall include:
 - 1. Operating manuals covering the installed Fire Alarm System.
 - 2. Point-to-Point diagrams of the entire Fire Alarm System as installed. This shall include all connected smoke detectors and addressable field modules. All drawings shall be provided in CAD and supplied in standard .DXF format. Vellum plots of each sheet shall also be provided. A system generated point to point diagram is required to ensure accuracy.
 - 3. The application program listing for the system as installed at the time of acceptance by the building owner and/or local Authority Having Jurisdiction (Disk and Hard copy printout).
 - 4. Name, address and telephone of the authorized factory representative.
 - 5. All drawings must reflect device address and programmed characteristics as verified in the presence of the engineer and/or the end user unless device addressing is electronically generated, and graphically printed.

1.8 WARRANTY

- A. Manufacturer shall guarantee the system equipment for a period of three (3) years from date of final acceptance of the system.
- B. The Contractor shall guarantee all wiring and raceways to be free from inherent mechanical or electrical defects for three (3) years from date of final acceptance of the system.
- C. Upon completion of the installation of Fire Alarm System equipment, the Electrical Contractor shall provide to the architect a signed written statement, substantially in form as follows: "The undersigned, having engaged as the Electrical Contractor, confirms that the Fire Alarm System equipment was installed in accordance with the wiring diagrams, instructions and directions provided to us by the manufacturer."

1.9 QUALITY ASSURANCE

- A. Qualifications: The installing factory trained and authorized personnel shall provide proof of their qualifications as Factory Authorization and Factory Training for the product(s) specified herein. These qualification credentials shall not be more than two years old, to ensure up-to-date product and application knowledge on the part of the installing factory trained and authorized personnel.

1.10 MAINTENANCE

- A. The Contractor shall provide a maintenance contract for the installed Fire Alarm System for period of one (1) year from the date of system commissioning. The maintenance contract shall be from a Factory Trained and Authorized Engineered Systems Distributor for the installed Fire Alarm System.

1.11 CERTIFICATES AND INSURANCE

- A. The Contractor shall provide the services and equipment of a Local Alarm Service Company listed by Underwriters Laboratories, Inc., in its current Directory as being capable of furnishing the signaling systems specified herein and who is authorized to, and shall issue a certificate for the equipment, installation and system described herein certifying that such equipment and all connected wiring and devices which form the specified system together with installation and maintenance service are in compliance with the requirements established by Underwriter's Laboratories. A copy of UL Listing card must be submitted by the Local Branch with the shop drawings proof of UL certification capability in the local area. Certificate service shall be for Local, Auxiliary, Remote Connect and Proprietary Fire Alarm Installer Code "FA" in UL Directory dated April 30, 1995, only.
- B. Specified equipment shall be furnished by a supplier who can provide evidence of carrying insurance coverage which shall include comprehensive, general liability, products liability, personal injury blanket contractual, premises operations and broad form property damage with limits no less than one million dollars, bodily injury and property damage combined. A certificate of insurance shall be submitted with the shop drawings as proof of insurance coverage.

PART 2 - PRODUCTS

2.1 GENERAL

- A. This Fire Alarm System Specification must be conformed to in its entirety to ensure that the installed and programmed Fire Alarm System will accommodate all of the future requirements and operations required by the building owner. Any specified item or operational feature not specifically addressed prior to bid date will be required to be met without exception.

2.2 EQUIPMENT AND MATERIAL GENERAL REQUIREMENTS

- A. All equipment furnished for this project shall be new and unused. All components and systems shall be designed for uninterrupted duty. All equipment, materials, accessories, devices, and other facilities covered by this specification or noted on contract drawings and installation specifications shall be the best suited for the intended use and shall be provided by a single manufacturer. If any of the equipment provided under this Specification is provided by different manufacturers, then that equipment shall be recognized as compatible by both manufacturers, and "Listed" as such by Underwriters' Laboratories.
- B. Fire Alarm System installation and operations shall be verified by the manufacturer's representative and a verification certificate presented upon completion. The manufacturer's representative shall be responsible for an on-site demonstration of the operation of the system and initial staff training as required by the Architect and/or Engineer.
- C. The Fire Alarm System shall be capable of detecting the electrical location of each fire alarm device including new and existing devices.

2.3 MANUFACTURERS

- A. All equipment, materials, and devices shall be compatible with the existing Simplex fire alarm system.
- B. Service availability: The supplier shall have sufficient stock on hand and have a fully equipped service organization capable of guaranteeing response time within 8 hours of service calls, 24 hours a day, 7 days a week to service completed systems.
- C. The Engineered Systems Distributor of the Fire Alarm System equipment specified herein shall provide a copy of their certificate of successful completion of an authorized training course given by the manufacturer of the Fire Alarm System equipment.

2.4 FIRE ALARM CONTROL UNIT

- A. The existing Fire Alarm Control Panel (FACP) is Silent Knight by Honeywell, and all additions to the existing panel shall be UL listed under Standards 864 (Control Units for Fire-Protective Signaling Systems) under categories UOJZ and APOU, and ULC listed under standard CAN/ULC-S527.
- B. The FACP additions shall include all required hardware and system programming to provide a complete and operational Fire Alarm System.:

2.5 SYSTEM SMOKE DETECTORS

- A. General Requirements for System Smoke Detectors:
 - 1. Comply with UL 268; operating at 24-V dc, nominal.
 - 2. Detectors shall be two wire type.
 - 3. Integral Addressable Module: Arranged to communicate detector status (normal, alarm, or trouble) to fire-alarm control unit.
 - 4. Base Mounting: Detector and associated electronic components shall be mounted in a twist-lock module that connects to a fixed base. Provide terminals in the fixed base for connection

to building wiring.

5. Self-Restoring: Detectors do not require resetting or readjustment after actuation to restore them to normal operation.
 6. Integral Visual-Indicating Light: LED type indicating detector has operated and power-on status.
 7. Remote Control: Unless otherwise indicated, detectors shall be analog-addressable type, individually monitored at fire-alarm control unit for calibration, sensitivity, and alarm condition and individually adjustable for sensitivity by fire-alarm control unit.
 - a. Rate-of-rise temperature characteristic shall be selectable at fire-alarm control unit for 15 or 20 deg F (8 or 11 deg C) per minute.
 - b. Fixed-temperature sensing shall be independent of rate-of-rise sensing and shall be settable at fire-alarm control unit to operate at 135 or 155 deg F (57 or 68 deg C).
 - c. Provide minimum 5 levels of detection sensitivity for each sensor.
- B. Photoelectric Smoke Detectors:
1. Detector address shall be accessible from fire-alarm control unit and shall be able to identify the detector's location within the system and its sensitivity setting.
 2. An operator at fire-alarm control unit, having the designated access level, shall be able to manually access the following for each detector:
 - a. Primary status.
 - b. Device type.
 - c. Present average value.
 - d. Present sensitivity selected.
 - e. Sensor range (normal, dirty, etc.).

2.6 HEAT DETECTORS

- A. General Requirements for Heat Detectors: Comply with UL 521.
- B. Heat Detector, Combination Type: Actuated by either a fixed temperature of 135 deg F (57 deg C) or a rate of rise that exceeds 15 deg F (8 deg C) per minute unless otherwise indicated.
 1. Mounting: Twist-lock base interchangeable with smoke-detector bases.
 2. Integral Addressable Module: Arranged to communicate detector status (normal, alarm, or trouble) to fire -alarm control unit.

2.7 NOTIFICATION APPLIANCES

- A. General Requirements for Notification Appliances: Connected to notification-appliance signal circuits, zoned as indicated, equipped for mounting as indicated, and with screw terminals for system connections.

- B. Visible Notification Appliances: Xenon strobe lights complying with UL 1971, with blue polycarbonate lens mounted on an aluminum faceplate. The word "ALARM" is engraved in minimum 1-inch- (25-mm-) high letters on the lens.
 - 1. Rated Light Output:
 - a. 15/30/75/110 cd, selectable in the field.
 - 2. Mounting: Wall mounted unless otherwise indicated.
 - 3. Flashing shall be in a temporal pattern, synchronized with other units.
 - 4. Strobe Leads: Factory connected to screw terminals.
 - 5. Mounting Faceplate: Factory finished, white.

2.8 ADDRESSABLE INTERFACE DEVICE

- C. General:
 - 1. Include address-setting means on the module.
 - 2. Store an internal identifying code for control panel use to identify the module type.
 - 3. Listed for controlling HVAC fan motor controllers.
- D. Monitor Module: Microelectronic module providing a system address for alarm-initiating devices for wired applications with normally open contacts. Provide for all sprinkler flow and tamper switches, and as required.
- E. Control Module:
 - 1. Operate notification devices.
 - 2. Operate solenoids for use in sprinkler service.
 - 3. Mute sound systems(s).
 - 4. Unlock security doors.
 - 5. Elevator Recall functions & Firefighter Hat indication.

2.9 FIRE ALARM CABLING

- A. Provide dual-rated FPLP MC multi-conductor fire alarm and control cable in size #14 AWG copper (or as recommended by the Fire Alarm Manufacturer) for use as fixed wiring within buildings, concealed. These multi-conductor cables shall have a maximum operating temperature of 105°C dry for FPLP applications at a nominal voltage rating of 300 volts or less and 90°C dry for MC cable installations at a nominal voltage rating of 600 volts or less. These cables shall be UL listed for through-penetration applications in wall and floor-ceiling assemblies of gypsum wallboard, concrete and concrete-block; and shall have qualified for one, two, and three-hour fire ratings.
- B. Where recommended by the Fire Alarm System manufacturer, provide a shield over the conductor assembly(ies). Shield shall consist of a laminated aluminum/mylar tape and a tinned

- copper drain wire. The drain wire shall be a minimum of #18 AWG and shall be in contact with the aluminum shield.
- C. Provide an insulated or bare grounding conductor sized in accordance with Table 6.3 of Underwriters Standard UL 1569, cabled with the circuit conductors and identified in compliance with Section 35 of UL 1569.
 - D. Provide a galvanized steel armor (colored red) applied over the inner cable assembly with a positive interlock in compliance with Section 12 of UL 1569 and Section 14 of UL 1424.
 - E. The cable shall be tested in accordance with the applicable sections of Underwriters Laboratories Standard for Metal Clad Cable, UL 1569.
 - F. Fire alarm control cabling shall be as manufactured by AFC Cable Systems or an approved equal.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. The entire system shall be installed in a skillful, workmanlike manner in accordance with approved manufacturers' manuals and wiring diagrams. The contractor shall furnish all conduit, wiring, outlet boxes, junction boxes, cabinets and similar devices necessary for the complete installation. All wiring shall be of the type recommended by the NEC, approved by local authorities having jurisdiction for the purpose, and shall be installed in dedicated conduit throughout.
- B. All penetration of floor slabs and fire walls shall be fire stopped in accordance with all local fire codes.
- C. End of Line Resistors shall be furnished as required for mounting as directed by the manufacturer.
- D. All wiring shall be color coded throughout and installed according to NEC standards.
- E. All low voltage operation shall be provided from the Fire Alarm Control Panel.
- F. Smoke or Heat Detector Spacing:
 - 1. Comply with NFPA 72, "Smoke-Sensing Fire Detectors" Section in the "Initiating Devices" Chapter, for smoke-detector spacing.
 - 2. Comply with NFPA 72, "Heat-Sensing Fire Detectors" Section in the "Initiating Devices" Chapter, for heat-detector spacing.
 - 3. Smooth ceiling spacing shall not exceed 30 feet (9 m).
 - 4. Spacing of detectors for irregular areas, for irregular ceiling construction, and for high ceiling areas shall be determined according to Appendix in NFPA 72.
 - 5. HVAC: Locate detectors not closer than 3 feet (1 m) from air-supply diffuser or return-air opening.
 - 6. Lighting Fixtures: Locate detectors not closer than 12 inches (300 mm) from any part of a lighting fixture.

3.2 DOCUMENTATION AND TRAINING

- A. The contractor shall compile and provide to the owners three (3) complete manual on the completed system to include operating and maintenance instruction, catalog cuts of all

equipment and components, as-built wiring diagrams and a manufacturer's suggested spare parts list.

- B. In addition to the above manuals, the contractor shall provide the services of the manufacturer's trained representative for a period of three (3) four-hour sessions to instruct the owners' designated personnel on the operation and maintenance of the entire system.

3.3 WIRING

- A. The Fire Alarm System shall be installed with all conduits, conductors, outlet boxes, fittings, connectors and accessories necessary to ensure a complete, operable system in compliance with all applicable codes and regulations.
- B. Wire and Cable: All fire alarm conductors and wiring shall be installed in metal armored cable or in conduit. Conductors within equipment enclosures shall be carefully cabled and laced. Individual conductors shall be tagged with E-Z code markers indicating circuit number and type. Markers shall be used on all conductors at each outlet or pull box at each equipment enclosure.
- C. Outlet pull and junction boxes shall be painted red on the exterior and shall be installed in accordance with Specification Section 260533, "Raceways and Boxes".
- D. T-tapped connections shall not be allowed on any supervised circuits. Connections shall be made directly to and from device terminal screws. Screw terminals shall have rising plates to terminate more than one wire or each wire shall be terminated to individual screws or each wire shall terminate in a ring lug.

3.4 TESTING, GUARANTEE, SERVICE

- A. Prior to installation of any equipment, the contractor shall provide the engineer with copies of submittals for approval. Submittals shall include typical one-line risers and equipment specification sheets.
- B. The Contractor is responsible for assuring that conduit size and wire quantity, size and type are suitable for the equipment supplied. The Contractor shall review the proper installation of each type of device with the equipment supplier. Final connections between the wiring and equipment shall be made under the supervision of the equipment supplier's representative.
- C. Upon completion, the Contractor shall conduct a functional test of the System for the Owner, Architect and Engineer.
 - 1. To assure that wire size, power supply, number of devices on a circuit, etc. are suitable to support 100% of devices being in alarm or operated simultaneously, this test shall include the following:
 - a. Place all sensors and monitor modules in alarm. Each shall display its address and alarm condition at both the FACP and FAAP.
 - b. Operate all control modules for the alarm or operated condition. Each module shall display its address and condition at the FACP.
 - c. Reset all alarmed and operated devices. The FACP shall display the address of any off-normal devices.
 - 2. Test a representative number of sensors for trouble by removing the sensor from its base. The address and trouble condition for each shall be displayed at the FACP. Insert a different type of sensor into the base. The address and trouble condition shall be displayed. The sensor will return to normal only when the proper sensor type is reinserted into the base.

- D. All components, parts and assemblies supplied by the manufacturer shall be guaranteed against defects in materials and workmanship for a period of 24 months.
- E. The equipment manufacturer shall have a local branch office staffed with trained, full-time employees who are capable of performing testing, inspection, repair, and maintenance services for the life of the Fire Alarm System.

3.5 COORDINATION OF MAINTENANCE AND MONITORING

- A. It shall be the responsibility of the Representative of Equipment Manufacturer to arrange for meetings between the Owner's Representative and the representatives of qualified companies who specialize in the maintenance, testing and central station monitoring of fire alarm systems.
- B. Include all necessary (code required) monthly monitoring on a per building basis until 30 days after substantial completion. Provide off-site UL certified central station monitoring services for each building.
- C. Contractor shall provide all testing and system demonstrations during weekends or at other times, as allowed by Owner, when classes are not in session.

3.6 FIELD QUALITY CONTROL

- A. The Fire Alarm System shall be installed and fully tested under the supervision of trained manufacturer's representative. The Fire Alarm System shall be demonstrated to perform all the functions as specified.

3.7 ACCEPTABLE INSTALLERS

- A. The Fire Alarm System specified herein shall be installed by a Factory Trained and Authorized Engineered Systems Distributor.
- B. Field connected devices may be installed and wired, and primary power may be wired by licensed Contractors under the direct supervision of a Factory Trained and Authorized Engineered Systems Distributor.

3.8 EXAMINATION

- A. Prior to the commencement of any of the work detailed herein, an examination and analysis of the area(s) where the Fire Alarm System and all associated components are to be installed shall be made.
- B. Any of these area(s) that are found to be outside the manufacturers' recommended environments for the particular specified products shall be noted on a Site Examination Report which shall be given to the Building Owners' Representative, and the local Authority Having Jurisdiction.

END OF SECTION 283111