



PROPOSAL DOCUMENTS

**ELEVATOR AND ESCALATOR
MODERNIZATION AND SERVICE
AT
NEW HAVEN PARKING AUTHORITY FACILITIES
NEW HAVEN, CONNECTICUT
NHPA PROJECT #21-011**

JULY 2025



ELEVATOR & ESCALATOR MODERNIZATION AND SERVICE AT THE NEW HAVEN PARKING AUTHORITY FACILITIES

New Haven Parking Authority
New Haven, Connecticut

NHPA Project No. 21-011

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Not Applicable

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Not Applicable

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Not Applicable

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Not Applicable

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INVITATION FOR PROPOSALS

INVITATION FOR PROPOSALS
**ELEVATOR AND ESCALATOR
MODERNIZATION AND SERVICE
AT
NEW HAVEN PARKING AUTHORITY FACILITIES
NEW HAVEN, CONNECTICUT
NHPA PROJECT #21-011**

The New Haven Parking Authority (“NHPA”), a special purpose municipal authority, created by Special Act 51-473 of the General Assembly of the State of Connecticut, as amended, with a mailing address of 232 George Street, New Haven, CT 06510, hereby issues this Invitation for Proposals for Elevator and Escalator Modernization and Service at its Facilities. NHPA will receive sealed proposals until 3:00 p.m. EDT time on August 19, 2025 (“Submission Deadline”) in accordance with the ***Instructions to Proposers***. **Any Proposal received after the Submission Deadline will be rejected.** NHPA shall decide when the specified time has arrived as a deadline to receive Proposals, and no Proposal received thereafter will be considered.

The Proposal Documents will be available beginning July 21, 2025 at no cost by downloading from the New Haven Parking Authority / Park New Haven website at <https://parknewhaven.com/request-for-bids/>.

A **mandatory** Pre-Proposal Briefing and Modernization Sites Tour shall be held on August 1, 2025. Meet at 9:30 a.m. at the Main Office of the New Haven Parking Authority, 232 George Street, New Haven CT 06510. **Proposals submitted by Proposers who do not attend the mandatory Pre-Proposal Briefing and Modernization Sites Tour will be rejected.**

The work for this project includes, but is not limited to: Modernization of 13 elevator cars at 4 Facilities: Air Rights Garage, Temple Medical Garage, Temple Street Garage, and 270 State Street Garage; and elevator and escalator preventative maintenance and repair services at New Haven Parking Authority facilities involving 28 elevator cars and 2 escalators.

The New Haven Parking Authority reserves the right to reject any or all proposals, to waive any informalities in the proposals and to further negotiate with proposers.

The New Haven Parking Authority is an Equal Opportunity/Affirmative Action Employer.

NEW HAVEN PARKING AUTHORITY

Douglas Hausladen, Executive Director

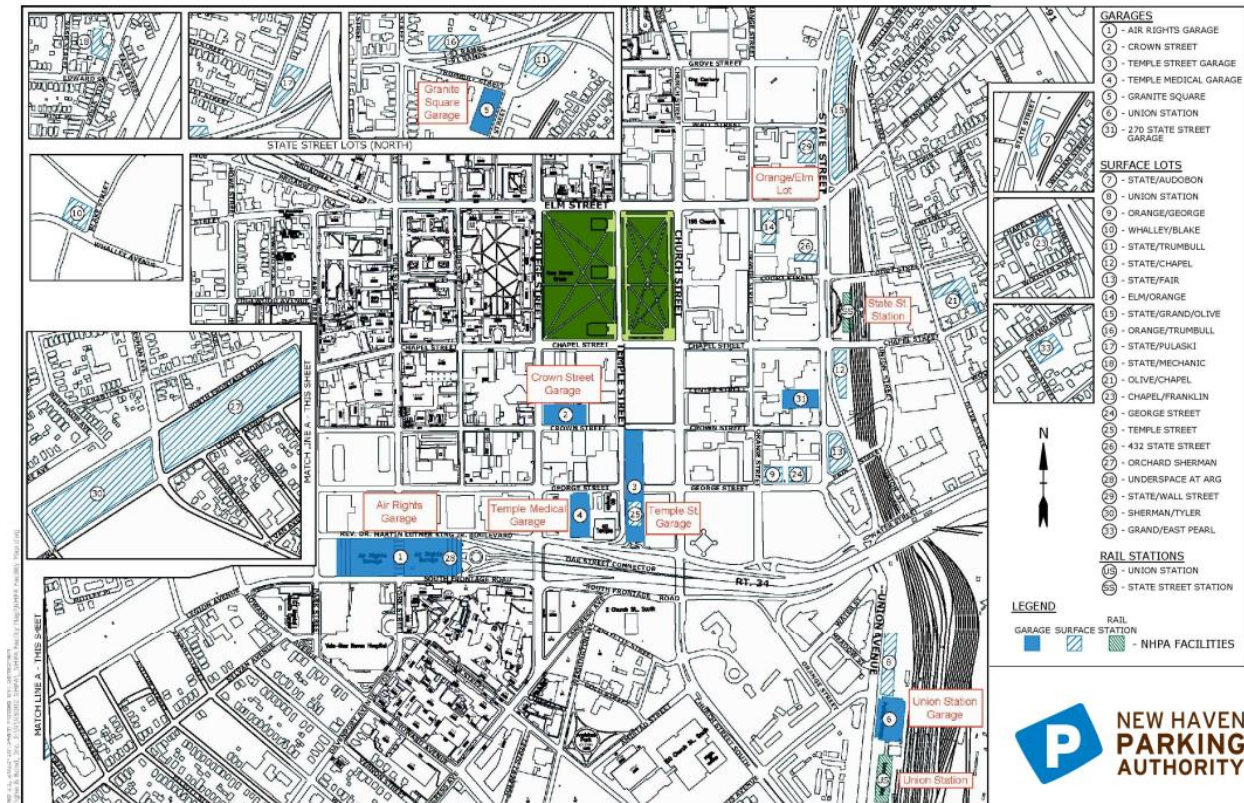
SITE PLAN

ELEVATOR AND ESCALATOR MODERNIZATION AND SERVICE

AT NEW HAVEN PARKING AUTHORITY FACILITIES, NEW HAVEN, CONNECTICUT

NHPA PROJECT #21-011

GARAGES	Modernization	Service
- AIR RIGHTS GARAGE	X	X
- CROWN STREET GARAGE		X
- TEMPLE STREET GARAGE	X	X
- TEMPLE MEDICAL GARAGE	X	X
- GRANITE SQUARE GARAGE		X
- UNION STATION GARAGE		X
- 270 STATE STREET GARAGE	X	X
RAIL STATIONS		
- UNION STATION BUILDING		X
- STATE STREET STATION		X



DESCRIPTION OF SERVICES REQUESTED
ELEVATOR AND ESCALATOR
MODERNIZATION AND SERVICE
AT
NEW HAVEN PARKING AUTHORITY FACILITIES
NEW HAVEN, CONNECTICUT
NHPA PROJECT #21-011

The New Haven Parking Authority (NHPA) is requesting proposals from qualified elevator and escalator service firms to provide service for NHPA's elevators and escalators together with the modernization of 13 elevators at the Air Rights Garage, Temple Medical Garage, Temple Street Garage, and 270 State Street Garage. The 28 elevators to be serviced are located at the Air Rights Garage, Crown Street Garage, Granite Square Garage, Temple Medical Garage, Temple Street Garage, 270 State Street Garage, State Street Station, Union Station Garage, and the Union Station Building and its underground passageway to train platforms. There are also two escalators to be serviced at the Union Station Building. Refer to enclosed Site Plan, which illustrates the location of the facilities involved. Refer to below inventory, which contains some summary information on the elevators and escalators involved. Refer to Proposal Documents concerning separate construction documents for the modernization, repairs and improvements.

The service firm(s) selected will be responsible for servicing, repairing and maintaining NHPA's elevators and escalators on a 24-hour basis. The service firm will also be responsible for monitoring and responding to calls made from the automatic dialers within the elevator cabs (where applicable) or for other authorized calls. The service firm shall provide incident reports as needed as well as a monthly summary report of activity.

The New Haven Parking Authority will tentatively enter into a five year contract renewable annually at NHPA's discretion. The New Haven Parking Authority will also include a cancellation-for-convenience clause in the proposed service agreement. The New Haven Parking Authority reserves the right to contract with other entities for similar services, and may award separate contracts to separate proposers.

The successful Proposer shall be required to carry insurance as stipulated in the Proposal Documents for services performed for the New Haven Parking Authority. The successful proposer shall provide and maintain a certificate of insurance and shall name the New Haven Parking Authority, the City of New Haven, the State of Connecticut and their respective officers, employees and agents as additional insured, related to services provided; the New Haven Parking Authority reserves the right to add entities to this list of additional insured. This insurance policy shall remain in full force and effect from the date of the service agreement through seven years after the date of completion of service or through the expiration of the statute of limitations, whichever is sooner.

Funding for these services may partially be provided by an agreement with the State of Connecticut, Department of Transportation. The successful proposer shall be required to abide by the requirements of State, as per enclosed Exhibits "A" and "A-1", as applicable.

A draft Service Agreement is provided within these Proposal Documents.

SUMMARY INVENTORY

ELEVATORS

FACILITY	NUMBER OF CARS	NUMBER OF LANDINGS PER CAR	TYPE OF CONVEYANCE	REMOTE MONITORED AUTODIALERS YES OR NO
Air Rights Garage	4	6	Traction	No
Crown Street Garage	4	8	Traction	Yes
Granite Square Garage	1	4	Hydraulic	Yes
Temple Medical Garage	2	7	Hydraulic	Yes
Temple Street Garage	4	6	Traction	Yes
	1	5	Hydraulic	Yes
270 State Street Garage	2	3	Hydraulic	Yes
State Street Station	1	2	Hydraulic	Yes
	1	2	Traction	Yes
Union Station Garage	2	6	Hydraulic	Yes
Union Station Main Building	2	5	Hydraulic	Yes
Union Station Passageway	4	2	Hydraulic	Yes

ESCALATORS

FACILITY	NUMBER OF ESCALATORS
Union Station Building	2

INSTRUCTIONS TO PROPOSERS

INSTRUCTIONS TO PROPOSERS

ELEVATOR AND ESCALATOR MODERNIZATION AND SERVICE AT NEW HAVEN PARKING AUTHORITY FACILITIES NEW HAVEN, CONNECTICUT NHPA PROJECT #21-011

The New Haven Parking Authority (“NHPA” or the “Authority”), hereby provides these Instructions to Proposers for Elevator and Escalator Modernization and Service at NHPA Facilities, NHPA Project #21-011.

1. USE OF SEPARATE PROPOSAL FORMS

The Proposal Documents include a complete set of the Proposal Forms to be filled out and submitted to the NHPA.

2. INTERPRETATIONS AND ADDENDA

No oral interpretation will be made to any Proposer as to the meaning of the Proposal Documents or any part thereof. Every request for an interpretation of the Proposal Documents shall be made in writing to the Chief Engineer, New Haven Parking Authority, via e-mail at jstaniewicz@nhparking.com with a copy to the NHPA counsel pokragly@cohenandwolf.com. Any inquiries must be received no later than Noon on August 8, 2025 to be given consideration. Every interpretation made to a Proposer will be in the form of an Addendum to the Proposal Documents and, when issued, will be also available on the New Haven Parking Authority website at <https://parknewhaven.com/request-for-Bids/> at least 24 hours before Proposals are opened. **It shall be the Proposer’s responsibility to make inquiry as to, and to obtain, any Addenda issued, if any. Proposers should monitor the Website for any issuance of Addenda.** All such Addenda shall become part of the Proposal Documents and each Proposer shall be bound by such Addenda.

NOTE: In the space provided on the Proposal Form, Proposers shall list each addendum by number which they received. Proposers who do not list all addenda issued by NHPA for this Proposal may be considered non-responsive to this Proposal and their Proposal may be rejected.

3. MANDATORY PRE-PROPOSAL BRIEFING AND MODERNIZATION SITES TOUR

A **mandatory** Pre-Proposal Briefing will be held at the Main Office of the New Haven Parking Authority, 232 George Street, New Haven CT 06510 at the time and date specified in the Invitation for Proposals. Site visits of the Authority’s facilities at which modernization is planned will be conducted immediately following the Pre-Proposal Briefing. **Proposals submitted by Proposers who do not attend the mandatory Pre-Proposal Briefing and**

Modernization Sites Tour will be rejected. This will not be a question and answer session. For questions, interpretations, etc., please refer to Section 2 of the Instructions to Proposers.

4. INSPECTION OF FACILITIES

In addition to the Mandatory Pre-Proposal Briefing and Modernization Sites Tour, prior to the Proposal submission, each Proposer shall visit the remainder of the New Haven Parking Authority Facilities involved with this Proposal (refer to Site Plan) and become fully acquainted with the existing conditions there relating to the proposed services, the facilities involved and the difficulties and restrictions attending the performance of the proposed services. The Proposer shall in no way be relieved of any obligation to visit the facilities involved and become acquainted with the conditions there existing and the difficulties and restrictions attending the performance of the proposed services, and the New Haven Parking Authority will reject any claim based on facts regarding which the Proposer should have been on notice. All personnel visiting the sites shall notify William Cable, Director of Security, sufficiently ahead of time at 203-946-7524 (office) or email at wcable@nhparking.com to make an appointment. NOTE: The train platforms and track areas are under the jurisdiction of MTA/Metro-North. **No personnel are allowed on the train track areas and must be accompanied by the Director of Security to visit the elevator machine rooms.**

5. PROPOSALS

- A. Each Proposal must be submitted utilizing the appropriate and applicable Proposal Forms. All blank spaces within the Proposal Forms must be filled in. No changes shall be made to the Forms. Erasures and other changes in the Proposal must be explained or noted over the signature of the Proposer.
- B. Each Proposer shall sign the Proposal in the blank space provided for this purpose. If a Proposal is made by a business entity, the name and address of such entity shall be indicated, together with the names and addresses of the applicable officers, directors, members, etc. If the Proposal is made by a partnership, it must be acknowledged by one of its partners; if made by a limited liability company, corporation, or other similar entity, it must be acknowledged by one of its members, officers, or similar duly authorized agents.
- C. Proposers shall submit all of the following completed documents to NHPA, which collectively shall constitute a "Proposal":
 - 1. Proposal Form
 - 2. Proposal Bond and Form of Surety Guaranty
 - 3. Non-Collusion Affidavit of Proposer
 - 4. Statement of Proposer's Qualifications
 - 5. Statement of Items to be Discussed by the Proposer
 - 6. Equal Employment Opportunity Agreement
 - 7. Current Work Force Certificate
 - 8. Community Subcontractor Utilization Certificate
 - 9. Certificate of Non-Arrearage
 - 10. Contractors Wage Certificate Form

- 11. Preliminary Project Progress Schedule
- 12. Hourly Rate Schedule

- D. Each Proposal shall be submitted, via email, by attaching one or more PDF files, to: jstaniewicz@nhparking.com (James Staniewicz, Chief Engineer) and pokragly@cohenandwolf.com (Peter Okragly of Cohen and Wolf, P.C., counsel to the New Haven Parking Authority). Emails shall contain the subject line “**Proposal for Elevator and Escalator Modernization and Service at NHPA Facilities, NHPA Project #21-011.**” NHPA shall decide when the specified time has arrived as a deadline to receive Proposals, and no Proposal received thereafter will be considered.
- E. Each Proposer is specifically advised that any person, firm, or any other party to whom it proposes to award a subcontract in the event of an Award, may be required to submit a certification regarding Equal Employment Opportunity, similar to that submitted by the Proposer. Subcontractors are subject to the approval of NHPA.
- F. NHPA may, at its option, waive any informality or accept or reject or negotiate any and all Proposals. Any Proposal received after the time, date and place specified shall not be considered; provided, however, NHPA, in its sole discretion, reserves the right to delay the opening of the Proposals.

6. PROPOSER’S PRICE ITEMIZATION

The Proposer is required to price the various components of the work as set forth in the Proposal Form. The prices submitted for each of the several items in the Proposal Form shall include its pro rata share of overhead and profit. The sum of all items in the Proposal Form shall equal the total amount of the Proposal (the “Proposal Price”). Any Proposal not conforming to this requirement may be rejected as informal. The special attention of all Proposers is called to this provision: Should conditions make it necessary to revise the scope of the Project and/or revise estimated quantities (if applicable), the Unit Prices and Lump Sums for each component listed in the Proposal Form shall serve as the basis for adjustments to the Proposal Price.

7. PROPOSAL GUARANTY

In the event the Proposal Price is \$50,000 or more, the Proposal must be accompanied by a proposal guaranty, which shall not be less than ten percent (10%) of the amount of the proposal. The guaranty shall be a proposal bond in the form attached. The proposal bond shall be secured by a guaranty or surety company authorized and qualified to do business in the State of Connecticut and listed in the latest issue of U.S. Treasury Circular 570. The amount of such proposal bond shall be within the maximum amount specified for such in said Circular 570. Proposals will be considered non-responsive unless accompanied by the required guaranty. The proposal guaranty shall insure the execution of the Agreement and the furnishing of the surety bond or bonds by the successful Proposer, all as required by the Proposal Documents.

8. COLLUSIVE AGREEMENTS PROHIBITED

Each Proposal shall have an affidavit attached thereto, in the form herein provided, that affirms that the Proposer has not colluded with any person, firm, entity, or any other third party in regard to the Proposal submitted.

Before executing any subcontract, the selected Proposer shall submit the name of any proposed subcontractor for prior approval and an affidavit from the subcontractor in the form to be provided by NHPA.

9. STATEMENT OF PROPOSER'S QUALIFICATIONS

Each Proposer shall submit the *Statement of the Proposer's Qualifications Form*. The Proposer shall include a statement of the Proposer's qualifications, its experience record in constructing and servicing the type of improvements embraced in the Agreement, and its organization and equipment available to complete the work contemplated; and, when specifically requested by NHPA, each Proposer shall also submit a detailed financial statement. The Proposals will be evaluated in part by the nature and extent of the service to be provided and by Proposer's qualifications and experience as outlined in the *Statement of Proposer's Qualifications Form*.

Each Proposer shall submit on the form furnished for that purpose (a copy of which is included in the Proposal Documents)

Proposers shall also attach the following as part of their response:

- (a) supplemental materials including copies of licenses and training certificates as applicable;
- (b) the required DAS prequalification certificates from the Proposer **if the contract value is in excess of \$1,000,000**, per Connecticut General Statutes § 4b-91, as well as from all "Substantial Subcontractors" (which, as defined in Connecticut General Statutes § 4a-100, means a **subcontract with a subcontract value in excess of \$1,000,000**); and
- (c) DAS certificates for all SBEs and MBEs (i.e., MBE/WBE/DisBEs) to be utilized on the project, as defined in Connecticut General Statutes § 4a-60g.

NHPA shall have the right to take such steps as it deems necessary to determine the ability of the Proposer to perform its obligations under the Agreement and upon request of NHPA the Proposer shall provide all such information and data for this purpose. The right is reserved to reject any proposal where an investigation of the available evidence or information does not satisfy NHPA that the Proposer is qualified to properly carry out the terms of the Agreement.

10. STATEMENT OF ITEMS TO BE DISCUSSED BY THE PROPOSER

Each Proposer shall submit the *Statement of the Items to be Discussed Form*. The Proposals will be evaluated in part by the nature and extent of details provided by Proposer as outlined in the *Statement of the Items to be Discussed Form*.

11. WAGES AND SALARIES

a. As per Connecticut General Statutes § 31-53, municipal grantees shall pay prevailing wages rates on a Public Works Contract. Under current law, the state or political subdivision must award the construction contract and be a party to the construction contract and not a mere grantor of funds for the project to require prevailing wage rates.

b. The provisions of Connecticut General Statutes § 31-53 do not apply when the total project cost of all work to be performed by all contractors and subcontractors in connection with new construction of any public works project is less than \$1,000,000 or where the total cost of all work to be performed by all contractors and subcontractors in connection with any remodeling, refinishing, refurbishing, rehabilitation, alteration or repair of any public works project is less than \$100,000.

Please refer to https://portal.ct.gov/dol/divisions/wage-and-workplace-standards/prevailing-wage?language=en_US for further guidance.

c. When Prevailing Wage Rates are required, the construction contract shall contain the following provision:

“The wages paid on an hourly basis to any person performing the work of any mechanic, laborer or worker on the work herein contracted to be done and the amount of payment or contribution paid or payable on behalf of each such person to any employee welfare fund, as defined in subsection (i) of section 31-53, shall be at a rate equal to the rate customary or prevailing for the same work in the same trade or occupation in the town in which such construction, remodeling, refinishing, refurbishing, rehabilitation, alteration or repair project is being undertaken. Any contractor who is not obligated by agreement to make payment or contribution on behalf of such persons to any such employee welfare fund shall pay to each mechanic, laborer or worker as part of such person’s wages the amount of payment or contribution for such person’s classification on each pay day.”

d. The State Department of Labor’s Wage and Workplace Standards Division (860-754-5186 or at matthew.ferri@ct.gov) will assist in determining the prevailing wage rate.

12. PRELIMINARY PROJECT PROGRESS SCHEDULE

The Proposer shall submit with its Proposal a Preliminary Progress Schedule (use enclosed form), showing the proposed dates of starting and completing each of the various sections of the work.

13. HOURLY RATE SCHEDULE

The Proposer shall submit with its Proposal an Hourly Rate Schedule (use enclosed form) for all tradesmen associated with this Proposal package for performing extra work on a time and material basis. These rates are to be fully loaded [including benefits, taxes (all Sales Taxes,

Labor and Material as applicable for this project and type of work), applicable insurance, overhead and profit, bond costs (if Subcontractor has provided Surety Bonds), small tools, travel, parking, supervision, and any other costs associated with labor, etc.] and are to be in accordance with the prevailing wages of the trade having jurisdiction in areas where the work is performed. The wage rates shall be valid for the life of the project. NOTE: Further, no mark-up shall be allowed on the premium time portion of the wage rate. These wage rates including detail and supporting documentation shall be made available within 5 days of verbal award and shall be broken down sufficiently representing all of the items noted above. All rates are subject to thorough analysis and subject to reduction if deemed inaccurate by the Program Manager and/or the Owner.

14. TAXES

Proposers should not include federal excise or state sales and use taxes, as NHPA is exempt from payment of such taxes. NHPA is also exempt from transportation taxes when goods are consigned to NHPA. NHPA will furnish tax exemption certificates upon satisfactory proof of delivery to NHPA. Shipments should be consigned to NHPA in care of the successful Proposer.

15. PERMITS

The successful Proposer shall obtain all required permits. The cost of the permits shall be included in the Proposal Price as part of applicable line items and no separate payment will be made. NHPA is not exempt from permit fees including, but not limited to, coordinating State of Connecticut elevator inspections/certifications/testing/turnover, City of New Haven Building Department permits, City of New Haven or State of Connecticut street/sidewalk obstruction permits, City of New Haven Commission on Equal Opportunities contract compliance conference fees, MTA/Metro-North entry permits for access on or near train platforms, hazardous material permits, etc.

16. EQUAL EMPLOYMENT OPPORTUNITY

Attention of Proposers is particularly called to the requirement for ensuring that employees and applicants for employment are not discriminated against because of their sex, sexual orientation, race, creed, color or national origin or physical handicap, or otherwise as prescribed by law.

Conferences concerning equal employment opportunity compliance by the successful Proposer may be scheduled with the City Commission on Equal Opportunities, and CHRO if applicable, prior to formal action authorizing the award of and/or notice to proceed for a contract by NHPA. The successful Proposer will receive forms and other documentation, which must be completed and returned to NHPA, the City Commission on Equal Opportunities, and CHRO if applicable, prior to the date of these conferences. The required information will detail the intended utilization of small business enterprises and minority/women/disabled business enterprises as subcontractors by the successful Proposer and the status of minorities, women and apprentices by the successful Proposer's current labor

force in completing the work as included in the Proposal Documents. This information will be part of the successful Proposer's Affirmative Action/Equal Opportunity Compliance Report and will represent a significant focus of discussion at these conferences. The successful Proposer is responsible for satisfying all applicable Affirmative Action/Equal Opportunity provisions as set forth in or referred to in these Proposal Documents.

NOTE: The City of New Haven Commission on Equal Opportunities charges a non-refundable fee, which varies depending on the dollar value of the construction contract, for its Equal Employment Opportunity Conference regarding contract compliance. Contact the City of New Haven Commission on Equal Opportunities for its fee schedule.

Information on the City's minority and women workforce requirements and resources is available from the City of New Haven Commission on Equal Opportunities, 200 Orange Street, New Haven, CT 06510, telephone (203) 946-8160. Also refer to General Condition Sections 210, 211 and 213.

17. NONDISCRIMINATION CERTIFICATION

The contract to be awarded is subject to contract compliance requirements mandated by [Sections 4a-60](#) and [4a-60a](#) of the Connecticut General Statutes; and, when the awarding agency is the State, [Sections 46a-71\(d\)](#) and [46a-81i\(d\)](#) of the Connecticut General Statutes. There are Contract Compliance Regulations codified at [Section 46a-68j-21 through 43](#) of the Regulations of Connecticut State Agencies, which establish a procedure for awarding all contracts covered by [Sections 4a-60](#) and [46a-71\(d\)](#) of the Connecticut General Statutes. According to [Section 46a-68j-30\(9\)](#) of the Contract Compliance Regulations, every agency awarding a contract subject to the contract compliance requirements has an obligation to "aggressively solicit the participation of legitimate minority business enterprises as Proposers, contractors, subcontractors and suppliers of materials."

"Minority business enterprise" is defined in [Section 4a-60](#) of the Connecticut General Statutes as a business wherein fifty-one percent or more of the capital stock, or assets belong to a person or persons: "(1) Who are active in daily affairs of the enterprise; (2) who have the power to direct the management and policies of the enterprise; and (3) who are members of a minority, as such term is defined in subsection (a) of [Section 32-9n](#)."

"Minority" groups are defined in [Section 32-9n](#) of the Connecticut General Statutes as "(1) Black Americans . . . (2) Hispanic Americans . . . (3) persons who have origins in the Iberian Peninsula . . . (4) Women . . . (5) Asian Pacific Americans and Pacific Islanders; (6) American Indians . . ." An individual with a disability is also a minority business enterprise as provided by [Section 4a-60g](#) of the Connecticut General Statutes. The above definitions apply to the contract compliance requirements by virtue of [Section 46a-68j-21\(11\)](#) of the Contract Compliance Regulations.

The awarding agency will consider the following factors when reviewing the Proposer's qualifications under the contract compliance requirements:

- (a) the Proposer's success in implementing an affirmative action plan;
- (b) the Proposer's success in developing an apprenticeship program complying with [Sections 46a-68-1 to 46a-68-17](#) of the Administrative Regulations of Connecticut State Agencies, inclusive;
- (c) the Proposer's promise to develop and implement a successful affirmative action plan;
- (d) the Proposer's submission of employment statistics contained in the "Employment Information Form", indicating that the composition of its workforce is at or near parity when compared to the racial and sexual composition of the workforce in the relevant labor market area; and
- (e) the Proposer's promise to set aside a portion of the contract for legitimate minority business enterprises. See [Section 46a-68j-30\(10\)\(E\)](#) of the Contract Compliance Regulations.

18. UTILIZATION OF INTENDED SUBCONTRACTORS

Proposers shall submit with their Proposal, on forms provided (or using additional sheets if necessary), the Community Subcontractor Utilization Certificate indicating:

- A. The name, address and contact person of each Subcontractor the Proposer will use.
- B. The name, address and contact person of each Supplier of Materials the Proposer will use in order to satisfy the requirement for use of the NHPA Community Subcontractor Utilization Program. (For Suppliers of Materials, only list those Suppliers of Materials for which the Proposer will use in order to satisfy the requirement for use of SBE/MBE/WBE/DisBE or having a place of business within the City of New Haven.)
- C. The categories of the Subcontractors and/or Suppliers of Materials utilized (i.e., SBE, MBE, WBE, DisBE, any other Subcontractors).
- D. The nature of the work to be undertaken by each Subcontractor or Supplier of Materials.
- E. The dollar value of each Subcontract or Supply of Materials.
- F. The percentage of Proposer's entire contract dollar amount to be expended for SBEs.
- G. The percentage of Proposer's entire contract dollar amount to be expended for MBEs, WBEs and DisBEs.
- H. The percentage of Proposer's entire contract value to be expended for businesses having a place of business within the City of New Haven limits.

Note: In the event the Prime Contractor/General Contractor is a SBE, MBE, WBE or DisBE, its status as such does NOT contribute to the SBE, MBE, WBE and DisBE Subcontractor requirements.

Additional Note: If the Proposer (i.e., prime Proposer) has a place of business within the City of New Haven limits, then the relevant dollar amount is calculated by deducting from the Proposer's entire contract value, the value of the subcontracts and suppliers of materials who do not have a place of business within the City of New Haven.

Proposers shall also submit with their Proposal a brief description of the experience and ability of each of the subcontractors and suppliers of materials together with the names and telephone numbers of at least three (3) references for each subcontractor and suppliers of materials.

The Proposer agrees that if awarded a contract for the Proposal, it shall execute a contract with the subcontractor and supplier of materials listed, except for good cause. The term "good cause" shall mean a subcontractor's or supplier of materials: (1) Death or physical inability, if the listed subcontractor or supplier of materials is an individual; (2) dissolution, if a corporation or partnership; (3) bankruptcy; (4) inability to furnish any required performance and payment bonds or required insurance coverage; (5) inability to obtain, or loss of a license necessary for the performance of the particular category of work to be performed; (6) failure or inability to comply with a requirement of law applicable to contractors, subcontractors, or construction, alteration, or repair projects; (7) failure on behalf of the subcontractor or supplier of materials to timely execute and return to Proposer the subcontract as follows: The Proposer shall present such subcontract to the subcontractor or each supplier of materials within five (5) business days of the issuance of the Notice to Proceed. The subcontractor or supplier of materials must execute and return the subcontract to Proposer within five (5) business days of its presentation by the Proposer; or, (8) inability to perform the subcontract or supply of materials.

In the event the successful Proposer seeks to substitute a subcontractor or supplier of materials for good cause, the successful Proposer shall file a written statement with/to the Chief Engineer, which statement shall include, but is not limited to:

- A. The name, address, telephone number and contact person of the original subcontractor or supplier of materials.
- B. The "good cause" claimed for such substitution.
- C. In the event the successful Proposer is claiming the good cause for such substitution is the failure of the subcontractor or supplier of materials to timely execute the subcontract, the dates of presentation of the subcontract to the subcontractor and the manner of delivery of the presentation (e.g. courier service, U.S. mail, etc.).
- D. In the event the good cause claims to be based on the inability of the subcontractor or supplier of materials to perform the subcontract, the grounds upon which the successful Proposer believes the subcontractor or supplier of materials will be unable to perform the subcontract.
- E. The names, address, telephone number and contact person of the proposed substitute subcontractor or supplier of materials and the information and documents required

elsewhere in these Proposal Documents as to the submittals for subcontracts. The Proposer (or its agents) shall sign the written statement under oath. Upon receipt of the written statement, the Chief Engineer or its representative shall send or deliver a copy of the statement to the subcontractor or supplier of materials as named in the statement submitted.

19. UTILIZATION OF SMALL AND MINORITY BUSINESS ENTERPRISES

- a. State law requires a minimum of twenty-five percent (25%) of the total contract be subcontracted to DAS-certified Small Business Enterprises (SBE), which includes but is not limited to DAS-certified Minority owned Business Enterprises (MBE), Women owned Business Enterprises (WBE), and Disabled owned Business Enterprises (DisBE) under the provisions of Connecticut General Statutes § 4a-60g as **subcontractors and/or suppliers of materials**. However, NHPA requires that a minimum of **thirty percent (30%) of total dollar amount of the contract** be subcontracted to SBE, which includes MBE, WBE, and/or DisBE, **as subcontractors and/or suppliers of materials**.
- b. State law also requires that a minimum of twenty-five percent (25%) of the total dollar amount (minimum 25%) of the work awarded to SBEs as described in Section 19.a. above, be awarded to MBE, WBE, and/or DisBEs. However, NHPA requires that a minimum of **twenty-five percent (25%) of total dollar amount of the contract** be subcontracted to MBE, WBE, and/or DisBE as **subcontractors and/or suppliers of materials**.
- c. NHPA reserves the right to request additional information from the Proposer about its subcontracting efforts.

Proposers shall submit with their Proposal, on the forms described in Section 18 of these Instructions to Proposers, a list of the SBEs and MBE, WBE and/or DisBE Subcontractors and Suppliers of Materials that the Proposer intends to use.

Proposers shall also refer to the *New Haven Parking Authority Community Subcontractor Utilization Program*, copy attached hereto and made a part hereof, and General Condition Section 212.

Upon request by NHPA, the Proposer shall submit signed contracts or letters of commitment with the SBE, MBE, WBE and/or DisBEs Subcontractors and Suppliers of Materials that the Proposer intends to use. Each SBE, MBE, WBE, and DisBE Subcontractor and Suppliers of Materials must be registered with and certified as such by the State of Connecticut Department of Administrative Services pursuant to State of Connecticut General Statutes § 4a-60g.

The minimum requirements are:

- a. The set-aside use of DAS-certified Small Business Enterprises (“SBE”) as **subcontractors and/or suppliers of materials** for a requirement of at least **30% of the Proposer’s entire contract value**;

b. The set-aside use of DAS-certified Minority Owned Business Enterprises (“MBE”), Women Owned Business Enterprises (“WBE”) and/or Disabled Owned Business Enterprises (“DisBE”) as **subcontractors and/or suppliers of materials** for a requirement of at least **25% of the Proposer’s entire contract value**. Please note that the MBE, WBE, and/or DisBE are **part of** the DAS-certified Small Business Enterprises; and

c. Independent of the SBE/MBE/WBE/DisBE requirements herein, a minimum of **ten percent (10%) of the Proposer’s entire contract value must include businesses having a place of business within the City of New Haven limits**. If the Proposer (i.e., prime Proposer) has a place of business within the City of New Haven limits, then the relevant percentage is calculated by deducting all of the subcontracts and suppliers of materials who do not have a place of business within the City of New Haven.

If a Proposer is unable to meet these minimum community participation requirements, then the Proposal shall be deemed non-responsive. However, in the event that a Proposer has met these minimum community participation requirements, the Proposer may be required to submit to NHPA and, if applicable, CHRO its efforts concerning compliance, upon request by NHPA or CHRO.

For reference, the City of New Haven’s Office of Small Contractor Development Program’s website address is: <https://www.newhavenct.gov/government/departments-divisions/small-contractor-development#ad-image-7> and its email contact is: lsnyder@newhavenct.gov . The following is a link to the Small Business Directory to search for small and minority business enterprises registered with the State of Connecticut Department of Administrative Services (DAS):

<https://biznet.ct.gov/SDSearch/SDSearch.aspx> The Minority Construction Council, Inc. is also a resource to assist in finding MBEs. Their website address is <https://mccforct.org/> .

The City of New Haven’s Office of Small Contractor Development Program can assist you in finding **Small/Disadvantaged/Minority Business Enterprises**. The following is a link to the City of New Haven’s Small Contractor Development Program:

<https://www.newhavenct.gov/government/departments-divisions/small-contractor-development#ad-image-7>

Any potential substitution of a **Small/Disadvantaged/Minority Business Enterprise** after the Proposal has been submitted shall be notified to NHPA immediately and good cause must be shown as for the reason of the substitution. NHPA, in its sole discretion, shall determine whether a substitution can be made.

20. REQUIREMENTS OF THE STATE OF CONNECTICUT

Pursuant to the February 14, 2022 Lease, Operating, and Funding Agreement between the State of Connecticut, Department of Transportation and the City of New Haven for New Haven Union Station Campus, the Successful Proposer as *Contractor* shall comply with

certain provisions required as stated herein per enclosed Exhibit “A” regarding work affecting Union Station Campus.

21. ADDITIONAL REQUIREMENTS OF THE CAPITAL FUNDING AGREEMENT

Pursuant to the Capital Funding Agreement between the State of Connecticut, Department of Transportation and the City of New Haven for New Haven Union Station Campus, the Successful Proposer as *Contractor* shall comply with certain provisions required as stated herein per enclosed Exhibit “A-1” regarding work affecting Union Station Campus, if funded through the Capital Funding Agreement.

22. TIME FOR RECEIVING PROPOSALS

Proposals received prior to the Proposal opening will be securely kept and unopened until the due date and time. The officer whose duty it is to open them will decide when the specified time has arrived, and no Proposal received thereafter will be considered.

23. OPENING OF PROPOSALS

After the time and place fixed for the opening of proposals, NHPA shall open and record the name of every proposer whose proposal was received within the time set for receiving proposals, irrespective of any irregularities therein. Proposers and other persons properly interested may request a list of the proposers received.

24. WITHDRAWAL OF PROPOSALS PRIOR TO OPENING

Proposals may be withdrawn via e-mail to the persons listed in Item 2, Interpretations and Addenda, of the Instructions to Proposals prior to the Proposal due date and time.

25. SELECTION OF SELECTED PROPOSER; REJECTION OF PROPOSALS

- A.** During the selection process, NHPA may invite a Proposer to make a presentation to its staff, Board of Commissioners or other interested parties.
- B.** NHPA will select the successful Proposer, if at all, as soon as practicable after the date of the Proposal opening. The successful Proposer shall be deemed to have the responsive Proposal which is in the best interest of NHPA based on price, qualifications, general experience, specific experience with working in active parking garages, specific experience with project management, responsiveness to the Proposal Documents, approach to the services provided, organizational structure, proposed schedule, use of subcontractors and associated use of MBE/WBE/DisBEs, service quality and ability, exceptions to the draft form of agreement, and other factors it deems in its best interest at its sole discretion. The Proposer to whom the selection is made will be notified at the earliest possible date. NHPA, however, reserves the right to reject or further negotiate

any and all Proposals or to waive any informality in submitted Proposal Documents whenever such rejection or negotiation or waiver is in NHPA's interest. NHPA also reserves the right to award multiple contracts at its sole discretion.

- C. The Proposer agrees that it will not award a contract or subcontract for any work to any contractor or subcontractor who is, at the time of award, ineligible for such contract under the provisions of any applicable regulations issued by the Secretary of Labor, United States Department of Labor, or is not qualified under applicable State and local laws or regulations.

26. EXECUTION OF AGREEMENT: PERFORMANCE BOND, AND LABOR AND MATERIAL BOND

- A. Subsequent to the award and within ten (10) days after the prescribed forms are presented for signature, or such other time as may be reasonably agreed to by NHPA, the successful Proposer shall execute and deliver to NHPA an Agreement in the form included in the Proposal Documents in such number of copies as NHPA shall require.

- B. Pursuant to Connecticut General Statutes § 49-41:

In the event the Proposal Price is less than \$50,000, **no** Performance Bond **nor** Labor & Material Bond shall be required;

In the event the Proposal Price is \$50,000 or more, but less than \$100,000, a Performance Bond **shall be required**, but **no** Labor & Material Bond shall be required;

In the event the Proposal Price is \$100,000 or more, both a Performance Bond and a Labor & Material Bond **shall be required**.

- C. Having satisfied all conditions of award as set forth elsewhere in these documents, the successful Proposer shall, within the period specified in paragraph "A" above, furnish a 100% surety bond in a penal sum not less than the Proposal Price as security for the faithful performance of the Contract, and a 100% labor and material bond for payment of all persons, firms, or corporations to whom the successful Proposer may become legally indebted for labor, materials, tools, equipment, or services of any nature including utility and transportation services, employed or used by him in performing the work. Such bonds shall be in the same form as those included in the Proposal Documents, or other form acceptable to NHPA, and shall bear the same date, or a date subsequent to that of the Agreement. These bonds shall be signed and issued by a guaranty or surety company satisfactory to NHPA, authorized and qualified to do business in the State of Connecticut, and listed in the latest issue of the U.S. Treasury Circular 570, and the penal sum of any such bond shall be within the maximum specified for such company in Circular 570. The current power of attorney for the person who signs for any surety company shall be attached to such bonds.

- D. The failure of the successful Proposer to execute such Agreement and to supply the required bonds or submit the insurance policies required in the Proposal Documents within ten (10) days after the prescribed forms are presented for signature, or within such extended period as NHPA may grant based upon reasons determined sufficient by NHPA, will cause damage and loss to NHPA in amounts which cannot be ascertained with precision at this time. Such failure shall constitute a breach sufficient to cause forfeiture of the Proposer's Proposal bond or guaranty to NHPA as liquidated damages without further action being taken by NHPA other than to call the bond or guaranty.

NHPA may either award the contract to the next lowest responsible Proposer, re-advertise for Proposals, or anything else in its interests. Irrespective of whether a favorable Proposal is received by re-advertising, the defaulting Proposer shall have no claim against NHPA for a refund.

27. NOTICE TO PROCEED

NHPA will issue a written notice to proceed ("NTP") after the following: (1) execution of the agreement by all parties and (2) the accepted Proposer's delivery of the required documents, for an effective date stated in the NTP.

FORMS

PROPOSAL FORM
ELEVATOR AND ESCALATOR
MODERNIZATION AND SERVICE
AT
NEW HAVEN PARKING AUTHORITY FACILITIES
NEW HAVEN, CONNECTICUT
NHPA PROJECT #21-011

Proposer's Name

Date

TO: NEW HAVEN PARKING AUTHORITY
c/o Department of Planning & Engineering
232 George Street
New Haven, Connecticut 06510

The undersigned, having inspected the New Haven Parking Authority facilities and its elevators and escalators, and familiarized ourselves/myself with the local conditions affecting the cost of the work and the Proposal Documents dated July 2025 as prepared by DESMAN and on file with the New Haven Parking Authority, which are incorporated herein by reference, hereby proposes the following all-inclusive fees for the facilities, as defined in the Proposal Documents: for the Proposal Price of:

This Proposal Price shall include all charges such as overhead, profit, insurance, permits, escalation, etc.

The following Addendum by number have been received: _____

NOTE: Proposers who do not list all addenda issued by NHPA for this proposal may be considered nonresponsive to this proposal and their proposal may be rejected.

Submitted herewith is the Proposal Price Itemization including an amount for all project components required by the Proposal Documents. The sum of all listed components shall equal the Proposal Price.

Submitted herewith are all the forms as listed in Section 5 of the Instructions to Proposers, in accordance with these Instructions to Proposers.

We/I acknowledge that should conditions make it necessary to revise the scope of the project, the Proposal Price Itemization shall serve as the basis for adjustments to the Proposal Price.

PROPOSER'S NAME

The Proposer hereby proposes the following all-inclusive fees for each of the facilities:

A. SERVICE AGREEMENT:

1. SERVICE BASE PRICE:

	<u>YEAR 1</u>	<u>YEAR 2</u>	<u>YEAR 3</u>	<u>YEAR 4</u>	<u>YEAR 5</u>
Air Rights Garage Elevators:	_____	_____	_____	_____	_____
Crown Street Garage Elevators:	_____	_____	_____	_____	_____
Granite Square Garage Elevators:	_____	_____	_____	_____	_____
Temple Medical Garage Elevators:	_____	_____	_____	_____	_____
Temple Street Garage Elevators:	_____	_____	_____	_____	_____
270 State Street Garage Elevators:	_____	_____	_____	_____	_____
State Street Station Elevators:	_____	_____	_____	_____	_____
Union Station Garage Elevators:	_____	_____	_____	_____	_____
Union Station Main Building Elevators:	_____	_____	_____	_____	_____
Union Station Tunnel Elevators:	_____	_____	_____	_____	_____
Union Station Building Escalators:	_____	_____	_____	_____	_____
TOTAL all facilities (the "Proposal Price for Base Service")	_____	_____	_____	_____	_____

PROPOSER'S NAME

2. ADDED OPTIONS FOR SERVICE.

- a. Dedicated Preventative Maintenance – Monday Mornings. In the event this option is selected, CONTRACTOR will provide an additional four (4) hours of preventive maintenance every Monday from 8 AM to 12 PM. In the event a Holiday falls on a Monday, then this service will be provided on the following Tuesday. NHPA hereby elects to activate this option until written notice to the contrary. The additional cost to the base price and modified maintenance fees in Year 1 shall be and thereafter may be increased by an amount not greater than ____% **[Proposer to fill in percentage amount]** annually effective July 1 of each successive year:

\$ _____/month

- b. Dedicated Resident Technician – Full Time. In the event this option is selected, CONTRACTOR will provide a full-time technician dedicated solely to NHPA for maintenance and call backs. This provides an immediate response and attention to NHPA facilities. This option is applicable with a minimum 1 (one) year contractual commitment due to the necessity of CONTRACTOR having to hire a dedicated technician for its work force, and is in lieu of the base and modified maintenance fees. The particular technician selected for this service is subject to NHPA's written consent, which consent may not be unreasonably withheld. The cost in Year 1 shall be and thereafter may be increased by an amount not greater than ____% **[Proposer to fill in percentage amount]** annually effective July 1 of each successive year:

\$ _____/month

3. ADDITIONAL SERVICES & EMERGENCY MINOR ADJUSTMENT CALLBACK SERVICE

- a. In the event NHPA elects to have CONTRACTOR provide Additional Services and Emergency Adjustment Callback Service, NHPA shall pay the following rates together with costs:

NOTE:

Regular Time = Monday - Friday 8:00 AM - 4:30 PM.

Overtime (1.7X) = Monday - Friday 4:30 PM - 8:00 AM & Saturday 12:00 AM - 11:59 PM

Sunday/Holiday (2X) = Sunday and Holidays 12:00 AM - 8:00 AM following day

PROPOSER'S NAME

Regular Time Hourly Rate-Mechanic	\$ _____/hr
Regular Time Hourly Rate-Helper	\$ _____/hr
Regular Time Hourly Rate-Team	\$ _____/hr
Overtime Hourly Rate-Mechanic	\$ _____/hr
Overtime Hourly Rate-Helper	\$ _____/hr
Overtime Hourly Rate-Team	\$ _____/hr
Sunday/Holiday Hourly-Mechanic	\$ _____/hr
Sunday/Holiday Hourly-Helper	\$ _____/hr
Sunday/Holiday Hourly-Team	\$ _____/hr

- b. These rates may be adjusted effective on July 1 of each year of the Term in accordance with documented increase in CONTRACTOR's standard rates, not to exceed ____% [Proposer to fill in percentage amount] per year.

B. MODERNIZATION & REPAIRS PROPOSAL PRICE:

The undersigned, having inspected the sites and familiarized ourselves/myself with the local conditions affecting the cost of the work and the Proposal Documents dated July 2025 as prepared by DESMAN and on file with the New Haven Parking Authority, hereby propose to provide all labor, materials, tools, equipment and transportation necessary to complete Elevator Modernization and Repairs at the Various Facilities, as defined in the Proposal Documents for the Proposal Price of

_____ DOLLARS
(\$ _____).

Note: Reference Technical Specification Section 013200, Measurement and Payment, Paragraph 1.03.D: No payment shall be made for stored materials or equipment. Payment shall be made only for materials and equipment in-place and accepted by Owner, less applicable retainage.

Proposal Item 1 – General Provisions:**A. General Mobilization/Demobilization/Miscellaneous Coordination.**

This line item shall consists of all labor, materials, tools and equipment required for setting-up general plant, storage/staging areas and facilities required to facilitate construction or as otherwise required by applicable Federal, State and Local laws; and the general mobilization of equipment required for the completion of the work as shown within the Bid Documents and all expenses for de-mobilization off the site upon completion of all work as shown within the Bid Documents. It will be the contractor's responsibility to obtain all necessary permits to perform the work.

Electricity (power) and water required for the completion of the work shall be furnished by the Owner at existing fixtures or outlets (The Owner will not provide any temporary pipes, cables, etc.). If the capacity of existing utilities is insufficient for the contractor's use, the Contractor shall be responsible for supplementing this capacity as required at no cost to the Owner. The contractor shall provide temporary lighting within designated work areas, as required.

The Contractor shall furnish, install, maintain, relocate and remove all signs, barricades, cones, warning lights, and other safety control devices and temporary signage required for the proper execution of the project. The Engineer and the Owner shall review the safety control device placement before work begins and prior to the beginning of work on any subsequent construction stages. Any deficiencies in the location or arrangement of devices shall be corrected by the contractor before starting work or as the work progresses towards completion. **Contractor shall note that while this Bid Item 1.A shall include the procurement and installation of all applicable safety & traffic control devices (i.e. barricades, etc.) as well as the coordination and installation of temporary signage, the material procurement of the temporary signage shall be included in Proposal Item 6.**

The Contractor shall provide and maintain adequate protection of all preexisting architectural, structural, mechanical, electrical, plumbing components and/or features within the confines of in the work areas that are to remain in-place. The work shall include the dismantling of any preexisting architectural, structural, mechanical, electrical, plumbing components and/or features within the confines of in the work areas (such as the temporary moving/relocation of tenant furniture, equipment, etc.) which might be required in order to perform the work specified. The temporarily dismantled installations shall be reinstalled as soon as possible to a condition equal to or better than the condition existing prior to the commencement of construction.

Work shall also include the provision of an effective ventilation system to safely remove all dust and hazardous fumes generated from demolition, any surface treatment applications, or other work. Contractor shall be required to remove any and all loose/spalled overhead or vertical concrete from the structure (concrete framing elements or deck) prior to the start of any demolition activities to prevent any deteriorated concrete from being jarred loose in an uncontrolled fashion. Contractor shall be required to coordinate all aspects of his work with NHPA management and operations staff as well as facility security personal throughout construction.

PROPOSER'S NAME

The contractor shall submit to the Owner/Engineer documentation of all pre-existing non-functioning electrical/mechanical systems within the entire work area. This documentation should be based on the contractor's condition survey performed immediately prior to the scheduled mobilization. The contractor shall not start the mobilization until the Owner approves of this submittal.

This work also consists of items not otherwise specifically indicated or shown on the plans but which are ancillary to the specified scope of work being performed, or part of the overall Scope of Work or otherwise not noted or assigned to other Proposal Items.

Contractor shall note that payment for this item shall be distributed in proportion to the total amount of all contract work complete in place unless otherwise approved in writing by NHPA.

Lump Sum = \$ _____

B. Provision of Bonds, Permits, and Insurance.

Work shall consist of the costs associated with the procurement of all bonds, permits, and insurance necessary for this project. Provision of bonds shall include, but not be limited to, Labor & Material Bonds, Performance Bonds, etc. It shall be the contractor's sole responsibility to obtain all necessary permits to perform the work, including, but not limited to, Building, Electrical, Mechanical, Plumbing, and Street Obstruction permits, if required. Insurance requirements are described in General Conditions Section 111 and Special Conditions Section 313.

Lump Sum = \$ _____

SUB-TOTAL PROPOSAL ITEM 1: = \$ _____

Proposal Item 2 – Work related to the 270 State Street Parking Garage:

- A. Modernization of the Hydraulic Elevators at the 270 State Street Parking Garage.

Work shall consist of the repair and modernization of the two (2) hydraulic elevators serving the 270 State Street Parking Garage, all as detailed in the specifications, along with all other work required for the satisfactory performance of this work item. Contractor shall note that work shall include re-finishing of all associated metal surfaces (i.e. entrances, etc.) designated to remain.

Lump Sum = \$ _____

- B. Electrical Coordination Work to Support the Elevator Repairs and Modernization at the 270 State Street Parking Garage.

Work shall consist of all electrical work and coordination to support the demolition, power, lighting, and HVAC (or otherwise mechanical) repairs and improvements to support the work, all as shown on the drawings, in accordance with the specifications, and/or otherwise directed by the Engineer, along with all other work required for the satisfactory performance of this work item.

Lump Sum = \$ _____

- C. HVAC/Mechanical Improvements at the 270 State Street Parking Garage:

Work shall consist of all HVAC/mechanical work and coordination to support the demolition, HVAC (or otherwise mechanical) repairs and improvements to support the work, all as shown on the drawings, in accordance with the specifications, and/or otherwise directed by the Engineer, along with all other work required for the satisfactory performance of this work item.

Lump Sum = \$ _____

- D. Installation of Fire Alarm System

Work shall consist of the installation of a new fire alarm system. Work shall include verification of the work prior to start of work, installation of new devices and panels, new associated conduit, wire and boxes for notification and initiating circuit wiring, along with all other work required for the satisfactory performance of the work.

Lump Sum = \$ _____

SUB-TOTAL PROPOSAL ITEM 2: = \$ _____

Proposal Item 3 – Work related to the Temple Medical Parking Garage:

- A. Modernization of the Hydraulic Elevators at the Temple Medical Parking Garage.

Work shall consist of the repair and modernization of the two (2) hydraulic elevators serving the Temple Medical Parking Garage, all as detailed in the specifications, along with all other work required for the satisfactory performance of this work item. Contractor shall note that work shall include re-finishing of all associated metal surfaces (i.e. entrances, etc.) designated to remain.

Lump Sum = \$ _____

- B. Electrical Coordination Work to Support Elevator Repairs and Modernization at the Temple Medical Parking Garage.

Work shall consist of all electrical work and coordination to support the demolition, power, lighting, and HVAC (or otherwise mechanical) repairs and improvements to support the work, all as shown on the drawings, in accordance with the specifications, and/or otherwise directed by the Engineer, along with all other work required for the satisfactory performance of this work item.

Lump Sum = \$ _____

- C. HVAC/Mechanical Improvements at the Temple Medical Parking Garage:

Work shall consist of all HVAC/mechanical work and coordination to support the demolition, HVAC (or otherwise mechanical) repairs and improvements to support the work, all as shown on the drawings, in accordance with the specifications, and/or otherwise directed by the Engineer, along with all other work required for the satisfactory performance of this work item.

Lump Sum = \$ _____

- D. Architectural Repairs and Improvements:

1. Installation of Epoxy Flooring:

Work shall consist of the installation of a new epoxy flooring system throughout the elevator lobby floors on Levels 1, 2, 3 & 4 at the Temple Medical Parking Garage. Work shall include proper surface preparation of existing concrete surfaces to remain to receive new flooring system as recommended by the manufacturer and approved by the Engineer, preparation and installation of a mock-up sample for review and approval by Owner/Engineer, installation of new flooring system, curing and finishing, along with all other work required for the satisfactory performance of this work item.

PROPOSER'S NAME

Contractor shall note that Work shall include the provision and installation of a mock-up of the full epoxy flooring system. Mock-up shall be installed in actual work location for Owner and Engineer to review, and shall consist of a minimum area as required by the Manufacturer (or a minimum of 2 feet by 2 feet square; whichever is greater) for review and acceptability of performance characteristics. Contractor shall not proceed with installation of remaining system until an acceptable mock-up has been provided to the Owner/Engineer for review. The accepted mock-up shall be considered the expected standard of appearance, quality and workmanship for the Work, and any portion of Work, not excluding the Work in its entirety if necessitated, not performed to this standard shall be removed and replaced at no cost to Owner. Contractor shall note separate Bid Item pricing for provision of mock-up sample.

Work shall also consist of the provision and installation of new detectable warning surfaces, within the handicap ramps of the 1st, 2nd, 3rd and 4th Level elevator lobbies, to replace those existing. Work shall include the removal of the existing warning surfaces, followed by surface preparation to receive the new warning surface as recommended by the manufacturer and approved by the Engineer, placement of the new warning surface, curing, along with all other work required for the satisfactory performance of this work item. Color of the new detectable warning surface to be Brick Red.

- a. Provision and Installation of Mock-up Sample.

Lump Sum = \$ _____

- b. Installation of Flooring System throughout the Elevator Lobbies

Lump Sum = \$ _____

- c. Installation of New Tactile Warning Surfaces.

Lump Sum = \$ _____

2. Installation of Exterior Insulation and Finish System (EIFS) related to the Vinyl Wall Coverings

Work shall consist of the installation of a complete Exterior Insulation and Finish System (EIFS), as specified, on designated surfaces. Work shall include the proper preparation of applicable substrate surfaces, followed by the installation of a complete Exterior Insulation and Finish System (EIFS) on designated surfaces, all in accordance with manufacturer's recommendations and as approved by the Engineer, along with all other work required for the satisfactory performance of this work item (reference Bid Item 3.D.3 for additional information). EIFS shall be compatible with the substrate encountered. Each coat application shall be contrasting color with final coat colors as scheduled or as directed by the Owner/Engineer to be submitted for verification prior to application.

Lump Sum = \$ _____

3. Installation of Vinyl Wall Coverings/Murals and Window Coverings/Film

Work shall consist of the preparation, fabrication and installation of exterior-grade vinyl-cling wall coverings and window coverings all as designated on the drawings; Contractor shall note that electronic files shall be provided by the Owner and are anticipated to be of a PDF-format (although alternative format may be available upon coordination with the Owner). Work shall include obtaining the designated electronic files, preparation and fabrication of the covering/film material, followed by installation of the coverings/film at the designated locations, along with all other work required for the satisfactory performance of this work item.

Contractor shall note that, although all coverings shall be full height from floor to ceiling, the individual locations vary in horizontal length, and therefore shall prepare the wall coverings accordingly. Contractor shall be responsible for verifying all dimensions prior to start of work.

Contractor shall note that the Owner's preferred vendor for installation of graphics is Pinpoint Promotions, 53 Hancock Street, Stratford, CT (tel: (203) 301-4273, contact: Mr. TJ Andrews) or approved equal. All costs associated with the preparation and installation of the wall coverings are to be borne by the Contractor and are considered to be included in the Contract Price.

Lump Sum = \$ _____

4. Installation of New Signage

Work shall consist of the provision of all materials, labor and equipment to furnish and install new aluminum signage as shown on the Drawings. Work shall include review and verification of placement of all new signage, followed by the installation of the new signage, inclusive of, but not limited to, coordination of stencil-cutting, the provision of all necessary mounting materials, support hardware and fasteners as required, priming and painting, application of vinyl-applied lettering, along with all other work required for the satisfactory performance of this work item; acceptable manufacturer shall be SignLite (tel: 203-239-6799) or approved equal.

Lump Sum = \$ _____

5. Installation of Precast Bollards

Work shall include the placement and installation of precast concrete bollards. Work shall include the verification of locations to receive new bollards, followed by the procurement and placement of the concrete bollards, all as shown on the drawings and directed by the engineer, along with all other work required for the satisfactory performance of this work item.

Contractor shall note that work shall also include the installation of a non-sag polyurethane cove joint around the full perimeter of the bollards.

Lump Sum = \$ _____

6. Modifications to Concrete Curbing

Work shall consist of the placement and installation of new concrete curbing, as shown on the Drawings or as directed by the Engineer. Work shall include marking areas for review by Engineer prior to start of work, selective demolition and surface preparation as required, placement of new reinforcing steel, placement of 5000 psi concrete, tooling and sealing of all joints, finishing and curing, along with all other work required for the satisfactory performance of this work item.

Contractor shall note that tooling and sealing of all control, construction and cove joints shall be incidental to this work item; all control joints shall continue up and down the associated vertical faces of the curbing as required. Contractor shall note that tooling of joints shall be performed at time of concrete placement; sawcutting of joints after concrete cures will not be allowed. Contractor shall also note that all joints shall incorporate non-sag polyurethane sealant; use of self-leveling polyurethane sealant shall be prohibited.

Lump Sum = \$ _____

7. Painting of Various Surfaces

Work shall consist of the application of a coating to designated soffit (overhead), storefront and door surfaces. Work shall include surface preparation as required, followed by the application of a coating to designated surfaces, all as scheduled per the drawings and specifications, along with all other work required for the satisfactory performance of this work item. Coatings shall be compatible with the substrate encountered. Each coat application shall be contrasting color with final coat color as scheduled or as directed by the Owner/Engineer to be submitted for verification prior to application; final color to be chosen by the Owner/Architect/Engineer.

Lump Sum = \$ _____

8. Miscellaneous Metal Work:

Work shall consist of the provision of all materials, labor and equipment required for the fabrication and installation of new metal work typically associated with the new lighting fixtures, as designated on the drawings or as directed by the Engineer. Work shall include, but not be limited to, all associated coordination work, such as the provision of all fasteners, shimming and leveling, etc. required for the installation of new metal components, welding as required, priming and painting, along with all other work required for the satisfactory performance of the work. Contractor shall reference Bid Item 3.B for lighting work.

Work shall also include review and verification of assembly requirements in the field with the Owner/Engineer prior to start of work. Contractor shall note that details and elevations shown in the Contract Drawings are schematic-in-nature, and do not depict all field conditions; Contractor shall provide shop drawings displaying all requirements, inclusive of all necessary sections, elevations, etc. to fully depict actual field conditions.

Lump Sum = \$ _____

SUB-TOTAL PROPOSAL ITEM 3: = \$ _____

Proposal Item 4 – Work related to the Temple Street Parking Garage:

- A. Modernization of the Hydraulic Elevators at the Temple Street Parking Garage.

Work shall consist of the repair and modernization of the one (1) hydraulic elevator serving the Temple Street Parking Garage, all as detailed in the specifications, along with all other work required for the satisfactory performance of this work item. Contractor shall note that work shall include re-finishing of all associated metal surfaces (i.e. entrances, etc.) designated to remain.

Lump Sum = \$ _____

- B. Modernization of the Traction Elevators at the Temple Street Parking Garage.

Work shall consist of the repair and modernization of the four (4) traction elevators serving the Temple Street Parking Garage, all as detailed in the specifications, along with all other work required for the satisfactory performance of this work item. Contractor shall note that work shall include re-finishing of all associated metal surfaces (i.e. entrances, etc.) designated to remain.

Lump Sum = \$ _____

- C. Electrical Coordination Work to Support Elevator Repairs and Modernization at the Temple Street Parking Garage.

Work shall consist of all electrical work and coordination to support the demolition, power, lighting, and HVAC (or otherwise mechanical) repairs and improvements to support the work, all as shown on the drawings, in accordance with the specifications, and/or otherwise directed by the Engineer, along with all other work required for the satisfactory performance of this work item.

Lump Sum = \$ _____

- D. HVAC/Mechanical Improvements at the Temple Street Parking Garage:

Work shall consist of all HVAC/mechanical work and coordination to support the demolition, HVAC (or otherwise mechanical) repairs and improvements to support the work, all as shown on the drawings, in accordance with the specifications, and/or otherwise directed by the Engineer, along with all other work required for the satisfactory performance of this work item.

Lump Sum = \$ _____

PROPOSER'S NAME

SUB-TOTAL PROPOSAL ITEM 4: = \$ _____

Proposal Item 5 – Work related to the Air Rights Parking Garage:

- A. Modernization of the Traction Elevators at the Air Rights Parking Garage.

Work shall consist of the repair and modernization of the four (4) traction elevators serving the Air Rights Parking Garage, all as detailed in the specifications, along with all other work required for the satisfactory performance of this work item. Contractor shall note that work shall include re-finishing of all associated metal surfaces (i.e. entrances, etc.) designated to remain.

Lump Sum = \$ _____

- B. Electrical Coordination Work to Support Elevator Repairs and Modernization at the Air Rights Parking Garage.

Work shall consist of all electrical work and coordination to support the demolition, power, lighting, and HVAC (or otherwise mechanical) repairs and improvements to support the work, all as shown on the drawings, in accordance with the specifications, and/or otherwise directed by the Engineer, along with all other work required for the satisfactory performance of this work item.

Lump Sum = \$ _____

- C. HVAC Improvements at the Air Rights Parking Garage:

Work shall consist of all HVAC/mechanical work and coordination to support the demolition, HVAC (or otherwise mechanical) repairs and improvements to support the work, all as shown on the drawings, in accordance with the specifications, and/or otherwise directed by the Engineer, along with all other work required for the satisfactory performance of this work item.

Lump Sum = \$ _____

SUB-TOTAL PROPOSAL ITEM 5: = \$ _____

PROPOSER'S NAME

Proposal Item 6 – Provision of Temporary Traffic Control Signage and Related Graphics:

Work shall consist of the provision of any and all temporary signage and graphics for use during construction, for Work impacting the interiors of the Parking Garages. All temporary signage shall be of a professional nature, as approved by Owner prior to procurement and prior to its installation, and shall consist of specified materials, along with all other work required for the satisfactory performance of this work item. All temporary signage required for the successful execution of the repair work shall become the property of NHPA unless otherwise approved.

Contractor shall note that while this Allowance shall solely pertain to the procurement of the applicable temporary signage, all required coordination with applicable parties to organize the temporary work areas both inside and outside of the facility, followed by the proposing and installation of associated temporary signage, along with the procurement and provision of temporary traffic control devices (i.e. barricades, etc.) shall be included in Bid Item 1.A, General Mobilization/Demobilization.

Allowance = \$10,000.00

Proposal Item 7 – Miscellaneous Contingency Allowance.

This contingency allowance shall pertain to any and all necessary work that may arise due to unforeseen conditions not covered by the Proposal Documents and which may need to be performed at the direction of the Owner/Engineer. Work shall include the Contractor coordinating with applicable parties to properly identify the scope of the additional work required, followed by the Contractor providing a written proposal for the required repairs for review and approval.

Upon approval of Contractor's proposal by the owner; payment for this item of work shall be made on a time and material basis at cost plus 15% verified by appropriate backup documentation, or alternately by acceptable lump sum as approved by the Owner. If the work is performed by a subcontractor, the General Contractor will be allowed to add an additional 5% to the time and material costs of the subcontractor.

Allowance = \$20,000.00

PROPOSER'S NAME

SUB-TOTAL PROPOSAL ITEM 1: = \$ _____

SUB-TOTAL PROPOSAL ITEM 2: = \$ _____

SUB-TOTAL PROPOSAL ITEM 3: = \$ _____

SUB-TOTAL PROPOSAL ITEM 4: = \$ _____

SUB-TOTAL PROPOSAL ITEM 5: = \$ _____

SUB-TOTAL PROPOSAL ITEM 6: = \$ **\$10,000.00**

SUB-TOTAL PROPOSAL ITEM 7: = \$ **\$20,000.00**

TOTAL PROPOSAL ITEMS 1 THROUGH 7 (THE "PROPOSAL PRICE FOR MODERNIZATION & REPAIR")

= \$ _____

PROPOSER'S NAME

PROPOSAL GUARANTEE

The information in this Proposal is correct to the best information, knowledge and belief of the undersigned. It is submitted without collusion with any person, individual or corporation.

Contractor

Signature

Name

Title

Address

Telephone/Fax/E-mail Address

Witness

State of _____, County of _____

On this _____ day of _____, 20____ before me personally

came _____, to me known who did depose and say

that he is _____,

of _____,

the Corporation/Partner/Individual described in and which executed the foregoing

instrument and that such instrument is duly submitted on behalf of

_____.

Notary Public

PROPOSAL BOND

KNOW ALL MEN BY THESE PRESENTS, THAT we the undersigned, _____ as
PRINCIPAL, and _____, as
SURETY are held and firmly bound unto the New Haven Parking Authority (“NHPA”)
in the penal sum of _____
_____ DOLLARS (\$_____),
together with any costs, expenses and fees, including reasonable attorney’s fees, incurred
by NHPA in any action taken to enforce this bond, in lawful money of the United States,
for the payment of which sum well and truly to be made, we bind ourselves, our heirs,
executors, administrators, successors, and assigns, jointly and severally, firmly by these
presents.

THE CONDITION OF THIS OBLIGATION IS SUCH that whereas the Principal
has submitted the accompanying Proposal dated _____,
for _____
_____.

NOW, THEREFORE, if the Principal (a) shall not withdraw said Proposal within
the period specified therein after the opening of same, or, if no period be specified, within
sixty (60) days after the said opening, and shall within the period specified therefor, or, if
no period be specified, within ten (10) days after the prescribed forms are presented to
him for signature, enter into a written Contract with NHPA in accordance with the
Proposal as accepted, and give bond with good and sufficient surety or sureties, as may
be required for the faithful performance and proper fulfillment of such Contract; or (b)
shall withdraw the Proposal within the period specified prior to the opening of proposals;
or (c) shall fail or refuse to enter into such Contract and give such bond within the time
specified, if and only if the Principal shall make payment to NHPA in an amount equal to
the difference between the amount specified in said Proposal and the amount for which
NHPA may procure the required work or supplies or both, if the latter amount be in
excess of the former, together with costs, expenses and fees, including reasonable
attorney’s fees incurred by NHPA as a result of said failure or refusal, then the above
obligation shall be void and of no effect, otherwise to remain in full force and effect.

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

In the presence of:

(Individual Principal)

(Business Address)

(Partnership)

By:_____

(Business Address)

Attest:

(Corporate Principal)

(Business Address)

(Affix
Seal)

By:_____

Attest:

(Corporate Surety)

(Business Address)

(Affix
Seal)

Countersigned

By:_____

By:_____

Attorney-in-Fact, State of _____

FORM OF SURETY GUARANTY
(To Accompany Proposal)

KNOW ALL MEN BY THESE PRESENTS, that for and in consideration of the sum of \$1.00, lawful money of the United States, the receipt whereof is hereby acknowledged, paid the undersigned corporation, and for other valuable consideration, the _____

(Name of Surety Company)

a corporation organized and existing under the laws of the State of _____ and licensed to do business in the State of Connecticut, certifies and agrees, that if Contract _____, Project No. _____ is awarded to _____, the undersigned corporation will execute

(Name of Proposer)

the bond or bonds as required by the Contract Documents and will become surety in the full amount of the Contract Price for the faithful performance of the contract and for payment of all persons supplying labor or furnishing materials in connection thencewith.

(Surety)

(To be accompanied by the usual proof of authority of officers of surety company to execute the same.)

CERTIFICATE AS TO CORPORATE PRINCIPAL

I, _____,
certify that I am the _____
Secretary of the Corporation named as Principal in the within bond, that
_____ who signed the said bond on
behalf of the Principal was then _____
of said corporation; that I know his signature and his signature thereto is genuine, and
that said bond was duly signed, sealed and attested to, for and in behalf of said
corporation by authority of its governing body.

_____(Corporate
Title_____Seal)

(The Surety Company must append statement of its financial condition and a copy of the resolution authorizing the execution of bonds by officers of the company, and the power-of-attorney of the surety company's attorney-in-fact, authorized to act within the State of Connecticut.)

NON-COLLUSION AFFIDAVIT OF PROPOSER

ELEVATOR AND ESCALATOR MODERNIZATION AND SERVICE AT NEW HAVEN PARKING AUTHORITY FACILITIES NEW HAVEN, CONNECTICUT NHPA PROJECT #21-011

State of _____
County of _____ ss.

_____, being first duly sworn, deposes and says that:

1. I am (individual, owner, member, partner, officer, director, representative, or agent) of _____ the Proposer that has submitted the attached Proposal;
2. I am fully informed respecting the preparation and contents of the attached Proposal and of all pertinent circumstances respecting such Proposal;
3. Such Proposal is genuine and is not a collusive or sham Proposal;
4. Neither the said Proposer nor any of its members, officers, partners, directors, owners, agents, representatives, employees, or parties in interest, including this affiant, has in any way colluded, conspired, connived or agreed, directly or indirectly with any other Proposer, firm or person to submit a collusive or sham Proposal in connection with the contract for which the attached Proposal has been submitted or to refrain from proposing in connection with such contract, or has in any manner, directly or indirectly, sought by agreement or collusion or communication or conference with any other Proposer, firm or person to fix the price or prices in the attached Proposal or of any other Proposer, or to fix any overhead, profit or cost element of the Proposal prices or the Proposal price of any other Proposer, or to secure through any collusion, conspiracy, connivance or unlawful agreement any advantage against the New Haven Parking Authority by any person interested in the Proposal;
5. The price or prices quoted in the attached Proposal are fair and proper and are not tainted by collusion, conspiracy, connivance or unlawful agreement on the part of the Proposer or any of its members, officers, partners, directors, owners, agents, representatives, employees, or parties in interest, including the affiant.
6. No officer or employee or person whose salary is payable in whole or in part from the New Haven Parking Authority is directly or indirectly interested in this Proposal, or in the supplies, materials, equipment, work or labor to which it relates, or in any of the profits thereof.

(Signed) _____

Title

Subscribed and sworn before me this _____ day of _____, _____.

Title

My Commission expires _____.

STATEMENT OF PROPOSER'S QUALIFICATIONS

ELEVATOR AND ESCALATOR MODERNIZATION AND SERVICE AT NEW HAVEN PARKING AUTHORITY FACILITIES NEW HAVEN, CONNECTICUT NHPA PROJECT #21-011

(Note: To be submitted by the Proposer with its Proposal)

All questions must be answered, and the data given must be clear and comprehensive. This statement must be notarized. If necessary, questions may be answered on separate attached sheets. The Proposer may submit any additional information desired but complete each item on this Form even if just to reference other attached sheets.

1. Name of Proposer.
2. Proposer's main office address, telephone number, and e-mail address.
3. Proposer's Form of Business Organization (e.g., corporation, LLC, partnership, sole proprietorship), when organized, and where organized. Please also provide proof of active status.
4. List and provide copies of all relevant licenses, certifications, permits, and/or similar approvals. Include applicable dates of renewal and expiration.
5. General character of services/work performed by Proposer's business.

6. How many years has the Proposer been engaged in business under its present firm or trade name?

7. Outline the background and experience of the Proposer regarding the proposed services. Note especially any any relevant and specific experience with working in parking garages, with working in active, occupied facilities, and with project management. Identify the trades which will be provided for this Project. Identify the key personnel who will have primary responsibility for the performance of the required services in the various fields of expertise involved. Provide professional license certifications and resumes noting professional and academic qualifications and experience.

8. Describe any proposed Subcontractors, and provide their qualifications, experience, and scope of services. Identify if any are minority-owned, woman-owned, disabled-owned, or small business enterprises, and provide certification.

9. Provide the name, address, phone number, and e-mail address and/or letters of references of at least three (3) references regarding your business qualifications.

10. Describe the Proposer's ability to provide required insurance coverage (reference Section 208 of the draft form of agreement).
11. Has the Proposer ever defaulted on a contract or breached a contract obligation? If so, state the nature of default or breach, status, and provide an explanation.
12. Has the Proposer ever failed to complete any work awarded? If so, provide an explanation.
13. Has the Proposer ever been disqualified, ineligible, suspended or otherwise barred by any applicable federal, state or municipal government? If so, provide an explanation.
14. Has the Proposer or any entity which it has or had common ownership ever filed for bankruptcy, receivership, or reorganization within the last ten years? If so, provide an explanation.
15. The Proposer may also include supplemental information of the Proposer's choice such as brochures, etc. This supplemental information is in addition to the specific items above and must be included as appendices.

The undersigned hereby represents that the above information is true and accurate to the best of their knowledge and further authorizes and requests any person, firm, or corporation to furnish any information requested by the New Haven Parking Authority in verification of the recitals comprising this Statement of Proposer's Qualifications.

Dated at _____ this _____ day of _____, 2025.

(Name of Proposer)

By: _____

Title: _____

State of _____, County of _____

On this _____ day of _____, 2025 before me personally

came _____, to me known who did depose and say

that _____

is _____,

of _____,

the (individual, owner, member, partner, officer, director, representative, or agent described) in and which executed the foregoing instrument and that such instrument is duly submitted on behalf of

_____.

Notary Public

EQUAL EMPLOYMENT OPPORTUNITY AGREEMENT

During the performance of this contract, the Contractor agrees:

- (a) To comply with all provisions of Executive Order 11246, Executive Order 11375, and Executive Order 12138, the Connecticut Fair Employment Practices Act, and the City of New Haven Contract Compliance Ordinance Chapter 12 ½, as all are amended from time to time, including all standards and regulations which are promulgated by the government authorities who established such acts and requirements, and all standards and regulations are incorporated herein by reference;
- (b) Not to discriminate against any employee or applicant for employment because of race, color, religion, age, sex, gender identity or expression, sexual orientation, physical disability or national origin. The Contractor will take affirmative action to ensure that applicants are employed, and that employees are treated during employment without regard to race, color, religion, sex, gender identity or expression, sexual orientation, age, national origin, or physical disability. Such action shall include but not be limited to the following: employment, upgrading, demotion, or transfer, recruitment or recruitment advertising, layoff, or termination, rates of pay or other forms of compensation, and selection for training, including apprenticeship;
- (c) To post notices to be provided by the contracting officer setting forth the provisions of this nondiscrimination clause in conspicuous places available to employees and applicants for employment;
- (d) To state, in all solicitations or advertisements for employees placed by or on behalf of the Contractor, that all qualified applicants will receive consideration for employment without regard to race, color, religion, sex, gender identity or expression, sexual orientation, age, national origin, or physical disability.
- (e) To send to each union or representative of workers with whom he/she has a collective bargaining agreement, or other contract or understanding, a notice advising the labor union or worker's representative of the Contractor's commitments under the equal opportunity clause of the City of New Haven, and shall post copies of the notice in conspicuous places available to employees and applicants for employment. The Contractor shall register all workers in the skilled trades, who are below the journeyman level, with the Connecticut Department of Labor, Office of Apprenticeship Training;
- (f) To utilize labor department and city sponsored manpower programs as a source of recruitment, and to notify the contract compliance unit and such programs of all job vacancies;
- (g) To take affirmative action to negotiate with qualified minority and women contractors for any work which may be proposed for subletting or for any additional services, supplied, or work which may be required as a result of this contract;
- (h) To cooperate with city departments in implementing required contract obligations for increasing the utilization of minority and women business enterprises;
- (i) To furnish all information and reports required by the City of New Haven contract compliance director pursuant to section 12 1/2-19 through section 12 1/2-32 of the City Ordinance and to permit access to its books, records and accounts by the contracting agency, the contract compliance officer, and the secretary of labor for purposes of investigation to ascertain compliance with the program;
- (j) To take such action, with respect to any subcontractor, as the city may direct as a means of enforcing the provisions of subparagraphs (a) through (m) herein, including penalties and sanctions for noncompliance, provided however that, in the event the Contractor becomes involved in or is threatened with litigation as a result of such direction by the city, the city will intervene in such litigation to the extent necessary to protect the interest of the city and to effectuate the city's equal employment opportunity program. In the case of contracts funded directly or indirectly, in whole or in part, under one (1) or more federal assistance programs, the Contractor or the city may ask the United States to enter into such litigation to protect the interest of the United States;
- (k) To file, along with its subcontractors, if any, compliance reports with the city and NHPA in the form and to the extent prescribed in the contract by the contract compliance director of the city. Compliance reports filed at such times as directed shall contain information as to the employment practices, policies, programs and statistics of the Contractor and its subcontractors, if any;
- (l) To include the provisions of subparagraphs (a) through (m) of this equal opportunity clause in every subcontract or purchase order so that said provisions will be binding upon each such subcontractor or vendor;
- (m) That a finding, as hereinafter provided of a refusal by the Contractor, or subcontractor, to comply with any portion of this program as herein stated and described, may subject the offending party to any or all of the penalties;
 - (1) Withholding of all future payments under the involved public contract to the Contractor in violation until it is determined that the Contractor, or subcontractor is in compliance with the provisions of the contract;
 - (2) Refusal of all future bids for any public contract with the city, or any of its departments or divisions, and NHPA until such time as the Contractor, or subcontractor, is in compliance with the provisions of the contract;
 - (3) Cancellation of the public contract;
 - (4) Recovery of specified monetary penalties;
 - (5) In case of substantial or material violation, or the threat of substantial or material violation, or the threat of substantial or material violation, of the compliance procedure or as may be provided for by contract, appropriate equitable or legal proceedings may be brought to enforce these provisions against contractors; subcontractors, or other organizations, individuals or groups who directly or indirectly are not in compliance with the policy as herein outlined.

IN WITNESS HEREOF on the _____ day of _____, 20_____

the Contractor has caused this Agreement to be duly executed as of the day and year first above written.

WITNESS

Contractor name

Signature

Date

CURRENT WORK FORCE CERTIFICATE

Equal Opportunities

BIDDER: _____

ADDRESS: _____ CITY/STATE: _____ ZIP CODE: _____

JOB CATEGORIES	RACIAL GROUP										TOTAL
	MALE					FEMALE					
	W	AA	HA	AI	O	W	AA	HA	AI	O	
Officials and Managers											
Professionals											
Technicians											
Sales Workers											
Office and Clerical											
Craftsmen (Skilled)											
Operatives (Semi-Skilled)											
Laborers (Unskilled)											
Service Workers											
TOTAL											

Are you a disadvantaged business enterprise? Yes ___ No ___

Are you a women's business enterprise? Yes ___ No ___

Does your company have an affirmative action plan? Yes ___ No ___

W - White (Caucasian) AA - African American HA - Hispanic American AI - American Indian O - Other

STATEMENT OF ITEMS TO BE DISCUSSED BY THE PROPOSER

ELEVATOR AND ESCALATOR MODERNIZATION AND SERVICE AT NEW HAVEN PARKING AUTHORITY FACILITIES NEW HAVEN, CONNECTICUT NHPA PROJECT #21-011

Proposer's Name: _____

The Proposer shall include in its Proposal the following information, as a minimum, regarding the proposed services for Elevator and Escalator Modernization and Services at New Haven Parking Authority Facilities. If necessary, questions may be answered on separate, attached sheets. The Proposer may submit any additional information as applicable and/or desired.

1. Describe in detail the Proposer's approach to accomplishing the work. Elaborate on the individual tasks as well as phasing and sequencing.
2. Describe the organizational structure under which the proposed services will be performed and identify and describe key personnel.
3. Discuss specific experience with working in active public parking garages.
3. Discuss specific experience with providing project management for similar projects. Also, discuss what the various items include in project management and how this will be carried out. Identify if project management will be performed in-house or by a sub-consultant/sub-contractor.

Proposer's Name: _____

4. Discuss history of, and proposed plans for, use of subcontractors (if any) and associated use of MBE/WBE/DisBEs,
5. Discuss the proposed time schedule and timeline for completing the proposed services. Include details such as engineering, fabrication, and delivery; installation; sequencing; working at multiple facilities. **NOTE: Only one elevator car is allowed out of service per facility at a time but Contractor may work on multiple facilities at a time.**
6. Discuss your ability to service, maintain, construct and repair the various types of elevator and escalator systems in use by New Haven Parking Authority and describe in detail your ability to obtain and provide quality, compatible repair and replacement parts, especially for those parts that are manufactured by other elevator companies.
7. Describe your inventory of repair and replacement parts and how long it takes for you to obtain parts not in stock.
8. How many service technicians are stationed in New Haven during both peak and off-peak times?
9. How many elevator/escalator units do you service in New Haven area and what is the ratio of service technicians servicing in New Haven versus the number of elevator/escalator units serviced in New Haven (excluding residential routes)?

Proposer's Name:_____

10. How many maintenance supervisors do you have available for the New Haven area?
11. Discuss your response time for calls for service both during peak and off-peak times.
12. The existing elevator cabs have auto dialers, which are monitored by the elevator service company, 24 hours per day. Describe your ability to monitor these auto dialers, and describe your procedures in handling calls.
13. Describe what reports, notification and monthly summaries you propose to provide in carrying out these services.
14. Describe in detail what repair and preventive maintenance service you propose to provide as standard and your proposed schedule/frequency for carrying out these services. Also, describe what services are not standard, and require additional compensation.
15. Discuss in detail and per each facility the fees associated with your providing the elevator and escalator repair and preventive maintenance services.

Proposer's Name:_____

16. What are your standard hourly compensation rates for your service personnel, including regular and overtime situations?

17. Discuss any options or cost savings you may offer.

18. Note any exceptions to the draft form of Service Agreement.

COMMUNITY SUBCONTRACTOR UTILIZATION CERTIFICATE

The undersigned, having read the Bid Documents and the requirements regarding the naming of subcontractors and the use of DAS-Certified Small (SBE) and Minority Business Enterprises (including Minority owned Business Enterprises (MBE), Women owned Business Enterprises (WBE), and/or Disabled owned Business Enterprises (DisBE)), and the use of businesses having a place of business within the City of New Haven, hereby provides the following assurance of compliance. As of the date of the bid opening, the Bidder shall achieve this requirement as follows (attach additional sheets if necessary):

SUBCONTRACTOR* / SUPPLIER**	ENTERPRISE CATEGORY	NATURE OF WORK	DOLLAR AMOUNT
Name:	☐ DAS-certified SBE (non-MBE/WBE/DisBE)		
	☐ DAS-certified MBE		
Address:	☐ DAS-certified WBE		
	☐ DAS-certified DisBE		
Contact Person:	☐ All other subcontractors		
Phone # / Email address:	☐ New Haven Business Enterprise		
Name:	☐ DAS-certified SBE (non-MBE/WBE/DisBE)		
	☐ DAS-certified MBE		
Address:	☐ DAS-certified WBE		
	☐ DAS-certified DisBE		
Contact Person:	☐ All other subcontractors		
Phone # / Email address:	☐ New Haven Business Enterprise		
Name:	☐ DAS-certified SBE (non-MBE/WBE/DisBE)		
	☐ DAS-certified MBE		
Address:	☐ DAS-certified WBE		
	☐ DAS-certified DisBE		
Contact Person:	☐ All other subcontractors		
Phone # / Email address:	☐ New Haven Business Enterprise		
Name:	☐ DAS-certified SBE (non-MBE/WBE/DisBE)		
	☐ DAS-certified MBE		
Address:	☐ DAS-certified WBE		
	☐ DAS-certified DisBE		
Contact Person:	☐ All other subcontractors		
Phone # / Email address:	☐ New Haven Business Enterprise		
Name:	☐ DAS-certified SBE (non-MBE/WBE/DisBE)		
	☐ DAS-certified MBE		
Address:	☐ DAS-certified WBE		
	☐ DAS-certified DisBE		
Contact Person:	☐ All other subcontractors		
Phone # / Email address:	☐ New Haven Business Enterprise		

*Note: This form is for listing Subcontractors and Suppliers of Materials. In the event the Prime Contractor/General Contractor is a SBE, MBE, WBE or DisBE, its status as such does NOT contribute to the SBE, MBE, WBE and DisBE subcontractor requirements.

** For Suppliers of Materials, list only those Suppliers for which the Bidder will use in order to satisfy the requirement for use of Small and Minority Business Enterprises. Label in the Nature of Work section as supplier of the specific material to be supplied.

CONTINUED:

Name of Bidder

SUBCONTRACTOR / SUPPLIER*	ENTERPRISE CATEGORY	NATURE OF WORK	DOLLAR AMOUNT
Name:	☐ DAS-certified SBE (non-MBE/WBE/DisBE)		
	☐ DAS-certified MBE		
Address:	☐ DAS-certified WBE		
	☐ DAS-certified DisBE		
Contact Person:	☐ All other subcontractors		
Phone # / Email address:	☐ New Haven Business Enterprise		
Name:	☐ DAS-certified SBE (non-MBE/WBE/DisBE)		
	☐ DAS-certified MBE		
Address:	☐ DAS-certified WBE		
	☐ DAS-certified DisBE		
Contact Person:	☐ All other subcontractors		
Phone # / Email address:	☐ New Haven Business Enterprise		
Name:	☐ DAS-certified SBE (non-MBE/WBE/DisBE)		
	☐ DAS-certified MBE		
Address:	☐ DAS-certified WBE		
	☐ DAS-certified DisBE		
Contact Person:	☐ All other subcontractors		
Phone # / Email address:	☐ New Haven Business Enterprise		
Name:	☐ DAS-certified SBE (non-MBE/WBE/DisBE)		
	☐ DAS-certified MBE		
Address:	☐ DAS-certified WBE		
	☐ DAS-certified DisBE		
Contact Person:	☐ All other subcontractors		
Phone # / Email address:	☐ New Haven Business Enterprise		
Name:	☐ DAS-certified SBE (non-MBE/WBE/DisBE)		
	☐ DAS-certified MBE		
Address:	☐ DAS-certified WBE		
	☐ DAS-certified DisBE		
Contact Person:	☐ All other subcontractors		
Phone # / Email address:	☐ New Haven Business Enterprise		

*Note: This form is for listing Subcontractors and Suppliers of Materials. In the event the Prime Contractor/General Contractor is a SBE, MBE, WBE or DisBE, its status as such does NOT contribute to the SBE, MBE, WBE and DisBE subcontractor requirements.

** For Suppliers of Materials, list only those Suppliers for which the Bidder will use in order to satisfy the requirement for use of Small and Minority Business Enterprises. Label in the Nature of Work section as supplier of the specific material to be supplied.

COMMUNITY SUBCONTRACTOR UTILIZATION CERTIFICATE [CONTINUED]

SUBCONTRACTOR/SUPPLIER NAME

BRIEF STATEMENT OF EXPERIENCE

REFERENCES

Name of Bidder	

COMMUNITY SUBCONTRACTOR UTILIZATION CERTIFICATE [CONTINUED]

SUBCONTRACTOR / SUPPLIER NAME

BRIEF STATEMENT OF EXPERIENCE

REFERENCES

CALCULATION SHEET FOR COMMUNITY SUBCONTRACTOR UTILIZATION CERTIFICATE

(A) Total Dollar Amount for All MBE, WBE and DisBE = \$ _____

(B) Total Dollar Amount for All SBE (non-MBE/WBE/DisBE), MBE, WBE and DisBE = \$ _____

(C) Total Dollar Amount for Businesses having a place of business within the City of New Haven limits*** = \$ _____

(D) Total Dollar Amount for Bidder's Entire Contract Value (The "Bid Price") = \$ _____

*** Note: If the Bidder (i.e., prime bidder) has a place of business within the City of New Haven limits, then the relevant dollar amount is calculated by deducting from the Bidder's entire contract value, the value of the subcontracts and suppliers of materials who do not have a place of business within the City of New Haven.

Minority Business Enterprises Utilization Calculation for Percentage of Total Contract Value:

1. (A) Divided By (D) x 100 = _____ % (Percentage of MBE, WBE and DisBE Participation) **NOTE: Must be no less than 25%.**

Small Business Enterprises Utilization Calculation for Percentage of Total Contract Value:

2. (B) Divided By (D) x 100 = _____ % (Percentage of SBE Participation) **NOTE: Must be no less than 30%.**

New Haven Business Enterprises Utilization Calculation for Percentage of Total Contract Value:

3. (C) Divided By (D) x 100 = _____ % (Percentage of New Haven Businesses) **NOTE: Must be no less than 10%.**

The Bidder further certifies that none of the SBE/MBE/WBE/DisBE Subcontractors or Suppliers of Materials that the Bidder has selected for participation in the NHPA Community Subcontractor Utilization Program fall within the definition of an Affiliated party pursuant to Connecticut State Statute Section 4a-60g. Additionally, the Bidder further certifies that, upon approval of the above-named firms, or other firms added or substituted in accordance with the Bid Documents, it will execute a binding contract with such subcontractors and suppliers of materials for the purpose of undertaking and completing the above described work.

Date: _____

Name of Bidder: _____

Official Address: _____

Name and Title of Signatory: _____

Signature: _____

Affix Corporate Seal
(Attach additional sheets if necessary)

NEW HAVEN PARKING AUTHORITY
CERTIFICATE OF NON ARREARAGE

STATE OF)
) ss
COUNTY OF)

_____ being duly
sworn deposes and says:

1. S/he is the (owner, partner, officer, representative,
or agent) of _____ the
Bidder that has submitted the attached Bid.

2. Neither the Bidder, nor its subcontractors are in
arrears to the State of Connecticut Second Injury Fund.

(signed) _____

(Title)

Subscribed and sworn to before me this _____ day of
_____, _____.

Notary Public/Commissioner
of the Superior Court

CONNECTICUT DEPARTMENT OF LABOR
WAGE AND WORKPLACE STANDARDS DIVISION

CONTRACTORS WAGE CERTIFICATION FORM

I, _____ of _____
Officer, Owner, Authorized Rep. Company Name

do hereby certify that the _____
Company Name

Street

City

and all of its subcontractors will pay all workers on the

Project Name and Number

Street and City

the wages as listed in the schedule of prevailing rates required for such project (a copy of which is attached hereto).

Signed

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

Notary Public



Return to:

Mr. James Staniewicz, PE
Chief Engineer
New Haven Parking Authority
Temple Street Parking Garage
One Temple Street
New Haven, CT 06510



THIS IS A PUBLIC WORKS PROJECT

Covered by the

PREVAILING WAGE LAW

CT General Statutes Section 31-53

**If you have QUESTIONS regarding your wages
CALL (860) 263-6790**

Section 31-55 of the CT State Statutes requires every contractor or subcontractor performing work for the state to post in a prominent place the prevailing wages as determined by the Labor Commissioner.

3f) Terrazzo Mechanics & Marble Setters	40.6	34.93
-----LABORERS-----		
4) Group 1: General laborers, carpenter tenders, concrete specialists, wrecking laborers and fire watchers.	35.7	28.85
4) Group 1a: Acetylene Burners (Hours worked with a torch)	36.7	28.85
4a) Group 2: Mortar mixers, plaster tender, power buggy operators, powdermen, fireproofers/mixer/nozzleman (Person running mixer and spraying fireproof only).	35.95	28.85
4b) Group 3: Jackhammer operators/pavement breaker, mason tender (brick), mason tender (cement/concrete), forklift operators and forklift operators (masonry).	36.2	28.85
4c) **Group 4: Pipelayers (Installation of water, storm drainage or sewage lines outside of the building line with P6, P7 license) (the pipelayer rate shall apply only to one or two employees of the total crew who primary task is to actually perform the mating of pipe sections) P6 and P7 rate is \$26.80.	36.7	28.85
4d) Group 5: Air track operator, sand blaster and hydraulic drills.	36.45	28.85
4e) Group 6: Blasters, nuclear and toxic waste removal.	38.7	28.85
4f) Group 7: Asbestos/lead removal and encapsulation (except it's removal from mechanical systems which are not to be scrapped).	38.7	28.85
4g) Group 8: Bottom men on open air caisson, cylindrical work and boring crew.	36.2	28.85

4h) Group 9: Top men on open air caisson, cylindrical work and boring crew.	35.7	28.85
4i) Group 10: Traffic Control Signalman	21.42	28.85
4j) Group 11: Toxic Waste Removers A or B With PPE	38.7	28.85
5) Carpenter, Acoustical Ceiling Installation, Soft Floor/Carpet Laying, Metal Stud Installation, Form Work and Scaffold Building, Drywall Hanging, Modular-Furniture Systems Installers, Lathers, Piledrivers, Resilient Floor Layers.	42.03	29.19
5a) Millwrights	43.25	29.13
5b) Carpenter - Welder	42.53	29.19
5c) Carpenter: Working with creosote lumber or acid	43.03	29.19
6) Electrical Worker (including low voltage wiring) (Trade License required: E1,2 L-5,6 C-5,6 T-1,2 L-1,2 V-1,2,7,8,9)	46.4	36.66+3% of gross wage
7a) Elevator Mechanic (Trade License required: R-1,2,5,6)	66.72	38.435+a+b
-----OUTSIDE LINE CONSTRUCTION-----		
Groundman	30.87	13.91
Linemen/Cable Splicer	56.12	32.85
8) Glazier (Trade License required: FG-1,2)	43.13	26.50+ a

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9) Ironworker, Ornamental, Reinforcing, Structural, and Precast Concrete Erection	45.25	43.62 + a
----OPERATORS----		
Group 1: Crane Handling or Erecting Structural Steel or Stone; Hoisting Engineer (2 drums or over). (Trade License Required)	58.19	29.80 + a
Group 1a: Front End Loader (7 cubic yards or over); Work Boat 26 ft. and Over	53.33	29.80 + a
Group 2: Cranes (100 ton rate capacity and over); Bauer Drill/Caisson. (Trade License Required)	57.78	29.80 + a
Group 2a: Cranes (under 100 ton rated capacity).	56.79	29.80 + a
Group 2b: Excavator over 2 cubic yards; Pile Driver (\$3.00 premium when operator controls hammer)	52.92	29.80 + a
Group 3: Excavator; Gradall; Master Mechanic; Hoisting Engineer (all types of equipment where a drum and cable are used to hoist or drag material regardless of motive power of operation), Rubber Tire Excavator (Drott-1085 or similar); Grader Operator; Bulldozer Finegrade. (slopes, shaping, laser or GPS, etc.). (Trade License Required)	51.92	29.80 + a
Group 4: Trenching Machines; Lighter Derrick; CMI Machine or Similar; Koehring Loader (Skooper); Goldhofer.	51.42	29.80 + a
Group 5: Specialty Railroad Equipment; Asphalt Spreader, Asphalt Reclaiming Machine; Line Grinder; Concrete Pumps; Drills with Self Contained Power Units; Boring Machine; Post Hole Digger; Auger; Pounder; Well Digger; Milling Machine (over 24 mandrel).	50.63	29.80 + a
Group 5 continued: Side Boom; Combination Hoe and Loader; Directional Driller.	50.63	29.80 + a

Group 6: Front End Loader (3 up to 7 cubic yards); Bulldozer (rough grade dozer).	50.22	29.80 + a
Group 7: Asphalt Roller; Concrete Saws and Cutters (ride on types); Vermeer Concrete Cutter; Stump Grinder; Scraper; Snooper; Skidder; Milling Machine (24" and under mandrel).	49.77	29.80 + a
Group 8: Mechanic; Grease Truck Operator; Hydroblaster; Barrier Mover; Power Stone Spreader; Welding; Work Boat Under 26 ft.; Transfer Machine; Rigger Foreman.	49.25	29.80 + a
Group 9: Front End Loader (under 3 cubic yards); Skid Steer Loader regardless of attachments; (Bobcat or Similar); Forklift, Power Chipper; Landscape Equipment (including Hydroseeder); Vacuum Excavation Truck and Hydrovac Excavation Truck (27 HG pressure or greater).	48.67	29.80 + a
Group 10: Vibratory hammer; ice machine; diesel and air, hammer, etc.	45.96	29.80 + a
Group 11: Conveyor, earth roller, power pavement breaker (whiphammer), robot demolition equipment.	45.96	29.80 + a
Group 12: Wellpoint Operator.	45.87	29.80 + a
Group 13: Compressor Battery Operator.	45.12	29.80 + a
Group 14: Elevator Operator; Tow Motor Operator (solid tire no rough terrain).	43.6	29.80 + a
Group 15: Generator Operator; Compressor Operator; Pump Operator; Welding Machine Operator; Heater Operator.	43.06	29.80 + a
Group 16: Maintenance Engineer.	42.2	29.80 + a

As of: July 14, 2025

Group 17: Portable Asphalt Plant Operator; Portable Crusher Plant Operator; Portable Concrete Plant Operator; Portable Grout Plant Operator; Portable Water Filtration Plant Operator.	47.91	29.80 + a

Group 18: Power Safety Boat; Vacuum Truck; Zim Mixer; Sweeper; (Minimum for any job requiring a CDL license); Rigger; Signalman.	44.7	29.80 + a

Surveyor: Chief of Party	48.16	29.80 + a

Surveyor: Assistant Chief of Party	44.41	29.80 + a

Surveyor: Instrument Man	42.73	29.80 + a

Surveyor: Rodman or Chainman	36.78	29.80 + a

-----PAINTERS (Including Drywall Finishing)-----

10a) Brush and Roller	39.57	26.50

10b) Taping Only/Drywall Finishing	40.32	26.50

10c) Paperhanger and Red Label	40.07	26.50

10d) Spray	42.57	26.50

10e) Spray Helper	40.57	26.50

10f) Blast	44.57	26.50

10g) Blast Helper	40.57	26.50
11) Plumber (excluding HVAC pipe installation) (Trade License required: P-1,2,6,7,8,9 J-1,2,3,4 SP-1,2)	50.58	36.30
12) Well Digger, Pile Testing Machine	37.26	24.05 + a
Roofer: Cole Tar Pitch	46.0	24.74 + a
Roofer: Slate, Tile, Composition, Shingles, Singly Ply and Damp/Waterproofing	44.5	24.74 + a
15) Sheetmetal Worker (Trade License required for HVAC and Ductwork: SM-1,SM-2,SM-3,SM-4,SM-5,SM-6)	44.7	44.38
16) Pipefitter (Including HVAC work) (Trade License required: S-1,2,3,4,5,6,7,8 B-1,2,3,4 D-1,2,3,4, G-1, G-2, G-8 & G-9)	50.58	36.30
-----TRUCK DRIVERS-----		
17) Block Truck	37.48	32.68 + a
17a) 2 Axle	36.16	32.68 + a
17ab) Helpers	34.66	32.68 + a
17b) 3 Axle, 2 Axle Mixer	36.27	32.68 + a

17c) 3 Axle Mixer	36.33	32.68 + a
17d) 4 Axle	36.39	32.68 + a
17e) 4 Axle Mixer	37.19	32.68 + a
17ef) 5 Axle	36.39	32.68 + a
17eg) 5 Axle Mixer	37.19	32.68 + a
17f) Heavy Duty Trailer (40 Tons and Over)	38.66	32.68 + a
17g) Euclids and Semi-Trailer	36.44	32.68 + a
17h) Heavy Duty Trailer up to 40 tons	37.39	32.68 + a
17i) Snorkle Truck	36.54	32.68 + a
17j) Swivel Dump and Tack Truck	36.39	32.68 + a
18) Sprinkler Fitter (Trade License required: F-1,2,3,4)	53.76	33.44 + a
19) Theatrical Stage Journeyman	25.76	7.34

Welders: Rate for craft to which welding is incidental.

Surveyors: Hazardous material removal: \$3.00 per hour premium.

*Note: Hazardous waste removal work receives additional \$1.25 per hour for truck drivers.

**Note: Hazardous waste premium \$3.00 per hour over classified rate

As of: July 14, 2025

Crane with 150 ft. boom (including jib) - \$1.50 extra
Crane with 200 ft. boom (including jib) - \$2.50 extra
Crane with 250 ft. boom (including jib) - \$5.00 extra
Crane with 300 ft. boom (including jib) - \$7.00 extra
Crane with 400 ft. boom (including jib) - \$10.00 extra

All classifications that indicate a percentage of the fringe benefits must be calculated at the percentage rate times the "base hourly rate".

Apprentices duly registered under the Commissioner of Labor's regulations on "Work Training Standards for Apprenticeship and Training Programs" Section 31-51-d-1 to 12, are allowed to be paid the appropriate percentage of the prevailing journeymen hourly base and the full fringe benefit rate, providing the work site ratio shall not be less than one full-time journeyperson instructing and supervising the work of each apprentice in a specific trade.

The Prevailing wage rates applicable to this project are subject to annual adjustments each July 1st for the duration of the project.

Each contractor shall pay the annual adjusted prevailing wage rate that is in effect each July 1st, as posted by the Department of Labor.

It is the contractor's responsibility to obtain the annual adjusted prevailing wage rate increases directly from the Department of Labor's website.

The annual adjustments will be posted on the Department of Labor's Web page:

www.ct.gov/dol. For those without internet access, please contact the division listed below.

The Department of Labor will continue to issue the initial prevailing wage rate schedule to the Contracting Agency for the project.

All subsequent annual adjustments will be posted on our Web Site for contractor access.

Contracting Agencies are under no obligation pursuant to State labor law to pay any increase due to the annual adjustment provision.

Effective October 1, 2005 - Public Act 05-50: any person performing the work of any mechanic, laborer, or worker shall be paid prevailing wage

All Person who perform work ON SITE must be paid prevailing wage for the appropriate mechanic, laborer, or worker classification.

All certified payrolls must list the hours worked and wages paid to All Persons who perform work ON SITE regardless of their ownership i.e.: (Owners, Corporate Officers, LLC Members, Independent Contractors, et. al)

Reporting and payment of wages is required regardless of any contractual relationship alleged to exist between the contractor and such person.

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

Please direct any questions which you may have pertaining to classification of work and payment of prevailing wages to the Wage and Workplace Standards Division, telephone (860)263-6790.

As of: July 14, 2025

Sec. 31-53b. Construction safety and health course. New miner training program. Proof of completion required for mechanics, laborers and workers on public works projects. Enforcement. Regulations. Exceptions. (a) Each contract for a public works project entered into on or after July 1, 2009, by the state or any of its agents, or by any political subdivision of the state or any of its agents, described in subsection (g) of section 31-53, shall contain a provision requiring that each contractor furnish proof with the weekly certified payroll form for the first week each employee begins work on such project that any person performing the work of a mechanic, laborer or worker pursuant to the classifications of labor under section 31-53 on such public works project, pursuant to such contract, has completed a course of at least ten hours in duration in construction safety and health approved by the federal Occupational Safety and Health Administration or, has completed a new miner training program approved by the Federal Mine Safety and Health Administration in accordance with 30 CFR 48 or, in the case of telecommunications employees, has completed at least ten hours of training in accordance with 29 CFR 1910.268.

(b) Any person required to complete a course or program under subsection (a) of this section who has not completed the course or program shall be subject to removal from the worksite if the person does not provide documentation of having completed such course or program by the fifteenth day after the date the person is found to be in noncompliance. The Labor Commissioner or said commissioner's designee shall enforce this section.

(c) Not later than January 1, 2009, the Labor Commissioner shall adopt regulations, in accordance with the provisions of chapter 54, to implement the provisions of subsections (a) and (b) of this section. Such regulations shall require that the ten-hour construction safety and health courses required under subsection (a) of this section be conducted in accordance with federal Occupational Safety and Health Administration Training Institute standards, or in accordance with Federal Mine Safety and Health Administration Standards or in accordance with 29 CFR 1910.268, as appropriate. The Labor Commissioner shall accept as sufficient proof of compliance with the provisions of subsection (a) or (b) of this section a student course completion card issued by the federal Occupational Safety and Health Administration Training Institute, or such other proof of compliance said commissioner deems appropriate, dated no earlier than five years before the commencement date of such public works project.

(d) This section shall not apply to employees of public service companies, as defined in section 16-1, or drivers of commercial motor vehicles driving the vehicle on the public works project and delivering or picking up cargo from public works projects provided they perform no labor relating to the project other than the loading and unloading of their cargo.

(P.A. 06-175, S. 1; P.A. 08-83, S. 1.)

History: P.A. 08-83 amended Subsec. (a) by making provisions applicable to public works project contracts entered into on or after July 1, 2009, replacing provision re total cost of work with reference to Sec. 31-53(g), requiring proof in certified payroll form that new mechanic, laborer or worker has completed a 10-hour or more construction safety course and adding provision re new miner training program, amended Subsec. (b) by substituting "person" for "employee" and adding "or program", amended Subsec. (c) by adding "or in accordance with Federal Mine Safety and Health Administration Standards" and setting new deadline of January 1, 2009, deleted former Subsec. (d) re "public building", added new Subsec. (d) re exemptions for public service company employees and delivery drivers who perform no labor other than delivery and made conforming and technical changes, effective January 1, 2009.

Informational Bulletin

THE 10-HOUR OSHA CONSTRUCTION SAFETY AND HEALTH COURSE

(applicable to public building contracts entered into *on or after July 1, 2007*, where the total cost of all work to be performed is at least \$100,000)

- (1) This requirement was created by Public Act No. 06-175, which is codified in Section 31-53b of the Connecticut General Statutes (pertaining to the prevailing wage statutes);
- (2) The course is required for public building construction contracts (projects funded in whole or in part by the state or any political subdivision of the state) entered into on or after July 1, 2007;
- (3) It is required of private employees (not state or municipal employees) and apprentices who perform manual labor for a general contractor or subcontractor on a public building project where the total cost of all work to be performed is at least \$100,000;
- (4) The ten-hour construction course pertains to the ten-hour Outreach Course conducted in accordance with federal OSHA Training Institute standards, and, for telecommunications workers, a ten-hour training course conducted in accordance with federal OSHA standard, 29 CFR 1910.268;
- (5) The internet website for the federal OSHA Training Institute is http://www.osha.gov/fso/ote/training/edcenters/fact_sheet.html;
- (6) The statutory language leaves it to the contractor and its employees to determine who pays for the cost of the ten-hour Outreach Course;
- (7) Within 30 days of receiving a contract award, a general contractor must furnish proof to the Labor Commissioner that all employees and apprentices performing manual labor on the project will have completed such a course;
- (8) Proof of completion may be demonstrated through either: (a) the presentation of a *bona fide* student course completion card issued by the federal OSHA Training Institute; or (2) the presentation of documentation provided to an employee by a trainer certified by the Institute pending the actual issuance of the completion card;
- (9) Any card with an issuance date more than 5 years prior to the commencement date of the construction project shall not constitute proof of compliance;

- (10) Each employer shall affix a copy of the construction safety course completion card to the certified payroll submitted to the contracting agency in accordance with Conn. Gen. Stat. § 31-53(f) on which such employee's name first appears;
- (11) Any employee found to be in non-compliance shall be subject to removal from the worksite if such employee does not provide satisfactory proof of course completion to the Labor Commissioner by the fifteenth day after the date the employee is determined to be in noncompliance;
- (12) Any such employee who is determined to be in noncompliance may continue to work on a public building construction project for a maximum of fourteen consecutive calendar days while bringing his or her status into compliance;
- (13) The Labor Commissioner may make complaint to the prosecuting authorities regarding any employer or agent of the employer, or officer or agent of the corporation who files a false certified payroll with respect to the status of an employee who is performing manual labor on a public building construction project;
- (14) The statute provides the minimum standards required for the completion of a safety course by manual laborers on public construction contracts; any contractor can exceed these minimum requirements; and
- (15) Regulations clarifying the statute are currently in the regulatory process, and shall be posted on the CTDOL website as soon as they are adopted in final form.
- (16) Any questions regarding this statute may be directed to the Wage and Workplace Standards Division of the Connecticut Labor Department via the internet website of <http://www.ctdol.state.ct.us/wgwkstnd/wgemenu.htm>; or by telephone at (860)263-6790.

THE ABOVE INFORMATION IS PROVIDED EXCLUSIVELY AS AN EDUCATIONAL RESOURCE, AND IS NOT INTENDED AS A SUBSTITUTE FOR LEGAL INTERPRETATIONS WHICH MAY ULTIMATELY ARISE CONCERNING THE CONSTRUCTION OF THE STATUTE OR THE REGULATIONS.

November 29, 2006

Notice
**To All Mason Contractors and Interested Parties
Regarding Construction Pursuant to Section 31-53 of the
Connecticut General Statutes (Prevailing Wage)**

The Connecticut Labor Department Wage and Workplace Standards Division is empowered to enforce the prevailing wage rates on projects covered by the above referenced statute.

Over the past few years the Division has withheld enforcement of the rate in effect for workers who operate a forklift on a prevailing wage rate project due to a potential jurisdictional dispute.

The rate listed in the schedules and in our Occupational Bulletin (see enclosed) has been as follows:

Forklift Operator:

- **Laborers (Group 4) Mason Tenders** - operates forklift solely to assist a mason to a maximum height of nine feet only.
- **Power Equipment Operator (Group 9)** - operates forklift to assist any trade and to assist a mason to a height over nine feet.

The U.S. Labor Department conducted a survey of rates in Connecticut but it has not been published and the rate in effect remains as outlined in the above Occupational Bulletin.

Since this is a classification matter and not one of jurisdiction, effective January 1, 2007 the Connecticut Labor Department will enforce the rate on each schedule in accordance with our statutory authority.

Your cooperation in filing appropriate and accurate certified payrolls is appreciated.

Information Bulletin

Occupational Classifications

The Connecticut Department of Labor has the responsibility to properly determine "job classification" on prevailing wage projects covered under C.G.S. Section 31-53(d).

Note: This information is intended to provide a sample of some occupational classifications for guidance purposes only. It is not an all-inclusive list of each occupation's duties. This list is being provided only to highlight some areas where a contractor may be unclear regarding the proper classification. If unsure, the employer should seek guidelines for CTDOL.

Below are additional clarifications of specific job duties performed for certain classifications:

- **ASBESTOS WORKERS**

Applies all insulating materials, protective coverings, coatings and finishes to all types of mechanical systems.

- **ASBESTOS INSULATOR**

Handle, install apply, fabricate, distribute, prepare, alter, repair, dismantle, heat and frost insulation, including penetration and fire stopping work on all penetration fire stop systems.

- **BOILERMAKERS**

Erects hydro plants, incomplete vessels, steel stacks, storage tanks for water, fuel, etc. Builds incomplete boilers, repairs heat exchanges and steam generators.

- **BRICKLAYERS, CEMENT MASONS, CEMENT FINISHERS, MARBLE MASONS, PLASTERERS, STONE MASONS, PLASTERERS. STONE MASONS, TERRAZZO WORKERS, TILE SETTERS**

Lays building materials such as brick, structural tile and concrete cinder, glass, gypsum, terra cotta block. Cuts, tools and sets marble, sets stone, finishes concrete, applies decorative steel, aluminum and plastic tile, applies cements, sand, pigment and marble chips to floors, stairways, etc.

- **CARPENTERS, MILLWRIGHTS. PILEDRIVERMEN. LATHERS. RESILIENT FLOOR LAYERS, DOCK BUILDERS, DIKERS, DIVER TENDERS**

Constructs, erects, installs and repairs structures and fixtures of wood, plywood and wallboard. Installs, assembles, dismantles, moves industrial machinery. Drives piling into ground to provide foundations for structures such as buildings and bridges, retaining walls for earth embankments, such as cofferdams. Fastens wooden, metal or rockboard lath to walls, ceilings and partitions of buildings, acoustical tile layer, concrete form builder. Applies firestopping materials on fire resistive joint systems only. Installation of curtain/window walls only where attached to wood or metal studs. Installation of insulated material of all types whether blown, nailed or attached in other ways to walls, ceilings and floors of buildings. Assembly and installation of modular furniture/furniture systems. Free-standing furniture is not covered. This includes free standing: student chairs, study top desks, book box desks, computer furniture, dictionary stand, atlas stand, wood shelving, two-position information access station, file cabinets, storage cabinets, tables, etc.

- **LABORER, CLEANING**

- The clean up of any construction debris and the general (heavy/light) cleaning, including sweeping, wash down, mopping, wiping of the construction facility and its furniture, washing, polishing, and dusting.

- **DELIVERY PERSONNEL**

- If delivery of supplies/building materials is to one common point and stockpiled there, prevailing wages are not required. If the delivery personnel are involved in the distribution of the material to multiple locations within the construction site then they would have to be paid prevailing wages for the type of work performed: laborer, equipment operator, electrician, ironworker, plumber, etc.

- An example of this would be where delivery of drywall is made to a building and the delivery personnel distribute the drywall from one "stockpile" location to further sub-locations on each floor. Distribution of material around a construction site is the job of a laborer or tradesman, and not a delivery personnel.

- **ELECTRICIANS**

Install, erect, maintenance, alteration or repair of any wire, cable, conduit, etc., which generates, transforms, transmits or uses electrical energy for light, heat, power or other purposes, including the installation or maintenance of telecommunication, LAN wiring or computer equipment, and low voltage wiring. ****License required per Connecticut General Statutes: E-1,2 L-5,6 C-5,6 T-1,2 L-1,2 V-1,2,7,8,9.***

- **ELEVATOR CONSTRUCTORS**

Install, erect, maintenance and repair of all types of elevators, escalators, dumb waiters and moving walks. **License required by Connecticut General Statutes: R-1,2,5,6.*

- **FORK LIFT OPERATOR**

Laborers Group 4) Mason Tenders - operates forklift solely to assist a mason to a maximum height of nine (9) feet only.

Power Equipment Operator Group 9 - operates forklift to assist any trade, and to assist a mason to a height over nine (9) feet.

- **GLAZIERS**

Glazing wood and metal sash, doors, partitions, and 2 story aluminum storefronts. Installs glass windows, skylights, store fronts and display cases or surfaces such as building fronts, interior walls, ceilings and table tops and metal store fronts. Installation of aluminum window walls and curtain walls is the "joint" work of glaziers and ironworkers, which require equal composite workforce.

- **IRONWORKERS**

Erection, installation and placement of structural steel, precast concrete, miscellaneous iron, ornamental iron, metal curtain wall, rigging and reinforcing steel. Handling, sorting, and installation of reinforcing steel (rebar). Metal bridge rail (traffic), metal bridge handrail, and decorative security fence installation. Installation of aluminum window walls and curtain walls is the "joint" work of glaziers and ironworkers which require equal composite workforce.

- **INSULATOR**

- Installing fire stopping systems/materials for "Penetration Firestop Systems": transit to cables, electrical conduits, insulated pipes, sprinkler pipe penetrations, ductwork behind radiation, electrical cable trays, fire rated pipe penetrations, natural polypropylene, HVAC ducts, plumbing bare metal, telephone and communication wires, and boiler room ceilings.

- **LABORERS**

Acetylene burners, asphalt rakers, chain saw operators, concrete and power buggy operator, concrete saw operator, fence and guard rail erector (except metal bridge rail (traffic), decorative security fence (non-metal)).

installation.), hand operated concrete vibrator operator, mason tenders, pipelayers (installation of storm drainage or sewage lines on the street only), pneumatic drill operator, pneumatic gas and electric drill operator, powermen and wagon drill operator, air track operator, block paver, curb setters, blasters, concrete spreaders.

- **PAINTERS**

Maintenance, preparation, cleaning, blasting (water and sand, etc.), painting or application of any protective coatings of every description on all bridges and appurtenances of highways, roadways, and railroads. Painting, decorating, hardwood finishing, paper hanging, sign writing, scenic art work and drywall hhg for any and all types of building and residential work.

- **LEAD PAINT REMOVAL**

- Painter's Rate

1. Removal of lead paint from bridges.
2. Removal of lead paint as preparation of any surface to be repainted.
3. Where removal is on a Demolition project prior to reconstruction.

- Laborer's Rate

1. Removal of lead paint from any surface NOT to be repainted.
2. Where removal is on a *TOTAL* Demolition project only.

- **PLUMBERS AND PIPEFITTERS**

Installation, repair, replacement, alteration or maintenance of all plumbing, heating, cooling and piping. **License required per Connecticut General Statutes: P-1,2,6,7,8,9 J-1,2,3,4 SP-1,2 S-1,2,3,4,5,6,7,8 B-1,2,3,4 D-1,2,3,4.*

- **POWER EQUIPMENT OPERATORS**

Operates several types of power construction equipment such as compressors, pumps, hoists, derricks, cranes, shovels, tractors, scrapers or motor graders, etc. Repairs and maintains equipment. **License required, crane operators only, per Connecticut General Statutes.*

- **ROOFERS**

Covers roofs with composition shingles or sheets, wood shingles, slate or asphalt and gravel to waterproof roofs, including preparation of surface. (demolition or removal of any type of roofing and or clean-up of any and all areas where a roof is to be relaid.)

- **SHEETMETAL WORKERS**

Fabricate, assemble, install and repair sheetmetal products and equipment in such areas as ventilation, air-conditioning, warm air heating, restaurant equipment, architectural sheet metal work, sheetmetal roofing, and aluminum gutters. Fabrication, handling, assembling, erecting, altering, repairing, etc. of coated metal material panels and composite metal material panels when used on building exteriors and interiors as soffits, fascia, louvers, partitions, canopies, cornice, column covers, awnings, beam covers, cladding, sun shades, lighting troughs, spires, ornamental roofing, metal ceilings, mansards, copings, ornamental and ventilation hoods, vertical and horizontal siding panels, trim, etc. The sheet metal classification also applies to the vast variety of coated metal material panels and composite metal material panels that have evolved over the years as an alternative to conventional ferrous and non-ferrous metals like steel, iron, tin, copper, brass, bronze, aluminum, etc. Fabrication, handling, assembling, erecting, altering, repairing, etc. of architectural metal roof, standing seam roof, composite metal roof, metal and composite bathroom/toilet partitions, aluminum gutters, metal and composite lockers and shelving, kitchen equipment, and walk-in coolers. To include testing and air –balancing ancillary to installation and construction.

- **SPRINKLER FITTERS**

Installation, alteration, maintenance and repair of fire protection sprinkler systems.

****License required per Connecticut General Statutes: F-1,2,3,4.***

- **TILE MARBLE AND TERRAZZO FINISHERS**

Assists and tends the tile setter, marble mason and terrazzo worker in the performance of their duties.

- **TRUCK DRIVERS**

~How to pay truck drivers delivering asphalt is under REVISION~

Truck Drivers are required to be paid prevailing wage for time spent "working" directly on the site. These drivers remain covered by the prevailing wage for any time spent transporting between the actual construction location and facilities (such as fabrication, plants, mobile factories, batch plant, borrow pits, job headquarters, tool yards, etc.) dedicated exclusively, or nearly so, to performance of the contract or project, which are so located in proximity to the actual construction location that it is reasonable to include them. ****License required, drivers only, per Connecticut General Statutes.***

For example:

- Material men and deliverymen are not covered under prevailing wage as long as they are not directly involved in the construction process. If, they unload the material, they would then be covered by prevailing wage for the classification they are performing work in: laborer, equipment operator, etc.
- Hauling material off site is not covered provided they are not dumping it at a location outlined above.
- Driving a truck on site and moving equipment or materials on site would be considered covered work, as this is part of the construction process.

➤ *Any questions regarding the proper classification should be directed to:*
Public Contract Compliance Unit
Wage and Workplace Standards Division
Connecticut Department of Labor
200 Folly Brook Blvd, Wethersfield, CT 06109
(860) 263-6790.

STATUTE 31-55a

- SPECIAL NOTICE -

To: All State and Political Subdivisions, Their Agents, and Contractors

Connecticut General Statute 31-55a - Annual adjustments to wage rates by contractors doing state work.

Each contractor that is awarded a contract on or after October 1, 2002, for (1) the construction of a state highway or bridge that falls under the provisions of section 31-54 of the general statutes, or (2) the construction, remodeling, refinishing, refurbishing, rehabilitation, alteration or repair of any public works project that falls under the provisions of section 31-53 of the general statutes shall contact the Labor Commissioner on or before July first of each year, for the duration of such contract, to ascertain the prevailing rate of wages on an hourly basis and the amount of payment or contributions paid or payable on behalf of each mechanic, laborer or worker employed upon the work contracted to be done, and shall make any necessary adjustments to such prevailing rate of wages and such payment or contributions paid or payable on behalf of each such employee, effective each July first.

- The prevailing wage rates applicable to any contract or subcontract awarded on or after October 1, 2002 are subject to annual adjustments each July 1st for the duration of any project which was originally advertised for bids on or after October 1, 2002.
- Each contractor affected by the above requirement shall pay the annual adjusted prevailing wage rate that is in effect each July 1st, as posted by the Department of Labor.
- It is the **contractor's** responsibility to obtain the annual adjusted prevailing wage rate increases directly from the Department of Labor's Web Site. The annual adjustments will be posted on the Department of Labor Web page: www.ctdol.state.ct.us. For those without internet access, please contact the division listed below.
- The Department of Labor will continue to issue the initial prevailing wage rate schedule to the Contracting Agency for the project. All subsequent annual adjustments will be posted on our Web Site for contractor access.

Any questions should be directed to the Contract Compliance Unit, Wage and Workplace Standards Division, Connecticut Department of Labor, 200 Folly Brook Blvd., Wethersfield, CT 06109 at (860)263-6790.

[New] In accordance with Section 31-53b(a) of the C.G.S. each contractor shall provide a copy of the OSHA 10 Hour Construction Safety and Health Card for each employee, to be attached to the first certified payroll on the project.

In accordance with Connecticut General Statutes, 31-53 Certified Payrolls with a statement of compliance shall be submitted monthly to the contracting agency.												PAYROLL CERTIFICATION FOR PUBLIC WORKS PROJECTS										Connecticut Department of Labor Wage and Workplace Standards Division 200 Folly Brook Blvd. Wethersfield, CT 06109							
CONTRACTOR NAME AND ADDRESS:												SUBCONTRACTOR NAME & ADDRESS						WORKER'S COMPENSATION INSURANCE CARRIER POLICY # EFFECTIVE DATE: EXPIRATION DATE:											
PAYROLL NUMBER		Week-Ending Date		PROJECT NAME & ADDRESS																									
PERSON/WORKER, ADDRESS and SECTION		APPR RATE %	MALE/ FEMALE AND RACE*	WORK CLASSIFICATION		DAY AND DATE						Total ST Hours	BASE HOURLY RATE	TYPE OF FRINGE BENEFITS Per Hour 1 through 6 (see back)	GROSS PAY FOR ALL WORK PERFORMED THIS WEEK	TOTAL DEDUCTIONS				GROSS PAY FOR THIS PREVAILING RATE JOB	CHECK # AND NET PAY								
						S	M	T	W	TH	F	S				Total O/T Hours	FICA	FEDERAL WITH- HOLDING	STATE WITH- HOLDING			LIST OTHER							
				Trade License Type & Number - OSHA 10 Certification Number		HOURS WORKED EACH DAY						TOTAL FRINGE BENEFIT PLAN CASH																	
												\$ Base Rate	1. \$ 2. \$ 3. \$																
												\$ Cash Fringe	4. \$ 5. \$ 6. \$																
												\$ Base Rate	1. \$ 2. \$ 3. \$																
												\$ Cash Fringe	4. \$ 5. \$ 6. \$																
												\$ Base Rate	1. \$ 2. \$ 3. \$																
												\$ Cash Fringe	4. \$ 5. \$ 6. \$																
												\$ Base Rate	1. \$ 2. \$ 3. \$																
												\$ Cash Fringe	4. \$ 5. \$ 6. \$																
12/9/2013												*IF REQUIRED																	
WWS-CP1												*SEE REVERSE SIDE												PAGE NUMBER ____OF					

***FRINGE BENEFITS EXPLANATION (P):**

Bona fide benefits paid to approved plans, funds or programs, except those required by Federal or State Law (unemployment tax, worker’s compensation, income taxes, etc.).

Please specify the type of benefits provided:

- 1) Medical or hospital care _____
- 4) Disability_____
- 2) Pension or retirement _____
- 5) Vacation, holiday_____
- 3) Life Insurance _____
- 6) Other (please specify) _____

CERTIFIED STATEMENT OF COMPLIANCE

For the week ending date of _____,

I, _____ of _____, (hereafter known as
Employer) in my capacity as _____ (title) do hereby certify and state:

Section A:

1. All persons employed on said project have been paid the full weekly wages earned by them during the week in accordance with Connecticut General Statutes, section 31-53, as amended. Further, I hereby certify and state the following:

a) The records submitted are true and accurate;

b) The rate of wages paid to each mechanic, laborer or workman and the amount of payment or contributions paid or payable on behalf of each such person to any employee welfare fund, as defined in Connecticut General Statutes, section 31-53 (h), are not less than the prevailing rate of wages and the amount of payment or contributions paid or payable on behalf of each such person to any employee welfare fund, as determined by the Labor Commissioner pursuant to subsection Connecticut General Statutes, section 31-53 (d), and said wages and benefits are not less than those which may also be required by contract;

c) The Employer has complied with all of the provisions in Connecticut General Statutes, section 31-53 (and Section 31-54 if applicable for state highway construction);

d) Each such person is covered by a worker’s compensation insurance policy for the duration of his employment which proof of coverage has been provided to the contracting agency;

e) The Employer does not receive kickbacks, which means any money, fee, commission, credit, gift, gratuity, thing of value, or compensation of any kind which is provided directly or indirectly, to any prime contractor, prime contractor employee, subcontractor, or subcontractor employee for the purpose of improperly obtaining or rewarding favorable treatment in connection with a prime contract or in connection with a prime contractor in connection with a subcontractor relating to a prime contractor; and

f) The Employer is aware that filing a certified payroll which he knows to be false is a class D felony for which the employer may be fined up to five thousand dollars, imprisoned for up to five years or both.
2. OSHA~The employer shall affix a copy of the construction safety course, program or training completion document to the certified payroll required to be submitted to the contracting agency for this project on which such persons name first appears.

(Signature)

(Title)

Submitted on (Date)

Weekly Payroll Certification For
Public Works Projects (Continued)

PAYROLL CERTIFICATION FOR PUBLIC WORKS PROJECTS

WEEKLY PAYROLL

Week-Ending Date:

Contractor or Subcontractor Business Name:

PERSON/WORKER, ADDRESS and SECTION	APPR RATE %	MALE/ FEMALE AND RACE*	WORK CLASSIFICATION	DAY AND DATE							Total ST Hours	BASE HOURLY RATE	TYPE OF FRINGE BENEFITS Per Hour 1 through 6 (see back)	GROSS PAY FOR ALL WORK PERFORMED THIS WEEK	TOTAL DEDUCTIONS				GROSS PAY FOR THIS PREVAILING RATE JOB	CHECK # AND NET PAY
				S	M	T	W	TH	F	S	FICA				FEDERAL	STATE	LIST OTHER			
			Trade License Type & Number - OSHA								TOTAL FRINGE BENEFIT PLAN									
			10 Certification Number	HOURS WORKED EACH DAY							Total O/T Hours	CASH								
												\$ Base Rate	1. \$ 2. \$ 3. \$							
												\$ Cash Fringe	4. \$ 5. \$ 6. \$							
												\$ Base Rate	1. \$ 2. \$ 3. \$							
												\$ Cash Fringe	4. \$ 5. \$ 6. \$							
												\$ Base Rate	1. \$ 2. \$ 3. \$							
												\$ Cash Fringe	4. \$ 5. \$ 6. \$							
												\$ Base Rate	1. \$ 2. \$ 3. \$							
												\$ Cash Fringe	4. \$ 5. \$ 6. \$							
												\$ Base Rate	1. \$ 2. \$ 3. \$							
												\$ Cash Fringe	4. \$ 5. \$ 6. \$							

12/9/2013
WWS-CP2

*IF REQUIRED

NOTICE: THIS PAGE MUST BE ACCOMPANIED BY A COVER PAGE (FORM # WWS-CP1)

PAGE NUMBER ____OF

**Connecticut Department of Labor
Wage and Workplace Standards Division
FOOTNOTES**

- ⇒ Please Note: If the “Benefits” listed on the schedule for the following occupations includes a letter(s) (+ a or + a+b for instance), refer to the information below.

Benefits to be paid at the appropriate prevailing wage rate for the listed occupation.

If the “Benefits” section for the occupation lists only a dollar amount, disregard the information below.

Bricklayers, Cement Masons, Cement Finishers, Concrete Finishers, Stone Masons
(Building Construction) and
(Residential- Hartford, Middlesex, New Haven, New London and Tolland Counties)

- a. Paid Holiday: Employees shall receive 4 hours for Christmas Eve holiday provided the employee works the regularly scheduled day before and after the holiday. Employers may schedule work on Christmas Eve and employees shall receive pay for actual hours worked in addition to holiday pay.

Elevator Constructors: Mechanics

- a. Paid Holidays: New Year’s Day, Memorial Day, Independence Day, Labor Day, Veterans’ Day, Thanksgiving Day, Christmas Day, plus the Friday after Thanksgiving.
- b. Vacation: Employer contributes 8% of basic hourly rate for 5 years or more of service or 6% of basic hourly rate for 6 months to 5 years of service as vacation pay credit.

Glaziers

- a. Paid Holidays: Labor Day and Christmas Day.

Power Equipment Operators
(Heavy and Highway Construction & Building Construction)

- a. Paid Holidays: New Year’s Day, Good Friday, Memorial day, Independence Day, Labor Day, Thanksgiving Day and Christmas Day, provided the employee works 3 days during the week in which the holiday falls, if scheduled, and if scheduled, the working day before and the working day after the holiday. Holidays falling on Saturday may be observed on Saturday, or if the employer so elects, on the preceding Friday.

Ironworkers

- a. Paid Holiday: Labor Day provided employee has been on the payroll for the 5 consecutive work days prior to Labor Day.

Laborers (Tunnel Construction)

- a. Paid Holidays: New Year's Day, Memorial Day, Independence Day, Labor Day, Thanksgiving Day and Christmas Day. No employee shall be eligible for holiday pay when he fails, without cause, to work the regular work day preceding the holiday or the regular work day following the holiday.

Roofers

- a. Paid Holidays: July 4th, Labor Day, and Christmas Day provided the employee is employed 15 days prior to the holiday.

Sprinkler Fitters

- a. Paid Holidays: Memorial Day, July 4th, Labor Day, Thanksgiving Day and Christmas Day, provided the employee has been in the employment of a contractor 20 working days prior to any such paid holiday.

Truck Drivers

(Heavy and Highway Construction & Building Construction)

- a. Paid Holidays: New Year's Day, Memorial Day, Independence Day, Labor Day, Thanksgiving Day, Christmas day, and Good Friday, provided the employee has at least 31 calendar days of service and works the last scheduled day before and the first scheduled day after the holiday, unless excused.

PRELIMINARY PROGRESS SCHEDULE

Elevator Modernization and Repairs
at the Various Facilities
NHPA Project No. 21-011
New Haven, Connecticut

PROPOSED
START DATE:

1,000 calendar days

Bid Items		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33
1.	General Provisions:																																	
2.	Work related to the 270 State Street Parking Garage																																	
	Modernization of Elevator #1																																	
	Modernization of Elevator #2																																	
3.	Work related to the Temple Medical Parking Garage																																	
	Modernization of Elevator #1																																	
	Modernization of Elevator #2																																	
4.	Work related to the Temple Street Parking Garage																																	
	Modernization of Elevator #1																																	
	Modernization of Elevator #2																																	
	Modernization of Elevator #3																																	
	Modernization of Elevator #4																																	
	Modernization of Elevator #5																																	
	Architectural Repairs and Improvements																																	
5.	Work related to the Air Rights Parking Garage																																	
	Modernization of Elevator #1																																	
	Modernization of Elevator #2																																	
	Modernization of Elevator #3																																	
	Modernization of Elevator #4																																	
6	Traffic Control Provisions																																	

HOURLY RATE SCHEDULE

The following are hourly wage rates for all tradesmen associated with this bid package for performing extra work on a time and material basis. These rates are fully loaded [including benefits, taxes (All Sales Taxes, Labor and Material as applicable for this project and type of work), applicable insurance, overhead and profit, bond costs (if Subcontractor has provided Surety Bonds), small tools, travel, parking, supervision , and any other costs associated with labor, etc.] and are in accordance with the prevailing wages of the trade having jurisdiction in areas where the work is performed. The wage rates shall be valid for the life of the project. NOTE: Further, no mark-up shall be allowed on the premium time portion of the wage rate. These wage rates including detail and supporting documentation shall be made available within 5 days of verbal award and shall be broken down sufficiently representing all of the items noted above. All rates are subject to thorough analysis and subject to reduction if deemed inaccurate by Turner Construction Company and/or The Owner.

Foremen	Straight Time	Time-and-a-Half	Double-Time
_____	\$ _____	\$ _____	\$ _____
_____	\$ _____	\$ _____	\$ _____
_____	\$ _____	\$ _____	\$ _____
_____	\$ _____	\$ _____	\$ _____
_____	\$ _____	\$ _____	\$ _____
Journeyman	Straight Time	Time-and-a-Half	Double-Time
_____	\$ _____	\$ _____	\$ _____
_____	\$ _____	\$ _____	\$ _____
_____	\$ _____	\$ _____	\$ _____
_____	\$ _____	\$ _____	\$ _____
_____	\$ _____	\$ _____	\$ _____
Apprentice	Straight Time	Time-and-a-Half	Double-Time
_____	\$ _____	\$ _____	\$ _____
_____	\$ _____	\$ _____	\$ _____
_____	\$ _____	\$ _____	\$ _____
_____	\$ _____	\$ _____	\$ _____
_____	\$ _____	\$ _____	\$ _____

NEW HAVEN PARKING AUTHORITY

PERFORMANCE BOND

KNOW ALL MEN BY THESE PRESENTS:

That _____
as Principal hereinafter called Contractor, and _____

as Surety, hereinafter called Surety, are held and firmly
bound unto the New Haven Parking Authority as Obligee,
hereinafter called Obligee, in the amount of _____

(\$ _____), for the payment whereof
Contractor and Surety bind themselves, their heirs, executors,
administrators, successors and assigns, jointly and severally,
firmly by these presents.

WHEREAS, Contractor has by written agreement dated _____
_____ entered into a contract with Obligee for _____

_____ which contract with all its terms, covenants, conditions and
stipulations is incorporated herein to form a part hereof as
fully as if said contract was recited at length herein.

NOW, THEREFORE, the condition of this obligation is such
that, if Contractor shall promptly and faithfully perform
said Contract, then this obligation shall be null and void;
otherwise it shall remain in full force and effect.

PROVIDED, that any alterations which may be made in the
terms of the Contract, or in the work to be done under it,
or the giving by the Obligee of any extension of time for
the performance of the Contract, or any other forbearance on
the part of either the Obligee or the Contractor to the
other shall not in any way release the Contractor and the
Surety, or either of any of them, their heirs, executors,
administrators, successors or assigns from their liability
hereunder, notice to the Surety of any such alterations,
extension or forbearance being hereby waived.

Whenever Contractor shall be, and declared by Obligee to be
in default under the Contract, the Obligee having performed
Obligee's obligations thereunder, the Surety may promptly
remedy the default, or shall promptly:

1. Complete the Contract in accordance with its terms and
conditions, by another contractor acceptable to the
Obligee said other Contractor to act as an agent of the
Surety, or

2. Obtain a bid or bids for submission for completing the Contract in accordance with its terms and conditions, and upon determination by Obligee and Surety of the lowest responsible bidder, arrange for a contract between such a bidder and Obligee, and make available as work progresses (even though there should be a default or a succession of defaults under the Contract or contracts of completion arranged under this paragraph) sufficient funds to pay the cost of completion less the balance of the contract price; but not exceeding, including other costs and damages for which the Surety may be liable hereunder, the amount set forth in the first paragraph hereof. The term "balance of the contract price" as used in this paragraph, shall mean the total amount payable by Obligee to Contractor under the Contract and any amendments thereto, less the amount properly paid by Obligee to Contractor.

SIGNED AND SEALED this _____ day of _____,
A.D. _____.

IN THE PRESENCE OF:

(Principal of Contractor) (Seal)

(Title)

(Surety) (Seal)

By: _____
Attorney in Fact

NEW HAVEN PARKING AUTHORITY

ACKNOWLEDGEMENT OF SURETY COMPANY

State of _____)

County of _____)

City of _____)

On this _____ day of _____, _____
before me personally came _____ to
me known to be the person named in the above instrument and
who after being by me duly sworn, did depose and say that he
resides in _____, that he is
the _____ of the corporation
described in which is executed the above instrument, that he
knows the seal of said corporation that the seal affixed to
said instrument is such corporate seal, that it was so
affixed pursuant to a resolution of the Board of Directors
of said corporation, and that he signed his name by like
order.

Notary Public

MY COMMISSION EXPIRES: _____

(The Surety Company must append statement of its financial condition and a copy of the resolution authorizing the execution of bonds by officers of the company, and the power-of-attorney of the surety company's attorney-in-fact, authorized to act within the State of Connecticut).

NEW HAVEN PARKING AUTHORITY

LABOR AND MATERIAL BOND

KNOW ALL MEN BY THESE PRESENTS:

That _____,
of the town of _____, County of _____,
State of _____, as Principal (hereinafter
called the Principal) and _____

_____ (a surety company authorized to
transact business in the State of Connecticut) as Surety
(hereinafter called the Surety) are held and firmly bound
unto the New Haven Parking Authority (hereinafter called the
Obligee) in the full penal sum of _____

(\$ _____), lawful money of the United States,
to be paid to said Obligee which payment will and truly be
made and done, the said Principal binds himself, his heirs,
executors, and administrators (or itself, its successors and
assigns) and the said Surety binds itself, its successors
and assigns, jointly and severally, firmly by these presents.

WHEREAS, said Principal has entered into a certain written
contract with said Obligee, dated _____ day of
_____, A.D. _____, which written contract
provides for _____

_____ which contract, with all of its terms, covenants, conditions
and stipulations is incorporated herein to form a part
hereof as fully as if said contract was recited at length
herein.

NOW, THEREFORE, the condition of this obligation is such
that, if the said Principal shall promptly pay for all
materials furnished and labor supplied or performed in the
prosecution of the work included in and under the aforesaid
contract, whether or not the material or labor enters into
and becomes a component part of the real asset, then this
obligation shall be null and void, otherwise it shall remain
and be in full force and effect.

PROVIDED, that any alterations which may be made in the
terms of the contract or in the work to be done under it, or
the giving by the Obligee of any extension of time for the
performance of the contract, or any other forbearance on the
part of either the Obligee or the Principal to the other
shall not in any way release the Principal and the Surety or
either or any of them, their heirs, executors, administrators,

successors or assigns from their liability hereunder, notice to the Surety of any such alterations, extension or forbearance being hereby waived.

Any party, whether a subcontractor or otherwise, who furnishes materials or supplies or performs labor or services in the prosecution of the work under said contract, and who is not paid therefore; may bring a suit on this bond in the name of the person suing, prosecute the same to a final judgment, and have execution thereon for such sum or sums as may be justly due.

This bond is furnished pursuant to Section 49-41 of the General Statutes of Connecticut, Revision of 1958.

SIGNED AND SEALED this _____ day of _____, A.D. _____

IN THE PRESENCE OF:

(Principal of Contractor) (Seal)

(Title)

(Surety) (Seal)

By: _____
Attorney-in-Fact

Attest:

NEW HAVEN PARKING AUTHORITY

ACKNOWLEDGEMENT OF SURETY COMPANY

State of _____)

County of _____)

City of _____)

On this _____ day of _____, _____
before me personally came _____ to
me known to be the person named in the above instrument and
who after being by me duly sworn, did depose and say that he
resides in _____, that he is
the _____ of the corporation
described in which is executed the above instrument, that he
knows the seal of said corporation that the seal affixed to
said instrument is such corporate seal, that it was so
affixed pursuant to a resolution of the Board of Directors
of said corporation, and that he signed his name by like
order.

Notary Public

MY COMMISSION EXPIRES: _____

(The Surety Company must append statement of its financial
condition and a copy of the resolution authorizing the
execution of bonds by officers of the company, and the
power-of-attorney of the surety company's attorney-in-fact,
authorized to act within the State of Connecticut).

**AGREEMENT
BY AND BETWEEN
NEW HAVEN PARKING AUTHORITY
AND**

**FOR
ELEVATOR AND ESCALATOR
MODERNIZATION AND SERVICE
AT
NEW HAVEN PARKING AUTHORITY FACILITIES
NEW HAVEN, CONNECTICUT**

NHPA CONTRACT #_____

NHPA PROJECT #21-021

THE AGREEMENT made effective on the _____ day of _____,
_____ by and between the New Haven Parking Authority, 232 George Street, New Haven,
CT 06510 ("NHPA") and _____ ("_____").

WITNESSETH, that NHPA and _____, for a price not to exceed
_____ Dollars and __ Cents (\$_____),
and considerations stated herein, mutually agree as follows:

ARTICLE 1. Statement of Work. _____ shall furnish all supervision, technical personnel, labor, materials, machinery, tools, equipment and service, including utility and transportation service, and perform and complete in an efficient and workmanlike manner all work required for the _____ in strict accordance with the Contract Documents.

ARTICLE 2. Contract Price. NHPA will pay _____ up to the amount stated above for the performance of the Contract in current funds for the total quantities of work performed at the unit prices or lump sum prices stipulated in the bid for the several respective items of work completed and in-place, subject to additions and deductions as provided in the Contract Documents.

ARTICLE 3. Contract. The executed Contract Documents shall consist of the following, when and as applicable:

- a. This Agreement
- b. Addenda
- c. Special Notice to Proposers for Community Subcontracting Opportunities
- d. Invitation for Proposers
- e. Instructions to Proposers
- f. Proposal Forms
- g. General Conditions
- h. NHPA Community Subcontractor Utilization Program
- i. Special Conditions
- j. Technical Specifications
- k. Drawings
- l. Notice of Award
- m. City of New Haven Commission on Equal Opportunities Certificate of Compliance
- n. Insurance Certificates and Bonds
- o. Trade Contract Attachment
- p. Notice to Proceed

THIS AGREEMENT, together with other documents enumerated in this ARTICLE 3, which said other documents are as fully a part of the Contract as if thereto attached or herein repeated from the Contract between the parties hereto.

IN WITNESS WHEREOF, the parties hereto have caused this Agreement to be duly executed as of the day and year first above written.

ATTEST:

NEW HAVEN PARKING AUTHORITY

By: _____

Its Chairman
(Duly Authorized)

ATTEST:

BY: _____

Its _____
(Duly Authorized)

RELEASE AND AGREEMENT TO HOLD HARMLESS

TO ALL PEOPLE TO WHOM THESE PRESENTS SHALL COME, GREETING:

KNOW YE, that _____
a Corporation organized and existing under the Laws of the State
of _____, having a principal place of business in the
Town of _____, County of _____,
and State of _____, hereinafter referred to as the
"Releasor", for and in the consideration of _____

received to its full satisfaction from the New Haven Parking Authority, hereinafter referred to as the "Releasee":

Does Hereby By These Presents for itself, its successors and assigns, its subcontractors, employees, consultants, suppliers, materialmen, agents and their respective successors and assigns, remise, release and forever discharge said Releasee, its successors and assigns, of any and all actions, suits, debts, dues, sums of money, accounts, reckonings, bonds, bills, specialties, covenants, contracts, controversies, agreements, promises, variances, trespasses, mechanics' lien rights, damages, judgments, extents, executions, claims and demands whatsoever in law or in equity which it has or ought to have or which it ever had or ought to have had, known or unknown, discovered or undiscovered, by reason or any matter, cause or thing whatsoever against said Releasee arising out of or in any connection with or relating to a certain contract entitled:

Project # _____, Contract # _____
between it and said Releasee;

And Does Hereby Agree to hold Releasee harmless from any and all claims and demands of whatever type made or instituted by its subcontractors, employees, consultants, suppliers, materialmen, agents, and their respective successors and assigns, with respect to said contract or work performed pursuant thereto.

WITNESSED _____ Name of Firm: _____

WITNESSED _____ By: _____
Its _____
Duly Authorized _____

STATE OF) _____, A.D., _____
COUNTY OF) ss. _____

Personally appeared _____, who is _____ of said Corporation, signer and sealer of the foregoing instrument, and acknowledged the same to be his/her free act and deed on behalf of said Corporation, before me.

NOTARY PUBLIC
Commissioner of the Superior Court
My Commission Expires:

TRADE CONTRACT ATTACHMENT

New Haven Parking Authority ("Owner") and _____ ("Trade Contractor")
further agree as follows:

The Trade Contractor acknowledges and agrees (i) that the role of Turner Construction Company ("Program Manager") is to function solely on behalf of and for the benefit of the Owner, (ii) that the Trade Contractor waives all claims, whether in contract, tort or otherwise, that it may now or hereafter have against the Program Manager, (iii) that the Program Manager shall be an additional insured on the insurance policies of the Trade Contractor and that all such policies shall contain a waiver of subrogation in favor of the Program Manager and (iv) that the Trade Contractor shall defend, indemnify and hold harmless Owner and Program Manager from any and all claims, demands, and suits (including, but not limited to suits for bodily injury and property damage) in any way arising out of or related to their respective contracts or alleged failure of Trade Contractor to perform its responsibilities or obligations.

The Trade Contractor further acknowledges that it must, at its own expense; work cooperatively with all other Trade Contractors on site to coordinate its work with the work of such Trade Contractors, including modifying its schedule and activities. To further such coordination it must, when requested by the Program Manager, submit to the Program Manager, a current updated copy of its detailed schedule to demonstrate the status of such coordination and, if the Program Manager deems it necessary, to modify its schedules and operations as and in the manner required by the Program Manager and to execute its work in the manner shown on the revised schedule. It is agreed that any such modifications required by the Program Manager or any resulting work shall not result in any claims against the Program Manager or the Owner and all such claims are waived. While the Program Manager may have the right to take such action, in no respect shall the Owner or the Program Manager be obligated to do so.

(Print Name)

(Signature)

Trade Contractor Acknowledgement

**COMMUNITY SUBCONTRACTOR UTILIZATION PROGRAM
MONTHLY PAYMENT STATUS REPORT**

Month/Year Ending _____

General Contractor/Prime Contractor Name: _____

NHPA Project Number: _____

NHPA Contract Number: _____

Project Name: _____

Notice to Proceed Contract Start Date: _____

Original Contract Amount: _____

Current Contract Amount with Approved Changed Orders: _____

Percent Contract Amount Completed to Date: _____

Listing of company name, their contract amount, and payment information for all DAS-Certified Small (SBE) and Minority Business Enterprises (including Minority owned Business Enterprises (MBE), Women owned Business Enterprises (WBE), and/or Disabled owned Business Enterprises (DisBE)), and the use of businesses having a place of business within the City of New Haven (NHB) to comply with NHPA's Community Subcontractor Utilization Program provisions:

Company Name*	*Identify as SBE, MBE,WBE, DisBE or NHB	Contract Amount	Total Payment To Date	Total Due Per This Month's Invoice

Signature of Company Official: _____

Printed Name and Title of Signatory: _____

Date of Report: _____:

Attach additional sheets as needed.

Submit updated report with each pay requisition

GENERAL CONDITIONS

GENERAL CONDITIONS

PART I

101. DEFINITIONS

Whenever used in any of the Contract Documents, the following meanings shall be given to the terms herein defined:

a. The terms "Contract" and "Contract Documents" mean that group of documents which embody the agreement between the Authority and the Contractor for the construction and installation of the improvements specified therein, and shall include the following: Executed Agreement, Addenda (if any), Invitation for Bids, Instructions to Bidders, Signed Copy of Bid, General Conditions, Special Conditions, Technical Specifications and Drawings (as listed in the Schedule of Drawings).

b. The term "Authority" or "Owner" refers to the New Haven Parking Authority.

c. The term "City" means the City of New Haven, Connecticut.

d. The term "State" means the State of Connecticut.

e. The term "Contractor" means the person, firm or corporation entering into the Contract with the Authority to construct and install the improvements embodied in the Contract.

f. The term "Project Area" means the physical area ("contract limits") in which the improvements contemplated by the Contract are to be installed or constructed.

g. The term "Engineer" means the Authority's Director of Planning & Engineering or Engineer in charge serving the Authority with architectural or engineering services, his successor, or any other person or persons, employed by the Authority for the purpose of directing or having charge of the improvements embodied in this Contract, the said Engineer acting directly or indirectly through any Assistant Engineer having general charge of the work or through any assistant having immediate charge of a portion thereof limited by the particular duties entrusted to him.

h. The term "Technical Specifications" or "Specifications" means that part of the Contract Documents which describes, outlines and specifies the qualities, quantities, technical characteristics, data and standards of the materials to be furnished, the workmanship required, and the methods to be used in carrying out the construction and installation of the improvements contemplated by this Contract.

i. The term "Addendum" or "Addenda" means any changes, revisions or clarifications of the Contract Documents which have been duly issued to prospective bidders prior to time of receiving bids.

102. COMMUNICATIONS

All notices, demands, requests, instructions, approvals, proposals, and claims must be in writing.

Any notice to or demand upon the Contractor shall be sufficiently given if delivered at the office of the Contractor stated on the signature page of the Agreement or if delivered to the field office of the Contractor or at such other office as the Contractor may from time to time designate in writing to the Authority, or if deposited in the United States mail in a sealed, postage-prepaid envelope, or delivered with charges prepaid to any telegraph company for transmission, or if transmitted via telefax, in each case addressed to either of such offices.

All papers required to be delivered to the Authority shall, unless otherwise specified in writing, be delivered to the Main Office of the New Haven Parking Authority, 50 Union Avenue, Union Station, New Haven, CT 06519-1752. Any notice to or demand upon the Authority shall be sufficiently given if so delivered, or if deposited in the United States mail in a sealed, postage-prepaid envelope, or if transmitted to said Authority at such address with charges prepaid by any telegraph company, or if transmitted via telefax, or if delivered by any of the foregoing means to such other representatives of the Authority or to such other addresses as the Authority may subsequently specify in writing to the Contractor for such purpose.

Notice to either party shall be deemed to have been given as of the time of actual delivery or in the case of mailing when the same should have been received in due course of post, or in the case of telegrams or telefax transmittals, at the time of actual receipt as the case may be.

103. RESPONSIBILITIES OF CONTRACTOR

Except as otherwise specifically stated in the Contract Documents, the Contractor shall provide and pay for all materials, labor, tools, equipment, water, light, heat, power, transportation, superintendence, temporary construction of every nature, charges, levies, fees or other expenses and all other services and facilities of every nature whatsoever necessary for the performance of the Contract and to deliver all improvements embraced in this Contract complete in every respect within the specified time.

Where the work is located in a public street or highway, the Contractor must apply for and obtain such permit or permits as

may be necessary. The Contractor must provide such security or insurance as may reasonably be required incidental to and as a prerequisite to such permit or permits. He shall bear all expense for and incidental to securing the permit or permits and complying with the terms and requirements thereof.

The Contractor shall arrange his operations and the spaces occupied by him so as to safely provide pedestrian and vehicular access in or to the Project Area as may be necessary when required to maintain such traffic, and to safely provide access to properties along the street, particularly driveways, access to fire hydrants, manholes, gate boxes and other utilities. If for any reason it is not expedient to backfill an excavation, the Contractor shall construct and maintain suitable bridges to carry pedestrians and traffic in or to the street, driveway or property in question as directed by the Engineer. The Contractor shall confine his occupancy of public or travelled ways to the smallest spaces compatible with the efficient performance or construction of the work contemplated by this Contract, and more particularly to such limits as are set by the Contract Documents.

104. OTHER CONTRACTS

The Authority may award, or may have awarded, other contracts for additional work, and the Contractor shall cooperate fully with such other contractors, by scheduling his own work with that to be performed under other contracts as may be directed by the Engineer. The Contractor shall not commit or permit any act which will interfere with the performance of work by any other contractor as scheduled, but shall act as necessary to insure the orderly, proper and economical construction of the whole project or group of projects.

In case of conflict between contractors, the Engineer will determine the location where work shall commence. Such determination shall have no effect on the contract costs and will not be considered as the basis for a claim for additional compensation.

The work under this Contract shall be coordinated with any other work which may be under construction or contemplated in the same general area. In order that the work under this Contract may conform to the conditions under which it has been undertaken, the Engineer will determine the location where the work will commence. Such determination shall have no effect on the contract cost and will not be considered as the basis for a claim for additional compensations.

105. MUTUAL RESPONSIBILITY OF CONTRACTORS

If, through acts of neglect on the part of the Contractor, any other contractor or any subcontractor shall suffer loss or damage on the work, the Contractor shall settle with such other

contractor or subcontractor by agreement or arbitration, if such other contractor or subcontractor will so settle. If such other contractor or subcontractor shall assert any claim against the Authority on account of any damage alleged to have been so sustained, the Authority will notify this Contractor, who shall defend at his own expense any suit based upon such claim and, if any judgment or claims against the Authority shall be allowed, the Contractor shall pay or satisfy such judgment or claim and pay all costs and expenses in connection therewith.

106. SUPERINTENDENCE BY CONTRACTOR

a. Except where the Contractor is an individual and gives his personal superintendence to the work, the Contractor shall have a competent superintendent, satisfactory to the Authority and the Engineer, on the work at all times during working hours with full authority to act for him. The Contractor shall also provide an adequate staff for the proper coordination and expediting of this work.

b. The Contractor shall lay out his own work unless otherwise provided, and he shall be responsible for all work executed by him under the Contract. He shall verify all figures and elevations before proceeding with the work and will be held responsible for any error resulting from this failure to do so.

107. SUBCONTRACTS

a. The Contractor shall not execute an agreement with any subcontractor or permit any subcontractor to perform any work included in this Contract until he has submitted a non-collusion affidavit from the subcontractor in substantially the form shown below and has received written approval of such subcontractor from the Authority. He shall submit a written statement concerning such information as the Authority may require concerning the experience, ability and responsibility of the proposed subcontractor and the scope of the subcontract.

NON-COLLUSION AFFIDAVIT OF SUBCONTRACTOR

State of _____)
County of _____) ss.

_____, being first duly sworn, deposes and says that:

1. He is (owner, partner, officer, representative, or agent) of _____ hereinafter referred to as the "Subcontractor";

2. He is fully informed respecting the preparation and contents of the Subcontractor's Proposal submitted by the

Subcontractor to _____, the
Contractor for certain work in connection with the
_____ Contract pertaining to the
_____ Project in New Haven,
Connecticut;

3. Such Subcontractor's Proposal is genuine and is not a collusive or sham proposal;

4. Neither the Subcontractor nor any of its officers, partners, owners, agents, representatives, employees or parties in interest, including this affiant, has in any way colluded, conspired, connived, or agreed, directly or indirectly, with any other bidder, firm or person to submit a collusive or sham proposal in connection with such Contract or to refrain from submitting a proposal in connection with such Contract, or has in any manner, directly or indirectly, sought by unlawful agreement or connivance with any other bidder, firm, or person to fix the price or prices in said Subcontractor's proposal, or to fix any overhead, profit or cost element of the price or prices in said Subcontractor's proposal, or to secure through collusion, conspiracy, connivance or unlawful agreement any advantage against the Authority or any person interested in the proposed Contract; and

(5) The price or prices quoted in the Subcontractor's proposal are fair and proper and are not tainted by any collusion, conspiracy, connivance or unlawful agreement on the part of the Subcontractor or any of its agents, representatives, owners, employees, or parties in interest including this affiant.

(Signed) _____

Title

Subscribed and sworn to before me this _____ day of _____,
19____

TITLE

My commission expires _____, 19____

b. No proposed subcontractor shall be disapproved by the Authority except for cause. Subcontractors shall not be changed during the course of work without prior approval of the Engineer.

c. The Contractor shall be fully responsible to the Authority for the acts and omissions of his subcontractors, and of persons either directly or indirectly employed by them, as he is for the acts and omissions of persons directly employed by him.

d. The Contractor shall cause appropriate provisions to be inserted in all subcontracts relative to the work to require compliance by each subcontractor with the applicable provisions of the Contract. In addition, the Contractor shall insert in each subcontract a provision whereby subcontractor consents to the Contractor's assignment of the subcontract to the Authority pursuant to subparagraph (g) below.

e. Nothing contained in this Contract shall create any contractual relationship between any subcontractor and the Authority.

f. All subcontractors shall pay their employees engaged in the work herein specified in accordance with the schedule of prevailing wages as set forth in the Contract Documents.

g. Each subcontract agreement for a portion of the work is hereby assigned by Contractor to the Authority provided that:

(i) the assignment is only effective upon termination of this Contract by the Authority for cause and only for those subcontract agreements which the Authority accepts by notifying the subcontractor in writing; and

(ii) the assignment is subject to any prior rights of the Contractor's surety, if any, obligated under bonds relating to the Contract.

108. FITTING AND COORDINATION OF THE WORK

The Contractor shall be responsible for the proper fitting of all work and for the coordination of the operations of all trades, subcontractors, or material men engaged upon this Contract. He shall be prepared to guarantee to each of his subcontractors the locations and measurements which they may require for the fitting of their work to all surrounding work.

109. PERMITS AND CODES

a. The Contractor shall give all notices required by, and comply with, all applicable laws, ordinances and codes of the Authority, the City of New Haven, the State of Connecticut and the Federal Government. All construction work and/or utility installations shall comply with all applicable ordinances and codes, including any terms and conditions imposed by any written waivers. Before installing any work, the Contractor shall examine the Drawings and Technical Specifications for compliance with applicable ordinances and codes, and shall immediately report any discrepancy to the Authority. Where the requirements of the Drawings and Technical Specifications fail to comply with such applicable ordinances or codes, the Authority will adjust the Contract by Change Order to conform to such ordinances or

codes (unless waivers in writing covering the difference have been granted by the governing body or department) and make appropriate adjustment in the Contract Price.

Should the Contractor fail to observe the foregoing provisions and proceed with the construction work and/or installation of any utility at variance with any applicable ordinance or code, including any written waivers (notwithstanding the fact that such methods are in compliance with the Drawings and Technical Specifications), the Contractor shall correct the methods of doing such work without cost to the Authority, but a change order will be issued to cover only the excess cost the Contractor would have been entitled to receive if the change had been made before the Contractor commenced work on the items involved.

b. The Contractor shall, at his own expense, secure and pay to the appropriate department of the City of New Haven or State of Connecticut the fees or charges for all permits for street pavements, sidewalks, sheds, removal of abandoned water taps, sealing of house connection drains, pavement cuts, building, electrical, elevator, plumbing, water, gas, sewer and/or any other permits required by the regulatory body of any of its agencies. The Contractor's attention is called to the fact that the City Engineer's Office has a list of all state maintained streets which is readily available to the Contractor for inspection.

c. The Contractor shall comply with applicable local laws and ordinances governing the disposal of surplus excavation, materials, debris and rubbish on or off the Project Area and shall commit no trespass on any public or private property in any operation due to or connected with the improvements embraced in this Contract.

110. WAGES

a. State of Connecticut Requirement

The wages paid on an hourly basis to any mechanic, laborer, or workman employed upon the work herein contracted to be done, and the amount of payment or contribution paid or payable on behalf of each such employee to an employee's welfare fund, as defined in Section 31-78 of the General Statutes of Connecticut shall be at a rate equal to the rate customary or prevailing for the same work in the same trade or occupation in the town in which such public works project is being constructed. Any contractor who is not obligated by agreement to make payment or contribution on behalf of such employee to any such employee's welfare fund shall pay to each employee as part of his wages the amount of payment or contribution for his classification on each pay day.

b. City of New Haven Requirement (Section 82 of City Charter)

In all contracts for the construction, repairing, or remodeling of public buildings or public works of any kind by the City of New Haven or any of its divisions, the wages paid any mechanic, laborer, or workman employed under the contract shall be at the rate of wages for the same type of work in the same trade or occupation prevailing in the City of New Haven, based upon the wage schedule and rates therein set by the United States Department of Labor for the New Haven area.

c. State Wage Standards

The wage determinations governing the work to be performed under this Contract are set forth elsewhere in the Contract Documents. Nothing herein contained shall be construed to permit the payment of wages or salaries below the rates required by any other provision of this Contract.

111. INSURANCE

a. The Contractor shall carry or require that there be carried Worker's Compensation Insurance for all his employees and those of his subcontractors engaged in work at the site, in accordance with State Worker's Compensation Law and shall certify that it and its subcontractors are not in arrears to the State of Connecticut Second Injury Fund.

b. The Contractor shall carry or require that there be carried Manufacturer's and Contractor's Public Liability Insurance with limits of \$2,000,000 to protect the contractor and his subcontractors against claims for injury to or death of one, or more than one, person because of accidents which may occur as a result of operations under the Contract; such insurance shall cover the use of all equipment including, but not limited to, excavating machinery, demolition machinery, trenching machines, cranes, hoists, rollers, concrete mixers, motor vehicles, etc. in the construction of the improvements embraced in this Contract.

c. The Contractor shall carry, during the life of the Contract, Property Damage Insurance in an amount of not less than \$1,000,000 to protect him and his subcontractors from claims for property damage which might arise from operations under the Contract.

d. The Contractor shall carry, and require that his subcontractors carry, Automotive Insurance, covering all motor vehicles used on the work with limits of \$1,000,000 personal injury liability and property damage liability, to protect against claims which might arise from the operations of this Contract.

e. Prior to commencement of the work contemplated by the Contract Documents, the Contractor shall provide certificates of insurance showing coverage by an insurance carrier authorized by the State of Connecticut to write insurance in the State. The certificates shall show the Authority as an additional named insured. Said Certificate should contain the following endorsements:

1. This insurance policy is intended to and shall indemnify and save harmless the New Haven Parking Authority, their employees, officers and agents from any and all claims, suits, actions, demands, fines, fees, judgments, damages and costs arising out of or in any way connected with any activities or the performance of any obligations under this Contract by the Contractor or any subcontractor or their agents or employees.

2. The Contractor and insurance company waive governmental immunity in the adjustment of claims or the defense of any suit, action or claim brought against the New Haven Parking Authority.

3. An endorsement of the work description, contract name, number and location;

4. An endorsement that the insurance company will give at least thirty (30) days written notice to the Authority prior to any modification or cancellation of any such insurance coverage; and

5. An endorsement that the Contractor will be responsible for the payment of all insurance premiums and/or charges.

f. At the discretion of the Authority, the Contractor may be asked to submit copies of his Worker's Compensation and Manufacturer's and Contractor's Public Liability, Property Damage, Automobile, Fire and Extended Coverage, if applicable, insurance policies to the Authority for review and approval. The Authority may, in writing, notify the Contractor of any disapproval of any such policies, and satisfactory policies shall be provided in place of those disapproved. The Contractor shall submit an insurance certificate in addition to a copy of each policy. The Contractor shall require its subcontractors to obtain policies of similar insurance before each commences work. All such insurance shall be carried with financially responsible insurance companies, licensed in the State and approved by the Authority and shall be kept in force until the Contractor's work is accepted by the Authority. Contracts of insurance, covering all operations under this contract, which expire before the Contractor's work is accepted by the Authority shall be renewed and submitted to the Authority for its approval.

112. PATENTS

The Contractor shall pay all royalties and license fees associated with the manufacture or use of proprietary items subject to such fees. He shall hold and save the Authority, its officers and employees, harmless from liability of any nature of kind, including, but not limited to, costs and expenses arising out of the use of any patented or unpatented invention, process, article, or appliance manufactured or used in the performance of the Contract, including its use by the Authority, unless otherwise specifically stipulated in the Technical Specifications.

113. WARRANTY OF TITLE

Materials, supplies, or equipment purchased for the work shall not be subject to any chattel mortgage or under a conditional sale or other agreement by which an interest therein or in any part thereof is retained by the seller, supplier or any other person excepting only the Contractor. The Contractor shall warrant good title to all materials, supplies and equipment installed or incorporated in the work and upon completion of all work, shall deliver the same together with all improvements and appurtenances constructed or placed thereon by him to the Authority free from any claims, liens, or charges. Neither the Contractor nor any person, firm or corporation furnishing any material or labor for any work covered by this Contract shall have any right to a lien upon any improvement or appurtenance thereon. Nothing contained in this paragraph, however, shall defeat or impair the right of persons furnishing materials or protection or any rights under any law permitting such persons to look to funds due the Contractor in the hands of the Authority. The provisions of this paragraph shall be inserted in all subcontracts and material contracts and notice of its provisions shall be given to all persons furnishing material for the work when no formal contract is entered into for such materials.

114. ASSIGNMENT OR NOVATION

The Contractor shall not assign or transfer, whether by an assignment or novation, any of its rights, duties, benefits, obligations, liabilities or responsibilities under this Contract without the written consent of the Authority, provided, however, that assignment to banks, trust companies, or other financial institutions may be made without the consent of the Authority. No assignment or novation of this Contract shall be valid unless the assignment or novation expressly provides that the assignment of any of the Contractor's rights or benefits under the Contract is subject to a prior lien for services rendered and materials, tools and equipment supplied for the performance of the work under this Contract in favor of all persons, firms or corporations rendering such labor or services or supplying such materials, tools or equipment.

115. PROGRESS SCHEDULE

The Contractor shall submit for approval immediately after execution of the Agreement, a carefully prepared Progress Schedule, which Progress Schedule shall update and supplant any preliminary schedules provided as part of the bid process, if applicable, showing the proposed dates of starting and completing each of the various sections of the work, the anticipated monthly payments to become due the Contractor, and the accumulated percent of progress each month.

116. PROGRESS OF WORK

In general, work shall be continued and prosecuted throughout the term of the Contract, including the winter season. The Contractor will be expected to keep work going whenever possible. The Engineer will determine when conditions are unfavorable for work, or for any portion thereof, and may order that the work be suspended on any part of all portions of the Contract whenever, in his opinion, the conditions are not such as will insure first-class work.

117. CONSTRUCTION EQUIPMENT

Prior to the start of work, the Contractor shall submit to the Engineer, for his approval, a "Schedule of Equipment" stating the type and number of pieces of equipment to be used on the job. All equipment to be used in the City streets and in the Authority's garages and paved surface lots shall be equipped with rubber tires. The use of equipment without rubber tires shall be by written approval and under the direction of the Engineer.

118. ACCESS TO PROJECT AREA

The terms "land", "private land", "property", "private road", "driveway", etc. as used in these Specifications, shall be interpreted to include not only the property or properties of any private individual or corporation, but also the property of a public utility or of any other public body not used as and legally established as a public street or highway. The provisions of this section shall apply to operations within the sites of any public building or institution, and similar location.

The Contractor should make inquiry and ascertain the limits, conditions, etc. of rights-of-way, access, etc., possessed by the Authority and available for use by the Contractor. Certain essential facts as to such rights may be indicated on plans or elsewhere in the Contract Documents. In some cases, the indications in the Contract Documents may restrict the Contractor more closely than the full extent of the right possessed by the Authority, in which case such indicated

restrictions shall govern the operations of and occupancies by the Contractor. The Contractor and those operating under him must know and conform to the limits of the spaces which he may occupy at the site of the work, the means of access thereto, and the conditions under which he may occupy or use such rights.

If the Contractor, by direct negotiation and bargain with any land owner, lessee or tenant, has secured for himself any right to use more space or greater privileges than the space provided by the Authority, for purposes incidental to the performance of the Contract, he shall upon request of the Engineer, furnish to the Engineer proper evidence that such additional rights have been properly secured and assurance that no damage to or claim upon the Authority will arise therefrom. The Authority shall not be liable in any way for any expense incurred by the Contractor in securing any such right to use additional property.

The Contractor shall be responsible for and reimburse the Authority for any and all losses, damage or expense which the Authority or others may suffer, either directly or indirectly or through any claims of any person or party, for any trespass outside the spaces and rights-of-way provided by the Authority to the Contractor or any violation or disregard of the terms and conditions established for the use or occupancy of those rights or for negligence in the exercise of those rights. The Authority may retain or deduct from any sum or sums due or to become due to the Contractor such amount or amounts as may be proper to insure the Authority against loss or expense by reason of the failure of the Contractor to observe the limits and conditions of the rights-of-way, rights-of-access, etc., provided by the Authority.

The Contractor shall request the Engineer to give proper notice to the owners and tenants of land traversed by the right-of-way or access ways to be used or occupied by the Contractor prior to any entry or re-entry into such rights-of-way, etc., or shall cause proper notice to be given to said owners and/or tenants. The Contractor shall thereafter wait a sufficient time to permit the delivery of such notice or notices, and also to allow time in which the owners or tenants may make necessary adjustments to avoid undue loss or inconvenience by the interference with their ordinary use of occupancy caused by the acts of the Contractor.

The Contractor shall take proper means to identify his employees, etc., when operating within private or restricted lands. He shall not permit his employees, subcontractors, suppliers, etc., to trespass outside the limits of the spaces provided for him, to unnecessarily interfere with or to annoy or to commit any nuisance or scatter rubbish thereon, or to loiter therein when their presence is not essential to the work then underway. He shall not permit others attracted to the site of

his work by his operations to loiter in the vicinity of his work or to enter or damage private property, within or without and near the rights-of-way provided by the Authority, or to annoy the regular occupants or owners of such property.

If access is provided by means of any private road or driveway or through private roads, the Contractor shall permit the regular owners or users thereof to use the same so far as it is consistent with the construction of the work. If any existing driveway or road is damaged by use thereof, the Contractor shall at once restore it to as good condition as it would have been in had he not used it. The Contractor and those under him using any private road or driveway must assume to use that road or driveway on an "as is" basis and use it at their own risk. Neither the Authority nor the land owner shall be liable for damage to persons or property of the Contractor's forces arising from any defect in such road or driveway, except as such defect may be the consequence of negligence of the Authority or the land owner before the award of the Contract or after completion of the work called for by the Contract. The liability of any party may be limited by the terms of the right-of-way or right-of-access document. The land owner and the Authority make no representation that the road or driveway surface, culverts, etc. are adequate to carry any specific load or weight. The Contractor may be held liable to the owner or regular users of the road and driveway for injury, damage or loss by reason of the negligence of the Contractor in the operation of vehicles thereon, or with respect to damage done to the road or driveway by his forces or by reason of failure to provide and maintain suitable warnings of dangers created by the operations of the Contractor.

Should it be necessary to open or remove portions of any hedge, gate, fence, or similar structure, such opening shall not be kept open at any time when it is not essential to the conduct of the work. Temporary gates shall be provided and such openings shall be closed except when opened for the passage of persons or vehicles. The openings shall be permanently restored and repaired when no longer needed for the performance of the Contract. Precautions shall be taken by the Contractor to prevent unauthorized persons from passing through such temporary openings or, having passed through such openings into otherwise enclosed lands, from causing damage therein.

119. USE OF PREMISES

a. The Contractor shall confine his equipment, storage of materials, and construction operations to the Project Area, shown on the Drawings and as prescribed by ordinances or permits, or as may be directed by the Authority, and shall not unreasonably encumber the site or public rights-of-way with his materials and construction equipment.

b. The Contractor shall comply with all reasonable instructions of the Engineer and the ordinances and codes of the Authority, the City of New Haven, the State of Connecticut and the Federal Government.

120. PUBLIC UTILITIES

The actual location of utilities shall be determined by the Contractor. The information shown on the Contract Plans is only for information and convenience of the Contractor and is in no way warranted to indicate the true conditions.

The Contractor's attention is particularly called to the requirements of the State of Connecticut's Public Act No. 77-350 "An Act Concerning Excavations Near Underground Utility Facilities" (Call Before You Dig), which must be strictly followed.

The Contractor shall inquire of the utility companies as to their mains, conduits, services and service materials in and adjacent to the area under construction. The costs for such locations and any costs for connections or disconnections shall be paid by the Contractor unless otherwise specified.

The Contractor shall, without expense to the Authority and to the satisfaction of the Engineer, do everything necessary to support, protect and maintain all pipes, conduits, sewers, drains, wires, poles or fixtures of all kinds in line of the work or adjacent thereto, and all fences, buildings, or other structures which might be damaged by the work herein contemplated. The Contractor shall give at least twenty-four (24) hours notice before breaking ground, to the owners of the structures, pipes or wire conduits that may be affected by his operations and shall not cause any hindrance to or interference with any such owners or their agents in protecting or repairing their property should they wish to do so, but will suffer them to take all such measures as they may deem necessary for said purposes. The Contractor shall protect water pipes from freezing during cold weather.

The Engineer may require the Contractor to take proper steps to protect the main lines of public utilities in the immediate vicinity of the work when endangered by the operations of the Contractor and, if the Contractor fails to take adequate provisions to protect such lines or structures, the Engineer may employ others to perform protective work, as may be reasonably needed, at the Contractor's expense.

121. TECHNICAL SPECIFICATIONS AND DRAWINGS

Anything mentioned in the Technical Specifications and not shown on the Drawings or shown on the Drawings and not mentioned in the Technical Specifications, shall be of like effect as if

shown on or mentioned in both. In case of any discrepancy in Drawings or Technical Specifications, the matter shall be immediately submitted to the Authority, without whose decision said discrepancy shall not be adjusted by the Contractor, save only at his own risk and expense.

Except for the Contractor's executed set, all Drawings and the Technical Specifications are and remain the property of the Authority. Such Drawings and Technical Specifications are not to be used on other work, and those sets in usable condition shall be returned to the Authority, upon request, at the completion or cessation of the work or termination of the Contract.

122. CONTRACT DOCUMENTS AND DRAWINGS

The Authority will furnish the Contractor, without charge, six (6) copies of the Contract Documents, including Technical Specifications and Drawings. Additional copies requested by the Contractor will be furnished at cost.

The Contractor shall, at all times, keep at the site of the work two (2) complete sets of the Contract Drawings and Specifications, also of all further drawings or instructions issued covering the work under the Contract for his own use and that of the Engineer or his authorized representatives. All changes as they occur are to be recorded immediately thereon.

As part of his general supervision, the Contractor shall carefully study and compare all drawings, specifications and other instructions given to him and shall report to the Engineer for clarification of any errors, omissions or discrepancies in or between such documents.

123. SHOP DRAWINGS

a. All required shop drawings, machinery details, layout drawings, etc., shall be submitted to the Engineer in triplicate (one of which shall be a reproducible set, i.e., sepia or vellum) for his approval sufficiently in advance of requirements to afford ample time for checking, including time for correcting, resubmitting and rechecking, if necessary. The Contractor may proceed, only at his own risk, with manufacture or installation of any equipment or work covered by said shop drawings, etc., until they are approved and no claim, by the Contractor, for extension of the Contract time will be granted by reason of his failure in this respect.

b. Any drawings submitted without the Contractor's stamp of approval will not be considered and will be returned to him for proper resubmission. If any drawings show variations from the requirements of the Contract because of standard shop practice or other reason, the Contractor shall make specific

mention of such variation in his letter of transmittal in order that, if acceptable, suitable action may be taken for proper adjustment, if any, of Contract Price and/or time, otherwise the Contractor will not be relieved of the responsibility for executing the work in accordance with the Contract even though the drawings have been approved.

c. If a shop drawing is in accordance with the Contract or involves only a minor adjustment in the interest of the Authority, not involving a change in Contract Price or time, the Engineer may approve the drawing. The approval shall be general, shall not relieve the Contractor from his responsibility for adherence to the Contract for any error in the drawing and shall contain in substance the following:

"The modification shown on the attached drawing is approved in the interest of the New Haven Parking Authority to effect an improvement for the Project and is ordered with the understanding that it does not involve any change in the Contract Price or time; that is subject generally to all Contract Stipulations and covenants; and that it is without prejudice to any and all rights of the New Haven Parking Authority under the Contract and surety bond or bonds."

d. The Contractor shall furnish as many copies of approved shop drawings as are necessary for proper coordination of the drawings at the site at all times.

124. REQUESTS FOR SUPPLEMENTARY INFORMATION

It shall be the responsibility of the Contractor to make timely requests of the Authority for any additional information not already in his possession, which should be furnished by the Authority under the terms of this Contract, and which he will require in the planning and execution of the work. Such requests may be submitted in writing from time to time as the need is approached, but each shall be filed in ample time to permit appropriate action to be taken by all parties involved so as to avoid delay. Each request shall be in writing, and list the various items and the latest date by which each will be required by the Contractor. The first list shall be submitted within two weeks after Contract award and shall be as complete as possible at the time. The Contractor shall, if requested, furnish promptly any assistance and information the Engineer may require in responding to these requests of the Contractor. The Contractor shall be fully responsible for any delay in his work or to others arising from his failure to comply fully with the provisions of this Section.

125. INSPECTION

a. All materials and workmanship will be subject to inspection, examination, or test by the Authority and the

Engineer at any and all times during manufacture of construction and at any and all places where such manufacture or construction is carried on. The Engineer shall have the right to reject defective material and workmanship or require its correction. Unacceptable workmanship shall be satisfactorily corrected. Rejected material shall be promptly segregated and removed from the Project Area and replaced with material of specified quality without charge therefor. If the Contractor fails to proceed at once with the correction of rejected workmanship or defective material, the Authority may by contract or otherwise, have the defects remedied or rejected materials removed from the Project Area and charge the cost of the same against any moneys which may be due the Contractor, without prejudice to any other rights or remedies of the Authority.

b. The Contractor shall furnish promptly all materials reasonably necessary for any test which may be required. (See Section 128 - SAMPLES, CERTIFICATES AND TESTS, under GENERAL CONDITIONS.) All tests by the Authority will be performed in such manner as not to delay the work unnecessarily and shall be made as described in the Technical Specifications.

c. The Contractor shall notify the Engineer sufficiently in advance of backfilling or concealing any facilities to permit proper inspection. If any facilities are concealed without approval or consent of the Engineer, the Contractor shall uncover for inspection and recover such facilities all at his own expense when so requested by the Engineer.

Should it be considered necessary or advisable by the Engineer at any time before final acceptance of the entire work to make an examination of work already completed and inspected, by uncovering the same, the Contractor shall on request promptly furnish all necessary facilities, labor and materials to uncover the work. If such work is found to be defective in any important or essential respect, due to fault of the Contractor or his subcontractors, he shall defray all the expenses of such examination and of satisfactory reconstruction. If, however, such work is found to meet the requirements of the Contract, the actual cost of labor and material necessarily involved in the examination and replacement, plus 10 percent of such costs to cover superintendence, general expenses and profit, shall be allowed the Contractor and in addition he shall be granted a suitable extension of time on account of the additional work involved, if completion of the work of the entire contract has been delayed thereby.

d. Inspection of materials and appurtenances to be incorporated in the improvements embraced in this Contract may be made at the place of production, manufacture or shipment, whenever the quantity justifies it, and such inspection and acceptance, unless otherwise stated in the Technical

Specifications, shall be final, except as regards (1) latent defects, (2) departures from specific requirements of the Contract, (3) damage or loss in transit, or (4) fraud or such gross mistakes as amount to fraud. Subject to the requirements contained in the preceding sentence, the inspection of materials as a whole or in part will be made at the Project Area.

e. Neither inspection, testing, approval nor acceptance of the work in whole or in part by the Authority or its agents shall relieve the Contractor or his sureties of full responsibility for materials furnished or work performed not in strict accordance with the Contract.

126. REVIEW BY THE NEW HAVEN PARKING AUTHORITY

The Authority, its authorized representatives and agents shall, at all times, have access to and be permitted to observe and review all work, materials, equipment, payrolls, personnel records, employment conditions, material invoices, and other relevant data and records pertaining to this Contract, provided, however, that all instructions and approval with respect to the work will be given to the Contractor only by the Authority through its authorized representatives or agents.

127. MATERIALS AND WORKMANSHIP

a. Unless otherwise specifically provided for in the Technical Specifications, all workmanship, equipment, materials and articles to be incorporated in the work shall be new and the best grade of the respective kinds for the purpose. The Engineer shall decide whether such workmanship, equipment, material and articles to be incorporated in the work are new and the best grade of the respective kinds for the purpose. Where equipment, materials, articles or workmanship are referred to in the Technical Specifications as "equal to" any particular standard, the Engineer shall decide the question of equality.

b. The Contractor shall furnish to the Authority for approval the manufacturer's detailed specifications for all machinery, mechanical and other special equipment, which he contemplates installing together with full information as to type, performance characteristics, and all other pertinent information as required, and shall likewise submit for approval as required full information concerning all other materials or articles which he proposes to incorporate in the work. (See Section 128 - SAMPLES, CERTIFICATES AND TESTS under GENERAL CONDITIONS.) Machinery, mechanical and other equipment, materials, or articles installed or used without such prior approval shall be at the risk of subsequent rejection.

c. Materials specified by reference to the number or symbol of a specific standard, such as an A.S.T.M. Standard, a Federal Specification or other similar standard, shall comply

with requirements in the latest revision thereof and any amendment or supplement thereto in effect on the date of the Invitation of Bids, except as such specific standards are limited or modified in such reference in regard to type, class or grade. The standards referred to, except as modified in the Technical Specifications, shall have full force and effect as though printed therein.

d. In addition to the requirements of the Technical Specifications, prior to the start of work, the Contractor shall notify the Engineer in writing of his anticipated sources of all materials proposed to be incorporated into the work. The Contractor shall further notify the Engineer in writing of any change in his source of anticipated source of materials.

e. The Authority may require the Contractor to dismiss from the work such employees or employees as the Engineer may deem incompetent, careless, or insubordinate.

128. SAMPLES, CERTIFICATES AND TESTS

a. The Contractor shall submit all material or equipment samples, certificates, affidavits, etc., as called for in the Contract Documents or required by the Engineer, promptly after award of the Contract and acceptance of the Contractor's bond. No such material or equipment shall be manufactured or delivered to the site, except at the Contractor's own risk, until the required samples or certificates have been approved in writing by the Engineer. Any delay in the work caused by late or improper submission of samples or certificates for approval shall not be considered just cause for an extension of the contract time.

Each sample submitted by the Contractor shall carry a label giving the name of the Contractor, the project for which it is intended, and the name of the producer. The accompanying certificate or letter from the Contractor shall state that the sample complies with contract requirements, shall give the name and brand of the product, its place of origin, the name and address of the producer and all specifications or other detailed information which will assist the Engineer in passing upon the acceptability of the sample promptly. It shall also include the statement that all materials or equipment furnished for use in the project will comply with the samples and/or certified statements.

b. Approval of any materials shall be general and shall not constitute a waiver of the Authority's right to demand full compliance with Contract requirements. After actual deliveries, the Engineer may require the Contractor to make such check tests as he deems necessary and may reject materials and equipment and accessories for cause, even though such materials and articles have been given general approval. If materials, equipment or accessories which fail to meet check tests have been

incorporated in the work, the Engineer will have the right to cause their removal and replacement by proper materials or to demand and secure such reparation by the Contractor as is equitable. If the aforementioned materials, equipment or accessories are caused to be removed or replaced by the Engineer, the cost of such removal or replacement shall not be considered cause for a change in the Contract Price or for extension of the contract time.

c. Except as otherwise specifically stated in the Contract, no separate payment for the costs of sampling and testing will be made, and all costs should be included in the Contract Price.

129. CARE OF WORK

a. The Contractor shall be responsible for the proper and continuous care and protection of all materials delivered and work performed until completion and final acceptance, whether or not the same has been covered in whole or in part by payments made by the Authority. All damaged work and materials shall be immediately removed from the Project Area and replaced at the Contractor's expense.

b. The Contractor shall properly secure the Project Area, from the time the work is commenced until final completion and acceptance.

c. In an emergency affecting the safety of life or property, including adjoining property, the Contractor, without special instructions or authorization from the Authority, is authorized to act at his discretion to prevent such threatened loss or injury, and he shall so act. Any compensation claims by the Contractor on account of such emergency work will be determined by the Authority as provided in the Section 139-CHANGES IN THE WORK under GENERAL CONDITIONS.

d. The Contractor shall avoid damage as a result of his operations to existing sidewalks, streets, curbs, pavements, utilities, (except those which are to be replaced or removed), adjoining property, etc., and he shall, at his own expense completely repair any damage thereto caused by his operation.

e. The Contractor shall shore up, brace, underpin, secure, and protect as may be necessary, all foundations and other parts of existing structures adjacent to, adjoining, and in the vicinity of the site, which may be in any way affected by the excavations or other operations connected with construction of the Improvements embraced in this Contract. The Contractor shall be responsible for the giving of any and all required notices to any adjoining or adjacent property owner or other party before the commencement of any work. The Contractor shall indemnify and save harmless the Authority from any damages on account of

settlements or the loss of lateral support of adjoining property and from all loss or expense and all damages for which the Authority may become liable in consequence of such injury or damage to adjoining and adjacent structures and their premises.

130. PARTIAL USE OF SITE IMPROVEMENTS

The Engineer, at his election, may give notice to the Contractor and place in use those sections of the improvements which have been completed, inspected and can be accepted as complying with the Technical Specifications and if, in his opinion, each such section is reasonably safe, fit and convenient, for the use and accommodation for which it was intended, provided:

a. The use of such sections of the improvements shall in no way impede the completion of the remainder of the work by the Contractor.

b. The Contractor shall not be responsible for any damages or maintenance costs due directly to the use of such sections.

c. The use of such sections shall in no way relieve the Contractor of liability due to having used defective materials or to poor workmanship.

d. The period of guarantee stipulated in the Section 146-GENERAL GUARANTY under GENERAL CONDITIONS, shall not begin to run until the date of the final acceptance of all work which the Contractor is required to construct under this Contract.

131. FIRES

Burning shall not be permitted.

132. BLASTING AND EXPLOSIVES

When the use of explosives is necessary for the prosecution of the work, all requirements of local and state laws and regulations shall be complied with and all necessary permits and licenses obtained by the Contractor at his expense. Permits and licenses shall be shown to Engineer.

The Contractor will keep on the job only such quantities of explosives as may be needed for the work underway and only during such time or times as they are being used. Explosives shall be sorted in a secure manner in locked containers and separate from all tools. Caps and detonators shall be stored separately from explosives.

The Contractor shall notify each public utility company, having structures in proximity to the site of the work and others who may be affected, of his intention to use explosives and such

notice shall be given sufficiently in advance to enable the companies, the Contractor and others to take such steps as they may deem necessary to protect utilities and property from injury. Such notice shall not relieve the Contractor of responsibility for any damage resulting from his blasting operation.

Explosives shall be of such power, placed and used in such quantities and positions as will not make the excavation unduly large, nor shatter unnecessarily the rock mass structure, upon or against which structures are to be built.

The rock obstacle or mass structure must be covered sufficiently when blasts are fired to prevent damage or injury to persons or property or the scattering of broken fragments on the adjacent ground. Adequate warning shall be given all persons in the vicinity before any blast is discharged.

No separate payment shall be made for blasting.

133. DEWATERING

The Contractor shall provide all necessary pumps, dams, drains, ditches, flumes, well points and other means of excluding and removing water from trenches, tunnels and other parts of the work, and for preventing the slopes from sliding or caving. He shall satisfactorily remove all water which interferes with the work. The flow of all sewers, drains, house connections and water courses encountered shall be maintained and provided for by the Contractor without damage or nuisance to other parties. All connections shall be restored as ordered. Before any masonry is placed or sewer pipes are laid, suitable drains shall be provided as needed and maintained in order that the bottom may be free from water and sufficiently dry at all times. No masonry of any kind laid in cement mortar shall be placed in water. No water shall be allowed to flow over or rise up on fresh concrete and no drainage shall be allowed to enter the sewer until such time and under such conditions as the Engineer may direct. The Contractor shall provide and operate additional pumps or drains at any place where the Engineer shall deem them necessary.

Where, in the opinion of the Engineer, some form of underdrainage is necessary but conditions do not warrant the installation of tile or pipe underdrain, he may order a layer of broken stone of suitable size placed in the bottom of the trench below the sewer, to serve as a drain.

No direct payment shall be made for the work specified herein, but compensation for such work and all expenses incidental thereto shall be considered as having been included in the Contract Price for the work.

134. CONTROL POINTS, BENCH MARKS AND LAYOUT OF THE WORK

The Contractor shall be held responsible for the protecting and safe guarding of all control points and bench marks set. Any replacement or re-establishment of control points or bench marks shall be at the expense of the Contractor.

The Contractor shall lay out the work and determine and maintain all lines, levels and grades required for the proper execution of the work. As the work proceeds, he shall check every major element of work for line, level and plumb. The Contractor shall submit all data prior to the start of construction in accordance with the requirements of the Technical Specifications, "LAYOUT OF THE WORK", as applicable.

135. ACCIDENT PREVENTION

a. The Contractor shall exercise proper precaution at all times for the protection of persons and property and shall be responsible for all damages to persons or property, either on or off the site, which occur as a result of his prosecution of or his failure to prosecute the work. The safety provisions of applicable laws and building and construction codes shall be observed including but not limited to OSHA and the Contractor shall take or cause to be taken such additional safety and health measures as the Authority may determine to be reasonably necessary. Any costs arising out of the taking of such health or safety measures shall be borne by the Contractor. Machinery, equipment and all hazards shall be guarded in accordance with the safety provisions of the "Manual of Accident Prevention in Construction" published by the Associated General Contractors of America, Inc., to the extent that such provisions are not in conflict with applicable local laws.

b. The Contractor shall indemnify and save harmless the Authority, its employees, officers and agents from any claims for damages resulting from property damage, personal injury and/or death suffered or alleged to have been suffered by any person as a result of any work conducted under this Contract, and the Contractor shall defend at his own expense any action, suit, proceeding, or other claim brought against the Authority, its employees, officers and agents by any such person.

136. ACCIDENT PREVENTION AND REPORTS

The Contractor shall maintain an accurate record of all cases of death, occupational disease, and injury requiring medical attention or causing loss of time from work, arising out of and in the course of employment on work under the Contract. The Contractor shall promptly prepare all necessary reports and file same in accordance with applicable law and shall furnish a copy of same to the Authority.

137. SANITARY FACILITIES

When required, the Contractor shall furnish, install and maintain ample sanitary facilities for the workmen. As the needs arise, a sufficient number of enclosed temporary toilets shall be conveniently placed as required by the sanitary codes of the State of Connecticut and City of New Haven. Drinking water shall be provided from an approved source, so piped or transported as to keep it safe and fresh and served from single service containers or satisfactory types of sanitary drinking stands or fountains. All such facilities and services shall be furnished in strict accordance with existing and governing health regulations.

138. REMOVAL OF DEBRIS, CLEANING, ETC.

The Contractor shall, periodically or as directed during the progress of the work, remove and legally dispose of all surplus excavated material and debris, and keep the Project Area and public rights-of-way reasonably clear. Upon completion of the work, he shall remove all temporary construction facilities, debris and unused materials provided for the work, and put the whole site of the work and public rights-of-way in a neat and clean condition.

No separate payment will be made for this removal and clean-up, and all costs shall be included in the Contract Price.

139. CHANGES IN THE WORK

a. The Authority may make changes and alterations in the scope of the work required to be performed by the Contractor by making additions thereto or by omitting work therefrom, or by giving extensions of time for the performance of this Contract or by giving any other forbearance, without invalidating the Contract, and without relieving or releasing the Contractor from any of his obligations under the Contract or any guarantee given by him pursuant to the Contract provisions, and without affecting the validity of the guarantee bonds, and without relieving or releasing the surety or sureties of said bonds. Notice of any such change, alteration, extension or forbearance to the surety or sureties of said bonds shall not be required. All such work shall be executed under the terms of the original Contract unless it is expressly provided otherwise.

b. Except for the purpose of affording protection against any emergency endangering life or property, the Contractor shall make no change in the materials used or in the specified manner of constructing and/or installing the improvements or supply additional labor, services or materials beyond that actually required for the execution of the Contract, unless in receipt of a written order from the Authority authorizing the Contractor to proceed with the change. No claim for an adjustment of the Contract Price will be valid unless undertaken as aforesaid or so ordered.

c. The Authority shall, before ordering the Contractor to proceed with desired changes, request an itemized proposal (including a person-day analysis for labor, percentage on labor for payroll taxes, materials, delivery charges and other miscellaneous items) from him covering the work involved in the change, after which the procedure shall be as follows:

1. If the Proposal is acceptable, the Authority will prepare the change order in accordance therewith for acceptance by the Contractor; and

2. If the Proposal is not acceptable and prompt agreement between the two parties cannot be reached, the Authority may order the Contractor to proceed with the work on a cost-plus-limited basis which is defined as the net cost of the work plus an allowance to cover overhead and profit, as stipulated below, the total cost not to exceed a specified limit, i.e., the amount initially proposed by the Contractor. The following allowances for overhead and profit are hereby established as reasonable and shall apply.

(a) For all labor the Contractor shall receive the rate of wage actually paid as shown by his certified payroll, which shall be at least the minimum rate established by the Contract Documents. For all foremen in direct charge of the work the Contractor shall receive the actual wage paid the foremen, as shown on his certified payroll. No part of the salary or expense of anyone above the grade of foreman and having general supervision of the work, will be included in the labor item.

Fifteen percent (15%) of the extra cost of all labor furnished by the Contractor, net of the amounts paid for labor insurance and taxes as set forth in paragraph (b), below.

(b) For the cost of all insurance and taxes imposed by law on labor employed on the work, i.e., Workman's Compensation, FICA, FUT, SUT, etc., the Contractor shall receive a pro-rated share of the actual amount paid to account for the annual limit of such insurance and taxes. The cost of any other insurance or tax will not be considered as part of the cost of a change in the work.

(c) Fifteen percent (15%) of the net extra cost of all materials used by the Contractor, less any allowable cash discounts, delivered on the work, including delivery charges as shown by original receipted bills.

(d) Rental rates for any power operated machinery, trucks or equipment, which it may be found necessary to use on cost-plus work shall be negotiated between the Engineer and the Contractor. These rates shall be reasonable and shall be based on those prevailing in the area where such is to be done, and they shall be agreed upon in writing before the work is begun. The

Contractor and the Engineer shall agree to hourly, daily or monthly equipment rental rates depending on the period of time required to complete the work covered by a change. In no case shall the rental rates exceed the rates set up in the current edition of the "Associated Equipment Distributors Compilation of Rental Rates for Construction Equipment" plus the cost of fuel and lubricants. Those rates shall include all repairs, fuel, lubricants, taxes, insurance, depreciation, storage and all attachments complete, ready to operate, but excluding operators. Operators shall be paid as stated hereinabove for labor.

No percentage for overhead and profit shall be added to the amounts of equipment rental prices agreed upon, and the price agreed upon shall be the total compensation allowed for use of such equipment.

d. Each change order shall include in its final form:

1. A detailed description of the change in the work.
2. The Contractor's proposal (if any) or a conformed copy thereof.
3. A definite statement as to the resulting change in the Contract Price and/or time.
4. The statement that all work involved in the change shall be performed in accordance with the contract requirements except as modified by the change order.

140. CLAIMS FOR EXTRA COST

a. If the Contractor claims that any instructions by the Authority or otherwise involve extra cost or extension of time, he shall, within ten (10) days after the receipt of such instruction, and in any event before proceeding to execute the work, submit his protest thereto in writing to the Authority, stating clearly and in detail the basis of his objections. No such claims will be considered unless so made.

b. Claims for additional compensation for extra work due to alleged errors in ground elevations, contour lines, or bench marks will not be recognized unless accompanied by certified survey data, made prior to the time the original ground was disturbed, clearly showing that errors exist which resulted or would result, in handling more material, or performing more work, than would be reasonably estimated from the Drawings and maps issued.

c. Any discrepancies which may be discovered between actual conditions and those represented by the Drawings shall at once be reported to the Authority and work shall not proceed, except at the Contractor's risk, until written instructions have been received by him from the Authority.

d. If, on the basis of the available evidence, the Authority determines that an adjustment of the Contract Price and/or time is justifiable, the procedure shall then be as provided in Section 139 - CHANGES IN THE WORK under GENERAL CONDITIONS.

e. During the progress of the work, if the Contractor encounters at the site unknown physical conditions differing materially from those inherent in work of the character provided for in this Contract, he shall promptly and before such conditions are disturbed, notify the Engineer in writing. The Engineer shall thereupon investigate such conditions and if he finds that they do materially differ, he shall cause such changes to be made in the Specifications and Drawings as may be deemed necessary, and shall make such equitable adjustment in the Contract Price or time as is justified, if any, by written order, as provided in the Section 139 - CHANGES IN THE WORK. No claim of the Contractor for adjustment hereunder shall be allowed unless he has given notice as above required.

141. DISPUTES

a. All disputes arising under this Contract or its interpretations, whether involving law or fact or both, or extra work, and all claims for alleged breach of contract shall within ten (10) days of commencement of the dispute be presented in writing by the Contractor to the Authority for decision. All papers pertaining to claims shall be filed in quadruplicate. Such notice need not detail the amount of the claim, but shall state the facts surrounding the dispute in sufficient detail to identify the claim together with its character and scope. In the meantime, the Contractor shall proceed with the work as directed. Any claim not presented in writing within the time limit specified within this paragraph shall be deemed to have been waived, except that if the claim is of a continuing character and notice of the claim is not given within ten (10) days of its commencement, the claim will be considered only for a period commencing ten (10) days prior to the receipt by the Authority of notice thereof.

b. The Contractor shall submit in detail his claim and his proof thereof. Each decision by the Authority will be in writing and will be mailed or otherwise delivered to the Contractor pursuant to Section 102.

c. Any unresolved dispute or claim arising out of or related to the Contract Documents or the breach thereof shall be settled by arbitration before the American Arbitration Association in accordance with the Construction Industry Arbitration Rules of the American Arbitration Association unless the parties agree otherwise and judgement upon the award rendered by the arbitrator or arbitrators may be entered in any court having jurisdiction thereof.

d. Notice of demand for arbitration shall be filed in writing with the other party and with the American Arbitration Association or other dispute resolution entity agreed to by the parties. Demand for arbitration of any dispute may not be made until the Authority has rendered a final written decision on the dispute/claim pursuant to subparagraph b above or until 60 days after Contractor's submission of a dispute/claim to the Authority, in the event the Authority fails to render a decision within said 60 days.

e. The Contractor in no case shall delay or stop the work by reason of any dispute, demand for arbitration or arbitration proceeding.

f. A party who files a demand for arbitration must assert in the demand all claims then known to that party on which arbitration is permitted to be demanded. When a party fails to include a claim through oversight, inadvertence or excusable neglect, or when a claim has matured or been acquired subsequently, the arbitrator or arbitrators may permit amendment.

g. The award rendered by the arbitrator or arbitrators shall be final, and judgement may be entered upon it in accordance with applicable law in any court having jurisdiction thereof.

142. PAYMENTS TO CONTRACTOR

1. Partial & Final Payments

a. The Contractor shall prepare his requisition for partial payment as of the last day of the month and submit it, with the required number of copies, to the Engineer for his approval. The amount of the payment due the Contractor shall be determined by the total value of work completed to date, and deducting (i) five percent (5%) of the total amount, to be retained until final payment and (ii) the amount of all previous payments. The total value of work completed to date shall be based on the estimated amount of work completed and on the Contract Price Itemization included in the Contractor's Bid.

b. Monthly or partial payments made by the Authority to the Contractor are moneys advanced for the purpose of assisting the Contractor to expedite the work of construction. All completed work covered by such monthly or partial payments shall remain the property of the Contractor and he shall be responsible for the care and protection of all materials and work upon which payments have been made. Such payments shall not constitute a waiver of the right of the Authority to require the fulfillment of all terms of the Contract and the delivery of all improvements embraced in this Contract complete and satisfactory to the Authority in all details.

c. The Authority before making payment may require the Contractor to furnish releases or receipts from all subcontractors having performed any work and all persons having supplied materials, equipment (installed on the project) and services to the Contractor, if the Authority deems the same necessary in order to protect its interest. However, the Authority may, if it deems such action advisable, make payment in part or in full to the Contractor without requiring the furnishing of such releases or receipts and any payments so made shall in no way impair the obligations of any surety or sureties furnished under this Contract.

d. Further, the Authority may, if it deems such action advisable, make payment in part or in full to the Contractor, although the Authority has notice or knowledge of the existence of claims, causes of action, or disputes by subcontractors, laborers, material men, suppliers of equipment and services and others, against the Contractor, and any payments so made shall in no way impair the obligations of any surety or sureties furnished under this Contract.

e. The Authority may require a hold harmless/release agreement, lien waivers and consent of surety prior to release of the payment.

f. After final inspection and acceptance by the Authority of all work under the Contract, the Contractor shall prepare his requisition for final payment. Final payment to the Contractor shall be made subject to his furnishing the Authority with a release in satisfactory form of all claims against the Authority arising under and by virtue of his Contract, other than claims specifically outlined in and reserved by Contractor in any demand for arbitration filed in accordance with the provisions of Section entitled DISPUTES under GENERAL CONDITIONS.

2. Withholding Payment

The Authority may withhold from any payment otherwise due the Contractor, which payment may include amounts due from Contractor to subcontractors and materialmen for work performed on or materials furnished to the project, so much of said payment as may be necessary to protect the interests of Authority. The foregoing provisions shall be construed solely for the benefit of the Authority and will not require the Authority to determine or adjust any claims or disputes between the Contractor and his subcontractors or material dealers, or to withhold any money for their protection unless the Authority elects to do so. The failure or refusal of the Authority to withhold any monies from the Contractor shall in no way impair the obligations of any surety or sureties under any bond or bonds furnished under this Contract.

3. Payments Subject to Submission of Certificates

Each payment to the Contractor by the Authority shall be made subject to submission by the Contractor of all written certificates required of him by the Section 203 - CONTRACTOR'S CERTIFICATES under GENERAL CONDITIONS.

4. Contract Payment Procedures

a. Before any payment is made to the Contractor, upon request by the Authority the Contractor shall submit to the Authority lien waivers for the prior month signed by all subcontractors showing that they have received payment as set forth below. If any subcontractor has not been paid, a written statement explaining the reason why shall be submitted to the Authority. The lien waiver form shall contain a notice to the subcontractor stating the reason(s) for withholding payment.

To ensure prompt payment of subcontractors, the Contractor shall make payment to any subcontractor employed by such Contractor within thirty (30) days of payment by the Authority to the Contractor for any work performed or for materials furnished by such subcontractor, provided such Contractor may withhold such payment if such Contractor has a bona fide reason for such withholding and if such Contractor notifies the affected subcontractor in writing of his reasons for withholding such payment and provides the Authority with a copy of the notice within such thirty (30) days period.

The Contractor shall include in each subcontract entered into by the Contractor for the purpose of performing such construction contract (1) a payment clause which obligates the Contractor to pay the subcontractor for satisfactory performance under its subcontract within thirty (30) days out of such amounts as are paid to the Contractor by the Authority under such contract; and (2) an interest penalty clause which obligates the Contractor to pay the subcontractor an interest penalty of one and one-half percent per month, or any higher amount allowed by law, on amounts due in the case of each payment not paid in accordance with the payment clause included in the subcontract pursuant to provision (1) above. This section shall not be construed to prohibit progress payments prior to final payment of the subcontract.

The Contractor shall include in each of its subcontracts a provision requiring each subcontractor to pay any amounts due any of its sub-subcontractors within thirty (30) days after such subcontractor receives a payment from the Contractor which encompasses labor or material furnished by such subcontractor.

143. FINAL INSPECTION

When the improvements embraced in this Contract are substantially complete, the Contractor shall notify the Engineer in writing that the work will be ready for final inspection on a definite date, which shall be stated in such notice. The notice will be given at least ten (10) days prior to the date stated for final inspection and bear the signed concurrence of the representative of the Authority having charge of inspection. If the Engineer determines that the status of the improvements is as represented, he will make the arrangements necessary to have final inspection commenced on the date stated in such notice, or as soon thereafter as is practicable. The inspection party may include representatives of the Authority, the City of New Haven, or any other party or parties the Authority deems necessary.

144. DEDUCTION FOR UNCORRECTED WORK

If the Authority in its sole discretion decides not to require the Contractor to correct work not completed in accordance with the Contract Documents, the Contract Price shall be reduced by an amount agreed to by the Contractor and the Authority. In the event the parties cannot reach agreement, the reduction amount issue shall be resolved in accordance with Section 141 - DISPUTES.

145. TERMINATIONS AND DELAYS

a. Termination of Contract. If the Contractor shall be adjudged a bankrupt, or if he should make a general assignment for the benefit of his creditors, or if a receiver shall be appointed on account of his insolvency, or if he should fail to make prompt payment to subcontractors or for material or labor, or if he refuses or fails to prosecute the work with such diligence as will insure its completion within the time specified in these Contract Documents, or if the Contractor should otherwise be guilty of a substantial violation of a provision of the Contract, then the Authority may, without prejudice to any other right or remedy and after giving the Contractor seven (7) days written notice, terminate the Contractor's right to proceed with the work. Upon such termination, the Authority may take over the work and prosecute the same to completion by contract or otherwise and the Contractor and his sureties shall be liable to the Authority of any additional cost incurred by the Authority in its completion of the work, and they shall be liable to the Authority for liquidated damages for any delay in the completion of the work, as provided in these Contract Documents. If the Contractor's right to proceed is terminated, the Authority may take possession of and utilize in completing the work such materials, tools, equipment and plant as may be on the site of the work and necessary therefor.

b. Excusable Delays. The right of the Contractor to proceed shall not be terminated for any delays in the completion of work due:

1. To any acts of the Government, including controls or restrictions upon or requisitioning of materials, equipment, tools or labor by reason of war, National Defense, or any other national emergency;

2. To unforeseeable causes including but not restricted to, acts of God or of the public enemy, fires, floods, epidemics, quarantine restrictions, freight embargoes effecting delivery of materials necessary for completion of the contract work when substitute materials are equally unavailable, and weather of unusual severity such as hurricanes, tornadoes, cyclones and other extreme weather conditions; and

3. To any delay of any subcontractor occasioned by any of the causes specified in sub-paragraphs 1 and 2 of this paragraph "b".

Provided, however, that the Contractor immediately notifies the Authority, in writing, upon realization of such delay, of the cause of delay. Upon receipt of such notification, the Authority shall ascertain the facts and the cause and extent of delay. If, upon the basis of the facts and the terms of this contract the delay is properly excusable, the Authority shall extend the time for completing the work for a period of time commensurate with the period of excusable delay.

c. The Authority, for its convenience, at any time upon written notice to Contractor, may terminate or suspend the Contractor's right to proceed with the work. Upon receipt of notice of termination or suspension under this section, Contractor shall immediately cease work and commence demobilization or take other action as directed by the Authority. In the event of termination of the work under this subsection, Contractor shall be entitled to payment for work completed, overhead and profit on work completed, demobilization/cancellation costs incurred and materials left at the Project Area. In the event of a suspension of the work under this subsection, Contractor shall be entitled to payment of additional demobilization and mobilization costs incurred.

146. GENERAL GUARANTY

Neither the final certificate of payment, nor any provision in the Contract, nor partial or entire use of the improvements embraced in this Contract by the Authority or the public shall constitute an acceptance of work not done in accordance with the Contract, or relieve the Contractor of liability in respect to

any express warranties or responsibility for faulty materials or workmanship. The Contractor shall promptly remedy any defects in the work and pay for any damage to other work resulting therefrom which shall appear within a period of one (1) year from the date of final acceptance of the work, unless otherwise specified. The Authority will give notice of defective materials and work with reasonable promptness.

GENERAL CONDITIONS

PART II

Revised July 16, 2025

201. STATE OF CONNECTICUT WAGE SCHEDULE

The wages paid on this project shall be as shown on the State of Connecticut Labor Department “Prevailing Wage Rates” included in the Contract Documents or as otherwise referenced.

NOTE: For construction contracts with a value less than \$100,000, and State of Connecticut Prevailing Wage Rates have not been included in the Contract Documents, the Contractor and their subcontractors of any tier shall pay a minimum wage which shall be no less than the amount specified as the “Living Wage” for the City of New Haven as established by Article IX, Living Wage, of the City of New Haven Code of Ordinances. For contracts of \$100,000 or more, the minimum wage paid shall correspond to the State of Connecticut prevailing wages, or if applicable, the prevailing wages promulgated in accordance with the Federal Davis-Bacon Act, whether or not such wages rates are included in the Contract Documents, or the Living Wage, whichever is greater.

Pursuant to Connecticut General Statutes § 31-55a, the Contractor shall contact the State Labor Commissioner on or before July first of each year, for the duration of the Contract, to ascertain the prevailing rate of wage, on an hourly basis and the amount of payment or contributions paid or payable on behalf of each mechanic, laborer or worker employed upon the work contracted to be done, and shall make any necessary adjustments to such prevailing rate of wages and such payment or contributions paid or payable on behalf of each employee.

The prevailing wage rates applicable to the Contract are subject to annual adjustments each July 1st of each calendar year for the duration of the Contract. The Contractor shall pay the annual adjusted prevailing wage rate that is in effect each July 1st, as posted by the Department of Labor.

It is the Contractor’s responsibility to obtain the annual adjusted prevailing wage rate increases directly from the Department of Labor’s web site. The annual adjustments will be posted on the Department of Labor’s web page: www.ctdol.state.ct.us. For those without internet access, contact the Contract Compliance Unit, Wage and Workplace Standards Division, Connecticut Department of Labor, 200 Folly Brook Boulevard, Wethersfield, CT 06109 at (860) 263-6790.

The City of New Haven Commission on Equal Opportunities locally administers Contractor compliance with prevailing wages, payroll reporting requirements, woman and minority workforce, and other matters related to City Ordinance Chapter 12 ½. Refer to City of New Haven/CEO website or call the Commission at 203-946-8160 for further information.

202. CONTRACTOR'S CERTIFICATES

Before any payment by NHPA to the Contractor under this Contract, the Contractor shall furnish NHPA with its certificate, substantially to the effect that the Contractor and each subcontractor have completed the work in accordance with the requirements of the Contract Documents, including wage and labor-standards provisions.

203. UNDERPAYMENT OF WAGES OR SALARIES

In case of underpayment of wages or salaries by the Contractor or by any subcontractor to laborers, mechanics or technical employees employed by the Contractor or subcontractor upon the work covered by this Contract, NHPA, in addition to such other rights as may be afforded it under this Contract, may withhold from the Contractor, out of any payments due the Contractor, so much thereof as NHPA may consider necessary to pay such laborers, mechanics or technical employees the full amount of wages or salaries required by the Contract.

204. COMPLAINTS, ETC., BY EMPLOYEES

No laborer, mechanic or technical employee to whom the wage, salary or other labor-standards provisions of this Contract are applicable shall be discharged or in any other manner discriminated against by the Contractor or any subcontractor because such employee has filed any complaint or instituted or caused to be instituted any proceeding or has testified or is about to testify in any proceeding relating to the labor standards applicable under this Contract to his employer.

205. CLAIMS AND DISPUTES PERTAINING TO SALARY AND WAGE RATES

Claims and disputes pertaining to salary rates or to classifications of technical employees, wage rates or classifications of laborers and mechanics employed upon the work covered by this contract shall be promptly reported by the Contractor in writing to NHPA and Authorities Having Jurisdiction for decision, whose decisions shall be final with respect thereto.

206. LISTING ALL EMPLOYMENT OPENINGS WITH THE OFFICE OF THE CONNECTICUT STATE EMPLOYEMENT SERVICE

This contract is executed subject to the Governor's Executive Order No. 17, incorporated herein by reference, and is hereby made a part of this Agreement.

Governor's Executive Order No. 17 requires, inter alia, that all contractors and subcontractors shall list all employment openings with the office of the Connecticut State Employment Service in the area where the work is to be performed or where the services are to be rendered. Failure of the contractor to conform with the requirements of the Governor's Executive Order No. 17 and any orders, rules or regulations issued pursuant thereof, shall be a basis of termination of this Agreement.

207. RESIDENTS PREFERENCE IN WORK ON PUBLIC FACILITIES

The Contractor shall comply with the provisions of Connecticut General Statutes § 31-52a, a part of which is quoted as follows:

Section 2(b). Each contract for any such project covered by this section under the supervision of the state or any of its agents shall contain the following provision: "In employment of mechanics, laborers or workmen to perform the work specified herein, preference shall be given to residents of the state who are, and continuously for at least six [6] months prior to the date hereof have been, residents of this state, and if no such person is available then to residents of other states."

208. EMPLOYMENT OF APPRENTICES

Apprentices (to mechanics) will be permitted to perform work covered by this Contract only under a bona fide apprenticeship program approved by NHPA and Authorities Having Jurisdiction.

209. EMPLOYMENT OF CERTAIN PERSONS PROHIBITED

No person who, at the time, is serving sentence in a penal or correctional institution shall be employed on the work covered by this Contract.

210. NONDISCRIMINATION

The Contractor agrees and warrants that in the performance of this contract it will not discriminate or permit discrimination against any person or group of persons on the grounds of race, color, religious creed, age, marital status, national origin, sex, mental retardation or physical disability, including but not limited to blindness, unless it is shown by such contractor that such disability prevents performance of the work involved in any manner prohibited by the laws of the United States or of the State of Connecticut, and further agrees to provide the Commission on Human Rights and Opportunities with such information requested by the Commission concerning the employment practices and procedures of the Contractor as related the provisions of Public Act 78-148.

This contract is subject to the provisions of Executive Order No. 3 of Governor Thomas J. Meskill promulgated June 16, 1971 and, as such, this contract may be cancelled, terminated, or suspended by the State Labor Commissioner for violation of or non-compliance with said Executive Order No. 3, or any state or federal law concerning nondiscrimination, notwithstanding that the Labor Commissioner is not a party to this contract. The parties to this contract as part of the consideration hereof, agree that Executive Order No. 3 and the Guidelines and Rules implementing Executive Order No. 3 are incorporated herein by reference and made a part thereof. The parties agree to abide by said Executive Order and the Guidelines and Rules implementing Order No. 3 and agree that the State Labor Commissioner shall have continuing jurisdiction in respect to contract performance in regard to nondiscrimination, until the contract is completed or terminated prior to completion.

The Contractor agrees as part consideration hereof, that this Contract is subject to the Guidelines and Rules issued by the State Labor Commissioner to implement Executive Order No. 3, and that he will not discriminate in his employment practices or policies, will file all reports as required, and will fully cooperate with the State of Connecticut and the State Labor Commissioner.

211. EQUAL EMPLOYMENT OPPORTUNITY

During the performance of this Contract, the Contractor agrees:

- (a) To comply with all provisions of Executive Order 11246, Executive Order 11375, and Executive Order 12138, the Connecticut Fair Employment Practices Act, and the City of New Haven Contract Compliance Ordinance Chapter 12 ½ as all are amended from time to time, including all standards and regulations which are promulgated by the government authorities who established such acts and requirements, and all standards and regulations are incorporated herein by reference;
- (b) Not to discriminate against any employee or applicant for employment because of race, color, religion, age, sex, gender identity or expression, sexual orientation, physical disability or national origin. The Contractor will take affirmative action to ensure that applicants are employed, and that employees are treated during employment without regard to race, color, religion, sex, gender identity or expression, sexual orientation, age, national origin, or physical disability. Such action shall include but not be limited to the following: employment, upgrading, demotion, or transfer, recruitment or recruitment advertising, layoff, or termination, rates of pay or other forms of compensation, and selection for training, including apprenticeship;
- (c) To post notices to be provided by the contracting officer setting forth the provisions of this nondiscrimination clause in conspicuous places available to employees and applicants for employment;
- (d) To state, in all solicitations or advertisements for employees placed by or on behalf of the Contractor, that all qualified applicants will receive consideration for employment without regard to race, color, religion, sex, gender identity or expression, sexual orientation, age, national origin, or physical disability.
- (e) To send to each union or representative of workers with whom he/she has a collective bargaining agreement, or other contract or understanding, a notice advising the labor union or worker's representative of the Contractor's commitments under the equal opportunity clause of the City of New Haven, and shall post copies of the notice in conspicuous places available to employees and applicants for employment. The Contractor shall register all workers in the skilled trades, who are below the journeyman level, with the Connecticut Department of Labor, Office of Apprenticeship Training;
- (f) To utilize labor department and city sponsored manpower programs as a source of recruitment, and to notify the contract compliance unit and such programs of all job vacancies;
- (g) To take affirmative action to negotiate with qualified minority and women contractors for any work which may be proposed for subletting or for any additional services, supplied, or work which may be required as a result of this contract;

- (h) To cooperate with city departments in implementing required contract obligations for increasing the utilization of minority and women business enterprises;
- (i) To furnish all information and reports required by the City of New Haven contract compliance director pursuant to section 12 ½ -19 through section 12 ½ -32 of the City Ordinance and to permit access to its books, records and accounts by the contracting agency, the contract compliance officer, and the secretary of labor for purposes of investigation to ascertain compliance with the program;
- (j) To take such action, with respect to any subcontractor, as the city may direct as a means of enforcing the provisions of subparagraphs (a) through (m) herein, including penalties and sanctions for noncompliance, provided however that, in the event the Contractor becomes involved in or is threatened with litigation as a result of such direction by the city, the city will intervene in such litigation to the extent necessary to protect the interest of the city and to effectuate the City's equal employment opportunity program. In the case of contracts funded directly or indirectly, in whole or in part, under one (1) or more federal assistance programs, the Contractor or the city may ask the United States to enter into such litigation to protect the interest of the United States;
- (k) To file, along with its subcontractors, if any, compliance reports with the city and NHPA in the form and to the extent prescribed in the contract by the contract compliance director of the city. Compliance reports filed at such times as directed shall contain information as to the employment practices, policies, programs and statistics of the Contractor and its subcontractors, if any;
- (l) To include the provisions of subparagraphs (a) through (m) of this equal opportunity clause in every subcontract or purchase order so that said provisions will be binding upon each such subcontractor or vendor;
- (m) That a finding, as hereinafter provided of a refusal by the Contractor, or subcontractor, to comply with any portion of this program as herein stated and described, may subject the offending party to any or all of the penalties;
 - (1) Withholding of all future payments under the involved public contract to the Contractor in violation until it is determined that the Contractor, or subcontractor is in compliance with the provisions of the contract;
 - (2) Refusal of all future bids for any public contract with the city, or any of its departments or divisions, and NHPA until such time as the Contractor, or subcontractor, is in compliance with the provisions of the contract;
 - (3) Cancellation of the public contract;
 - (4) Recovery of specified monetary penalties;
 - (5) In case of substantial or material violation, or the threat of substantial or material violation, of the compliance procedure or as may be provided for by contract, appropriate equitable or legal proceedings may be brought to enforce these provisions against contractors; subcontractors, or other organizations, individuals or groups who directly or indirectly are not in compliance with the policy as herein outlined.

212. NHPA COMMUNITY SUBCONTRACTOR UTILIZATION

In performing the Contract, the Contractor shall comply with the following, as more fully described in **the Instructions to Bidders/Proposers**:

- a. The utilization of DAS-certified Small Business Enterprises (“SBE”) as **subcontractors and/or suppliers of materials** for a requirement of at least **30% of the Contractor’s entire contract value**;
- b. The utilization of DAS-certified Minority Owned Business Enterprises (“MBE”), Women Owned Business Enterprises (“WBE”) and/or Disabled Owned Business Enterprises (“DisBE”) as **subcontractors and/or suppliers of materials** for a requirement of at least **25% of the Contractor’s entire contract value**. Please note that the MBE, WBE, and/or DisBE are **part of** the DAS-certified Small Business Enterprises; and
- c. Independent of the SBE/MBE/WBE/DisBE requirements herein, **a minimum of ten percent (10%) of the Contractor’s entire contract value must include businesses having a place of business within the City of New Haven limits**. If the Contractor (i.e., prime bidder) has a place of business within the City of New Haven limits, then the relevant percentage is calculated by deducting all of the subcontracts and suppliers of materials who do not have a place of business within the City of New Haven.

The Contractor shall submit with each invoice an updated *Community Subcontractor Utilization Program Monthly Payment Status Report* using form provided.

Refer to *New Haven Parking Authority Community Subcontractor Utilization Program* (enclosed) for additional information.

213. MINORITY AND WOMEN EMPLOYMENT WORKFORCE REQUIREMENTS

In accordance with Chapter 12½ of the Code of Ordinances of the City of New Haven, the following minimum minority and women workforce employment percentages are required, unless otherwise approved by the City of New Haven Commission on Equal Opportunity:

Minority workforce requirement: 25%
Women workforce requirement: 6.9%
Apprentice workforce requirement 15% (50% of which must be 1st year apprentice)

Additional information on minority and women employment requirements and resources is available from the *City of New Haven Commission on Equal Opportunities*, 200 Orange Street, New Haven, CT 06510, telephone 203-946-8160. Contact *New Haven Works* at newhavenworkspipeline.org, telephone 203-562-9000, for construction worker employment resources. Copies of the Code of Ordinances Chapter 12 ½ are available from the are available from the City / Town Clerk, the Commission on Equal Opportunities or by the following link: https://www.newhavenct.gov/gov/depts/equal_opportunities/about/ordinance.htm .

214. SELF-PERFORMANCE

In any contract awarded, the Prime Contractor/General Contractor and Subcontractor(s) must comply with General Statutes § 4a-60g (e), which provides that:

“The awarding authority shall require that a contractor or subcontractor awarded a contract or a portion of a contract under this section perform not less than thirty per cent of the work with the workforces of such contractor or subcontractor and shall require that not less than fifty per cent of the work be performed by contractors or subcontractors eligible for awards under this section. A contractor awarded a contract or a portion of a contract under this section shall not subcontract with any person with whom the contractor is affiliated. No person who is affiliated with another person shall be eligible for awards under this section if both affiliated persons considered together would not qualify as a small contractor or a minority business enterprise under subsection (a) of this section. The awarding authority shall require that a contractor awarded a contract pursuant to this section submit, in writing, an explanation of any subcontract to such contract that is entered into with any person that is not eligible for the award of a contract pursuant to this section, prior to the performance of any work pursuant to such subcontract.”

215. SERVICE OF PROCESS

The successful bidder, if not a resident of the State of Connecticut, or in the case of a partnership, the partners, if not residents, hereby appoints the Secretary of State of the State of Connecticut, and its successors in office as agent for service of process for any action arising out of or as a result of this contract; such appointment to be in effect throughout the life of this contract, and six (6) years thereafter.

216. “OR EQUAL” CLAUSE

Whenever a material or article required is specified or shown on the drawings by using the name of the proprietary product or of a particular manufacturer or vendor, any material or article which will perform adequately the duties imposed by the general design may be considered equal and satisfactory providing the material or article so proposed is of equal substance and function in NHPA’s opinion. It shall not be purchased or installed without written approval by NHPA. In all cases, new materials shall be used in the project. If two (2) or more brands, makes or materials, devices or equipment are shown or specified, each should be regarded as the equal of the other. Any other brand, make of material, device or equipment, which in the opinion of NHPA or its authorized agent is the recognized equal of that specified, considering quality, workmanship and economy of operations and is suitable for the purpose intended, may be acceptable.

217. AMERICANS WITH DISABILITIES ACT

The Contractor and all of the Contractor’s subcontractors shall comply with all applicable provisions of the Americans with Disabilities Act.

**NEW HAVEN PARKING AUTHORITY
COMMUNITY SUBCONTRACTOR UTILIZATION PROGRAM**

Approved March 15, 2021

Sec. 1. Name.

This program shall be known as the New Haven Parking Authority Community Subcontractor Utilization Program.

Sec. 2. Scope.

The provisions of this program shall apply to all NHPA construction contracts, except those that are financed by the City of New Haven or any other governmental entity and/or agency (i.e. State or Federal), under which a different set of provisions may apply.

This program applies to construction contracts that are valued at a minimum of \$25,000.00.

Sec. 3. DAS Certification.

Small Business Enterprise (SBE), Minority-owned Business Enterprise (MBE), Women-owned Business Enterprise (WBE), or Disabled-owned Business Enterprise (DisBE) must be certified by the State of Connecticut Department of Administrative Services (DAS).¹

Sec. 4. NHPA Subcontractor Outreach.

- (a) *Purpose.* The purpose of this section is to nurture small and minority **Subcontractors and Suppliers of Materials** who have the potential for long-term, sustainable success on a level playing field.
- (b) *Outreach.* NHPA outreach includes a variety of methods, including, but not limited to the following:
 - (1) Post bid or proposal opportunity information on the NHPA publicly accessible website;
 - (2) Announcement in the New Haven Register and three relevant targeted publications aimed at small and minority contractors: *Inner City News*, *La Voz*, and the *New Haven Independent*;

¹Small Business Enterprise a.k.a. Small Contractor is defined as any contractor, subcontractor, manufacturer, service company or nonprofit corporation (A) that maintains its principal place of business in the state, (B) that had gross revenues not exceeding fifteen million dollars in the most recently completed fiscal year prior to such application, and (C) that is independent. Small contractor does not include any person who is affiliated with another person if both persons considered together have a gross revenue exceeding fifteen million dollars. See Connecticut General Statutes § 4a-60g.

"Minority" groups are defined in [Section 32-9n](#) of the Connecticut General Statutes as "(1) Black Americans, including all persons having origins in any of the Black African racial groups not of Hispanic origin; (2) Hispanic Americans, including all persons of Mexican, Puerto Rican, Cuban, Central or South American, or other Spanish culture or origin, regardless of race; (3) all persons having origins in the Iberian Peninsula, including Portugal, regardless of race; (4) women; (5) Asian Pacific Americans and Pacific islanders; or (6) American Indians and persons having origins in any of the original peoples of North America and maintaining identifiable tribal affiliations through membership and participation or community identification." An individual with a disability is also a minority business enterprise as provided by Connecticut General Statutes § [4a-60g](#) of the Connecticut General Statutes.

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- (3) E-mail the City of New Haven Office of the Small Construction Development program to inform of any relevant bids or proposals;
- (4) E-mail the City of New Haven Commission on Equal Opportunities to inform of any relevant bids or proposals;
- (5) E-mail the Minority Construction Council to inform of any relevant bids or proposals;
- (6) E-mail the Greater New Haven Business and Professional Association to inform of any relevant bids or proposals;
- (7) E-mail the New Haven Regional Contractor's Alliance to inform of any relevant bids or proposals;
- (8) E-mail the Greater New England Minority Development Council to inform of any relevant bids or proposals;
- (9) E-mail notification to the Connecticut Women's Business Development Council to inform of any relevant bids or proposals;
- (10) E-mail notification to interested contractors within the relevant industry segment;
- (11) Notification by the Minority Construction Council to its members or interested parties to provide an overview of the bids or proposals;
- (12) Post bid or proposal opportunity information in the State of Connecticut Department of Administrative Services Contracting Portal (DAS Contracting Portal);

Sec. 5. Community Subcontractor Utilization Requirements.

Bidders must submit with their Bid on forms provided a list of their Intended Subcontractors, together with any other additional applicable requirements (i.e. CHRO compliance on State funded projects), including:

- (a) the use of DAS-certified Small Business Enterprises ("SBE") as **Subcontractors and/or Suppliers of Materials** for a requirement of at least 30% of the Bidder's entire contract value;
- (b) the use of DAS-certified Minority Owned Business Enterprises ("MBE"), Women Owned Business Enterprises ("WBE") and/or Disabled Owned Business Enterprises ("DisBE") as **Subcontractors and/or Suppliers of Materials** for a requirement of at least 25% of the Bidder's entire contract value. Please note that the MBE, WBE, and/or DisBE are part of the DAS-certified Small Business Enterprises; and
- (c) independent of the SBE/MBE/WBE/DisBE requirements herein, a minimum of 10% of the Bidder's entire contract value must include businesses having a place of business within the City of New Haven limits.
- (d) In order to satisfy the requirement for use of this Community Subcontractor Utilization Program, Bidders shall submit with their Bid, on forms provided (or using additional sheets if necessary), the Intended Community Subcontractor Utilization Certificate indicating:

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- i. The name, address and contact person of each Subcontractor the bidder will use.
- ii. The name, address and contact person of each Supplier of Materials the bidder will use in order to satisfy the requirement for use of this Community Subcontractor Utilization Program. (For Suppliers of Materials, only list those Suppliers of Materials for which the Bidder will use in order to satisfy the requirement for use of SBE/MBE/WBE/DisBE or New Haven-based.)
- iii. The categories of the Subcontractors and/or Suppliers of Materials utilized (i.e. SBE, MBE, WBE, DisBE, any other Subcontractors)
- iv. The nature of the work to be undertaken by each Subcontractor or Supplier of Materials.
- v. The dollar value of each Subcontract or Supplier of Materials.
- vi. The percentage of Bidder's entire contract dollar amount to be expended for SBEs;
- vii. The percentage of Bidder's entire contract dollar amount to be expended for MBEs, WBEs and DisBEs.
- viii. The percentage of Bidder's entire contract dollar amount to be expended for businesses having a place of business within the City of New Haven limits.

Note: In the event the Prime Contractor/General Contractor is a SBE, MBE, WBE or DisBE, its status as such does NOT contribute to the SBE, MBE, WBE and DisBE Subcontractor requirements.

Additional Note: If the Bidder (i.e., prime bidder) has a place of business within the City of New Haven limits, then the relevant dollar amount is calculated by deducting from the Bidder's entire contract value, the value of the subcontracts and suppliers of materials who do not have a place of business within the City of New Haven.

Bidders shall also submit with their bid a brief description of the experience and ability of each of the Subcontractors and Suppliers of Materials together with the names, telephone numbers, and e-mail addresses of at least three (3) references for each Subcontractor and Suppliers of Materials.

If a bidder is unable to meet these minimum community participation requirements, then the bid shall be deemed non-responsive. However, in the event that a bidder **has met** these minimum community participation requirements, the bidder may be required to submit to NHPA its efforts concerning compliance, upon request by NHPA.

For reference: the City of New Haven's Office of Small Contractor Development Program's website is: https://www.newhavenct.gov/gov/depts/small_contractor/default.htm and its email contact is: lsnyder@newhavenct.gov; the following is a link to the Small Business Directory to

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search for small and minority business enterprises registered with the State of Connecticut Department of Administrative Services (DAS): <https://biznet.ct.gov/SDSearch/SDSearch.aspx>

Sec. 6. Exceptions.

- (a) In the event that a construction contract is funded by the City of New Haven, state or federal government or other applicable government entity and/or agency thereof or sources other than the NHPA, the provisions of this program may not apply.
- (b) The utilization requirements may not apply to the following procurements:
 - (1) Construction services that NHPA determines are available only from a sole source and the prospective contractor is not currently disqualified from doing business with NHPA, or from doing business with any governmental agency.
 - (2) Construction contracts determined by NHPA that are necessary to respond to an emergency situation that is a threat to the public health, safety or welfare.
 - (3) Construction contracts determined by NHPA that are made through cooperative purchasing arrangements with other governmental or private entities when, in the judgment of NHPA, such contracts are in the best interest of NHPA and such arrangements involve competitive purchasing procedures.
 - (4) Construction contracts made in a manner approved by NHPA where it would not be practicable or in the best interest of NHPA to proceed in accordance with provisions of this program and where NHPA shall find that the making of such a contract in such manner is in the best interest of NHPA.

Sec. 7. Protest procedure.

- (a) If at the time of a bid opening there is an apparent low responsible bidder that should be awarded an NHPA construction contract in accordance with the provisions of this program but an unsuccessful party (a "protesting party") is of the opinion that the apparent low bidder did not comply with the provisions of this program, then the protesting party or parties shall have a period of three (3) calendar days from the date on which the bids were publicly opened in order to protest such award.
- (b) Any such protest shall be made in writing and received by the NHPA representative in charge of the project by not later than 3:00 p.m. on the third **calendar** day following the date of the bid opening.
- (c) Upon timely receipt of such protest letter, the NHPA representative shall forward such protest letter to NHPA's Executive Director and its legal counsel.
- (e) Once the protest is reviewed, a written opinion as to whether the apparent low bid or bidder met the requirements of this program shall be issued. The written opinion shall be sent to both the protesting party or parties and the apparent low bidder, and a copy of said opinion shall be maintained by NHPA.

Sec. 8. Administration.

- (a) The Executive Director of NHPA shall be responsible for the overall administration of this program.

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- (b) This program is separate and distinct from the requirements of Article II of Chapter 12 ½ of the City of New Haven's Code of Ordinances as applicable to NHPA on City of New Haven-related Construction Contracts.

SPECIAL CONDITIONS

SPECIAL CONDITIONS

ELEVATOR AND ESCALATOR MODERNIZATION AND SERVICE AT NEW HAVEN PARKING AUTHORITY FACILITIES NEW HAVEN, CONNECTICUT NHPA PROJECT #21-011

301. PROJECT SITE

A. The project sites for Modernization are: Air Rights Garage, 60 York Street; Temple Medical Garage, 230 George Street; Temple Street Garage, One Temple Street; and 270 State Street Garage, 270 State Street; all in New Haven, Connecticut. These facilities as well as the following are included for the Service Agreement: Union Station Garage, 40 Union Avenue, Union Station Building, 50 Union Avenue, and State Street Station, 259 State Street (together the "Union Station Campus"); Crown Street Garage, 213 Crown Street; and Granite Square Garage, 690 State Street, New Haven, Connecticut.

Contractors shall be aware that the Union Station Campus facilities, which NHPA manages, are adjacent to live, active railroad tracks. The Contractor shall not adversely impact the railroad track property.

B. All contractors submitting proposals for this work shall first examine the site and all conditions thereon. All proposals shall take into consideration all conditions as may affect the work under this contract. All Contractors shall be aware that the Union Station Building and Garage Project Site is an Historic Building, and Contractor shall be cognizant of supplemental requirements associated with "historic structures" as described in associated project specifications or as detailed in other applicable references. Union Station Building and Garage are also considered a key rail station under applicable ADA guidelines. Although certain references are noted within the project specifications, the Contractor shall be aware that these references are listed for informational purposes only, and the Contractor shall be held solely responsible for being knowledgeable of ALL applicable codes and regulations.

C. The Contractor is **not** allowed on the train platforms or track areas unless authorized in writing by the Railroads.

D. The New Haven Parking Authority (NHPA) shall be the Contracting Agency for this project. For purposes of this project, use of the word "Owner," as used within these documents, shall refer to the NHPA.

E. Verify all grades, lines, levels and dimensions, as shown on the drawings, and report any errors or inconsistencies discovered in the above to the Engineer before commencing work.

302. STATEMENT OF WORK

The work for this project includes, but is not limited to: designated Elevator Modernization, and Elevator and Escalator Preventative Maintenance and Repair Services, together with all incidental work thereto and in accordance with Proposal Documents.

303. PARKING SPACE RESTRICTIONS

The Contractor shall schedule and arrange its work to minimize the number of parking spaces disturbed and/or taken out of service (including those required for traffic control), at any given time. The number of parking spaces and hours of availability allowed to be disturbed and/or taken out of service for construction activities is limited and must be coordinated with NHPA in advance. Once disturbed and/or taken out of service, the affected areas shall be made fully operational by the Contractor prior to its disturbing and/or taking out of service any other areas. The Contractor shall coordinate its construction activities with NHPA.

The Contractor shall post signs suitably in advance identifying parking areas to be taken out of service for construction activities. The Contractor shall coordinate with NHPA the relocation of any vehicles should they need to be removed from the proposed work area.

Once disturbed and/or taken out of service, the affected parking spaces shall be made operational by the Contractor prior to its disturbing and/or taking out of service any other spaces. The Contractor is to coordinate all disruption of parking space activities with NHPA. Note that available parking spaces may not necessarily be all together and next to one another, and flexibility in sequence of work is required.

304. WORK HOURS AND RELATED RESTRICTIONS

The Contractor's construction activities have certain work hour restrictions, as follows:

- A. Work shall be coordinated with the NHPA, City and State, and/or other affected parties, as applicable.
- B. The Contractor shall comply with all applicable noise ordinances. In general, noise generated by construction activities per applicable noise level standards is permissible during the hours of 7:00 AM and 10:00 PM on Mondays through

Saturdays, and 9:00 AM through 9:00 PM on Sundays, or as otherwise prescribed by law.

- C. At Union Station Campus, no work in the public access areas will be allowed from November 21st through January 1st or on holidays and weekends before and after holidays, unless otherwise authorized in writing by NHPA. The Contractor shall coordinate activities with NHPA.
- D. Work performed that may impact parking operations, traffic flow, pedestrian access or tenant spaces must be performed at only those times that minimize such impact and as authorized in writing by NHPA. Work shall be properly coordinated and sequenced with NHPA and affected parties as applicable.
- E. Work which may affect pedestrian access to any of facility's elevators shall require special coordination with NHPA. All costs associated with any special coordination, including but not limited placement of temporary directional signage needed to direct patrons to alternative means of egress shall be borne by the Contractor and are considered to be included in the Contract Price. All temporary signage shall be as approved by NHPA. Contractors shall be restricted to temporarily eliminating access to elevators on only one level at a time.
- F. Elevator service and stairways are vitally important for pedestrian travel in the facilities. Work involving the elevators and stairs requires special coordination with NHPA. The Contractor shall maintain access to the elevators to the maximum extent practical but should conditions mandate an impact to elevator access, the Contractor shall be restricted to temporarily limiting access to elevators on only one level and the Contractor may take out of service no more than one elevator car at one time and on a schedule approved in advance by NHPA, and patrons shall be notified and redirected with temporary directional signage to means of access and egress alternative accordingly. If an elevator is out of service, access to the adjacent stair shall be maintained to the extent possible. Only one stair may be taken out of service in each facility at one time and on a schedule approved in advance by NHPA, and patrons shall be notified and redirected with temporary directional signage to alternative means of access and egress accordingly to a nearby elevator and to a nearby stair. All costs associated with the elevator and stair closures are to be borne by the Contractor and are considered to be included in the Contract Price.
- D. Contractor shall provide barricades, scaffolding, or other required equipment to protect and maintain pedestrian access and egress within the Facilities, within the commercial and occupied spaces, and on the adjacent walkways/sidewalks and other affected areas. Pedestrian access and egress shall be maintained at all times.

All temporary partitions shall be designed to control dust and debris and attenuate noise on all sides of the garage and to prevent unauthorized access into the work area. The Contractor shall obey all applicable noise laws. The Contractor shall also use noise dampening/sound absorbing insulation in perimeter partitions to abate noise in the immediate vicinity and to nearby residential apartments and businesses. The partitions shall protect other areas within and near the facility from water, dust and flying debris. The Contractor shall provide a dust collection/filter system to prevent dust and debris from escaping in the work area ventilation exhaust as applicable. All drainage systems shall be protected from damage and shall be maintained in functioning order.

- F. Work affecting the commercial or occupied spaces or privately-owned areas shall be coordinated in advance and performed at times that minimize disruption. Permission for work in privately-owned areas must be secured prior to occupying them.

305. TRAFFIC CONTROL PLAN

The Contractor shall submit for approval immediately after execution of the Agreement, a carefully prepared Traffic Control Plan, conforming to the requirements of the Contract and in accordance with the Drawings and Specifications. This plan should show:

- A. The proposed dates of starting and completing each of the various phases of the Work
- B. The Total number of parking spaces impacted by the Work
- C. The vehicular and pedestrian traffic flow during construction, both external and internal to the Project Area
- D. Barricades, signs, markings and other traffic control devices to be used for the maintenance and protection of vehicular and pedestrian traffic, both external and internal to the Project Area. Provision of signage shall include all temporary signage for use when illuminated signage may be out of service

The Contractor's special attention is called to the fact that the Project Site(s) will be in active use while the Work is in progress and the Traffic Control Plan must address this condition.

The Contractor shall provide maximum vehicular and pedestrian mobility through and/or near the Project Area. The Contractor shall coordinate, as required, with the New Haven Parking Authority, applicable City and State agencies and departments, and all other applicable parties, as well as provide extra-duty police officers, as required by the City of New Haven and/or State of Connecticut, to maintain proper vehicular traffic on the surrounding streets. No traffic lane shall be taken out of service without appropriate

approvals and permits having been obtained by the Contractor from the Authorities Having Jurisdiction. The obtaining of said permits, inclusive of, but not limited to, all necessary street and sidewalk obstruction permits, shall be solely the responsibility of the Contractor.

NOTE: The City of New Haven and State of Connecticut also requires a copy of the Traffic Control Plan together with other information on protection and safety measures the Contractor will implement.

All traffic control devices shall comply with the latest edition of the Manual on Uniform Traffic Control Devices.

All costs associated with the Traffic Control Plan are to be borne by the Contractor and are considered to be included in the Contract Price.

306. CONTRACTOR'S COMPANY VEHICLE PARKING

Parking is limited at the Project Site. Contractor's company work vehicles (no employee vehicles) will be allowed at the Project Site only at designated locations. The Contractor must provide NHPA with a list of company work vehicles requiring the need to park at the site, and NHPA may issue keycards or similar devices for the Contractor's use; keycards shall be returned to NHPA upon completion of the project. All Contractor parking is at the Contractor's own risk. Violators parking in unauthorized areas are subject to having their vehicle towed at their expense. Contractor parking is a privilege subject to suspension if abuses are detected. NOTE: there are weight restrictions and limited vertical clearances in the parking garage(s).

307. SEQUENCE OF OPERATIONS

- A. **Only one elevator car is allowed out of service per Facility at a time but Contractor may work on multiple Facilities at a time.**
- B. As soon as practicable (not more than 10 days) after the award of the contract, the Contractor shall furnish a man-power loaded construction schedule to the Engineer. Contractor will revise the schedule as work progress deviates from schedule or as needed in order to complete the work within the Time for Commencement and Completion or when requested by the Engineer.
- C. The Contractor shall, at all times, employ sufficient labor and equipment to facilitate the Work and to ensure that the project is completed on or before the time specified in Section 308, "Time for Commencement and Completion."
- D. All work is to be coordinated in advance with NHPA so as to not disrupt or conflict with operations of the parking areas, associated commercial space tenants, and privately-owned areas.

- E. The Contractor shall take measurements in the field to verify or supplement all grades, lines, levels and dimensions as indicated on drawings and shall be responsible for accurate fit of specified work. Contractor shall report any errors or inconsistencies discovered in the above to the Engineer before commencing work.
- F. The Contractor shall obtain and pay for all permits, licenses, certificates, inspections or other legal fees both permanent or temporary which are required for the execution of the contract.
- G. The Contractor shall coordinate its work with that of any other Contractors on site. The Contractor is advised that there may be other construction activities being performed at the Facilities, adjacent facilities, and surrounding streets and sidewalks during this construction project. The Contractor shall coordinate its work with that of any other Contractors on-site or otherwise impacted, and to the extent practical while maintaining a safe environment and safe work operations, the Contractor shall allow the other contractors to have access into the work area to perform their work. The work currently being performed is inclusive of, but not limited to, the following:
- Union Station Garage State-of-Good Repairs, Project #23-009. Construction anticipated to start summer 2025 and last several years.
 - Union Station Building State-of-Good Repairs, Project #23-020. Construction anticipated to start fall 2025 and last several years.
 - Union Station Enabling Project - Phase 1. Project #23-051. Construction anticipated to start spring 2026 and last several years.
 - Union Station Interior Wayfinding Signage, Project #23-054. Design is in progress.
 - Union Station East Lot Development. In proposal approval stage for development of parcel.
 - Union Station West Lot development. In early stages of design (30%).
 - Union Station Area Geothermal Energy Network Project. In early stages of development.
 - Union Station and State Street Station – CTDOT Platform and Canopy Project – in design.
 - Air Rights Garage – lighting replacement and repair project – in design.
 - Air Rights Garage – repairs and improvements project – in design.
 - Crown Street Garage – commercial space demolition and white box – in design.
 - Temple Street Garage - repair project – in design.
 - 270 State Street Garage - repair project – in design.

- Parking Access & Revenue Control System Replacement in multiple facilities – in procurement stage.
- Other projects as may arise.

308. TIME FOR COMMENCEMENT AND COMPLETION

Regarding the Modernization work, the Contractor shall begin work under this Contract within ten (10) days from the date of the “Notice to Proceed” issued for the project and shall substantially complete all construction of the entire project within **One Thousand (1,000) calendar days** of the date of the Notice of Proceed. Contractor shall note that time for commencement and completion does not include potential shutdown of work due to winter weather.

309. LIQUIDATED DAMAGES FOR DELAY

A. The Contractor guarantees that it can and will complete the Work within the time limit stated in the Contract Documents, or within the time extended as provided elsewhere in the Contract Documents.

In as much as the damage and loss to NHPA, which will result from the failure of the Contractor to complete the project within **1,000 calendar days**, cannot be ascertained with precision, the Contractor and NHPA agree that the liquidated damage sum listed in subparagraph “B” below for each day of which the Contractor shall fail to complete the work or any part thereof in accordance with the provisions hereof is a reasonable sum and that such liquidated damages are not a penalty. NHPA will deduct and retain out any money due or to become due hereunder, the amount of liquidated damages, and in case those amounts are less than the amount of liquidated damages, the Contractor shall be liable to pay the difference upon demand by NHPA.

B. The Contractor agrees to pay NHPA a sum of **\$500.00** (“the Liquidated Sum”) for each calendar day beyond the established project completion date that the work remains incomplete.

310. TEMPORARY ELECTRIC LIGHT AND POWER

A. The Contractor shall provide and pay all costs connected with the furnishing of adequate light and power during construction, including that for power tools, equipment, appliances, barricades, storage sheds, etc.

B. The Contractor shall furnish all temporary power sources, wiring, meters, transformers, fixtures, extension cords, lamps, etc., and shall remove them upon completion. All temporary light and power shall be in accordance with code requirements.

- C. The Contractor may use the electrical power supplied to the facility for the Contractor's operations, free-of-charge.

311. CONTRACTOR'S OFFICE AT THE PROJECT SITE

Contractor need not maintain a field office at the Project sites. As a minimum, Contractor shall have an e-mail address where communications may be received as well as Contractor shall provide a mobile phone number at which Contractor can be reached at all times. Contractor's superintendent shall have in its use a smartphone with email access during the day to facilitate electronic communications.

312. STORAGE SPACE

No storage space shall be allocated for use by the Contractor. Any need for storage on-site must be provided by the Contractor and properly coordinated with NHPA and applicable Authorities Having Jurisdiction prior to start of work. Storage of any construction material, equipment and project records or associated paperwork is at the Contractor's own risk and Contractor shall suitably secure any such materials and store them in accordance with all applicable laws, rules and regulations, and not exceed any weight limits.

313. ADDITIONAL INSURANCE REQUIREMENTS AND INDEMNITY

In addition to the insurance requirements of General Conditions Section 111, the following requirements shall also apply:

- A. The following shall be listed as additional insureds to all policies on a primary and non-contributory basis for all insurance coverages required as set forth below to the extent allowed by law: the New Haven Parking Authority/Park New Haven, the City of New Haven, the State of Connecticut, Desman, Inc., Turner Construction Company, 101 College Street, LLC, Temple MOB, LLC, Yale New Haven Hospital, Smilow Cancer Hospital, Yale University School of Medicine, Medical Center Realty, Daymarr Realty, LLC, Acorn Property Management Group, and their respective officers, representatives, agents, servants, employees, successors and assigns. NHPA reserves the right to add entities to this list.
- B. With respect to the operations performed by the Contractor and those performed for the Contractor by its subcontractors, the Contractor shall carry, and/or require its subcontractors to carry, for the duration of the Contract, with the required additional insureds, the minimum liability insurance coverage set forth in the following items "B(1)" through "B(8)" at the Contractor's expense:

1. **Worker's Compensation and Employers' Liability Insurance** as required by the laws of the State of Connecticut: Workers Compensation with Statutory Limits and Employers' Liability with policy limit amounts not less than:
 - a. \$1,000,000 Each Accident (bodily injury by accident);
 - b. \$1,000,000 Disease – Policy limit (bodily injury by disease); and
 - c. \$1,000,000 Disease – Each Employee (bodily injury by disease).

When work is to be performed over or adjacent to navigable water, each Workers' Compensation policy shall contain the U.S. Longshoreman's and Harbor Workers' Act endorsement with the limits in accordance with the laws of the United States.

2. **Builder's Risk Insurance:** in an amount equal to or greater than the dollar value of the construction contract. The New Haven Parking Authority shall be named as Loss Payee. The City of New Haven and the State of Connecticut (as applicable) shall be listed as additional insureds.
3. **Owners' Protective Liability Insurance:** for the benefit and in the name of each of the New Haven Parking Authority, the City of New Haven, and the State of Connecticut (as applicable), with policy limit amounts of not less than One Million Dollars (\$1,000,000) each occurrence and Two Million Dollars (\$2,000,000) aggregate.
4. **Commercial General Liability Insurance, including Contractual Liability Insurance,** for all damages arising out of bodily injuries to, or death of, all persons and/or out of injury to, or destruction of, property, with policy limit amounts not less than the following One Million Dollars (\$1,000,000) each occurrence, and, subject to that limit per accident, a total (or aggregate) limit of Two Million Dollars (\$2,000,000).
5. **Automobile Liability Insurance** covering the operation of all motor vehicles, including those hired or borrowed, that are used in connection with the Project for all damages arising out of bodily injuries to, or death of, all persons and/or out of injury to, or destruction of, property, providing a One Million Dollars (\$1,000,000) combined single limit.
6. **Umbrella/Excess Liability** with limits of Five Million Dollars (\$5,000,000) Each Occurrence and Aggregate. The Umbrella/Excess must apply over the Products & Completed Operations. This Item B(6) shall be in addition to any umbrella/excess liability insurance that the Contractor may secure to satisfy the minimum limits required for Item B(4) Commercial General Liability and Item B(5) Automobile Liability Insurance using Umbrella Liability Insurance.

7. In the event the performance of any Contract involves **environmentally regulated substances or hazardous material exposure(s)**, Contractor's **Pollution Liability Insurance** with respect to the work and activities of the Contractor and/or their subcontractors, including but not limited to handling, transporting or disposing of any hazardous substances and/or environmentally regulated materials and any sudden and/or non-sudden pollution or impairment of the environment, including clean-up costs and defense with limits of liability specifically written for such Contract in the amount of at least Five Million Dollars (\$5,000,000). The Contractor and/or their subcontractors shall comply with all federal, state, and/or local laws, rules and regulations and shall obtain any additional coverage required by federal, state, or local government agencies. The Contractor's Pollution Liability Insurance shall be in effect from the date of written notice to proceed authorizing the work relating to the hazardous substances or other environmentally regulated materials and extend through the completion of the work.
8. In the event the performance of any Contract involves **construction or demolition work** performed by Contractor or its subcontractor(s) within fifty (50) feet of the railroad right-of way or State-owned rail property, with applicability determined by the State of Connecticut Department of Transportation, **Railroad Protective Liability Insurance** providing coverage of at least Two Million Dollars (\$2,000,000) for each accident or occurrence resulting in damages from (1) bodily injury to or death of all persons and/or (2) injury to or destruction of property and subject to that limit per accident or occurrence, an aggregate coverage of at least Six Million Dollars (\$6,000,000) for all damages during the policy period, and with all entities falling within any of the following listed categories named as insured parties: (i) the owner of the railroad right-of-way, including the State of Connecticut, (ii) the owner of any railcar licensed or permitted to travel within that affected portion of railroad right-of-way, (iii) the operator of any railcar licensed or permitted to travel within that affected portion of the railroad right-of-way, and (iv) any other party with an insurable interest. If such insurance is required by the State of Connecticut Department of Transportation, the Contractor shall obtain (or require its subcontractor to obtain, as applicable) such insurance and submit evidence of the minimum coverage indicated above to the NHPA and the City prior to the commencement of the rail-related work and/or activities. The Contractor or its subcontractor, as applicable, shall maintain such coverage until the work and/or activities is/are accepted. The following railroads have insurable interests including Metro-North Commuter Railroad Company, Metropolitan Transportation Authority (MTA), National Railroad Passenger Corporation (AMTRAK), CSX Transportation, Inc. & New York Central Lines, LLC, Providence & Worcester Railroad Company (P&W), and Transit America Services Inc./Alternate Concepts Inc. A Joint Venture.

9. In the event the performance of any Contract involves professional services, the Contractor or its applicable Subcontractors shall provide **Professional Liability Insurance** insuring against liability for professional services performed under this Contract in the amount of not less than Two Million Dollars (\$2,000,000) per occurrence, Two Million Dollars (\$2,000,000) aggregate. This policy shall remain in full force and effect from the date of any Contract through the longer of the expiration of the statute of limitations for actions against professional service providers (inclusive of extended injury limitation) or three (3) years from the date of completion of work by the Consultant or its subconsultant. It is understood that no terms and conditions of such insurance policy may be changed except upon the prior written approval of NHPA, which approval shall not be unreasonably withheld. This policy shall also include **pollution and environmental impairment coverage**, if such insurance is applicable to the services performed by the Consultant or subconsultant under any Contract, in the minimum amount of Two Million Dollars (\$2,000,000). The Consultant or subconsultant may provide pollution and environmental impairment coverage as stand-alone policy rather than as part of this Professional Liability Insurance policy.

10. **Policy Requirements:**

- a. All insurance coverages shall be primary.
 - b. All insurance policies shall be written by insurance company or companies satisfactory to the New Haven Parking Authority, as applicable, having a Financial Strength Rating of "A-" or higher and a Financial Size Rating of VIII or higher from A.M. Best Company.
 - c. Each insurance policy shall require that the insurance company agrees to investigate and defend the insured against all potential claims for damages, even if groundless.
 - d. All insurance policies shall also include a **Waiver of Subrogation**.
11. If any insurance policy is written on a "Claims Made" basis, the policy must be continually renewed for a minimum of two (2) years from the completion date of this Contract. If the policy is replaced and/or the retroactive date is changed, then the expiring policy must be endorsed to extend the reporting period for claims for the policy in effect during the contract for two (2) years from the completion date.
12. **Insurance Certificates:** The Contractor shall present original, completed Certificates of Insurance to the New Haven Parking Authority, 232 George Street, New Haven, CT 06510 prior to contract issuance. Contractor shall provide renewal certificates at least 30 days prior to the expiration date of the policies. Should any of the above-described policies be cancelled, limits reduced or coverage altered, 30 days written notice must be given to the New Haven Parking Authority.

C. Indemnification:

1. For the purposes of this Paragraph 313.C, the following definitions shall apply:

Indemnified Parties: The State of Connecticut, including CTDOT and any office, department, board, council, commission, institution or other agency or entity of the State of Connecticut, the City of New Haven, and the New Haven Parking Authority.

Claims: All actions, suits, claims, demands, investigations and proceedings of any kind, open, pending or threatened, whether mature, unmatured, contingent, known or unknown, at law or in equity, in any forum.

Contractor Parties: A Contractor's members, directors, officers, shareholders, partners, managers, principal officers, representatives, agents, servants, consultants, employees or any one of them or any other person or entity with whom the Contractor is in privity of oral or written contract and the Contractor intends for such other person or entity to Perform under the Contract in any capacity.

Records: All working papers and such other information and materials as may have been accumulated by the Contractor in performing under the Contract, including but not limited to, documents, data, plans, books, computations, drawings, specifications, notes, reports, records, estimates, summaries, memoranda and correspondence, kept or stored in any form.

2. Contractor's Indemnification Obligation:

The Contractor shall indemnify, defend and hold harmless the State, the City of New Haven, and the New Haven Parking Authority and each of their officers, representatives, agents, servants, employees, successors and assigns from and against any and all (1) Claims arising, directly or indirectly, in connection with the Contract, including the acts of commission or omission (collectively, the "Acts") of the Contractor or Contractor Parties; and (2) liabilities, damages, losses, costs and expenses, including but not limited to, attorneys' and other professionals' fees, arising, directly or indirectly, in connection with Claims, Acts or the Contract. The Contractor shall use counsel reasonably acceptable to the Indemnified Parties in carrying out its obligations under this section. The Contractor's obligations under this section to indemnify, defend and hold harmless against Claims includes Claims concerning confidentiality of any part of or all of the Contractor's bid, proposal or any Records, any intellectual property rights, other proprietary rights of any person or entity, copyrighted or uncopyrighted compositions, secret

processes, patented or unpatented inventions, articles or appliances furnished or used in the performance of this Contract.

The Contractor shall not be responsible for indemnifying or holding the State, the City of New Haven, and the New Haven Parking Authority harmless from any liability arising due to the negligence of the State, the City of New Haven, and the New Haven Parking Authority or any third party acting under the direct control or supervision of the Indemnified parties.

The Contractor shall reimburse the Indemnified Parties for any and all damages to the real or personal property of the Indemnified Parties caused by the Acts of the Contractor or any Contractor Parties. The Indemnified Parties shall give the Contractor reasonable notice of any such Claims.

The Contractor's duties under this section shall remain fully in effect and binding in accordance with the terms and conditions of the Contract, without being lessened or compromised in any way, even where the Contractor is alleged or is found to have merely contributed in part to the Acts giving rise to the Claims and/or where the State is alleged or is found to have contributed to the Acts giving rise to the Claims.

This section shall survive the Termination of the Contract and shall not be limited by reason of any insurance coverage.

314. REQUIREMENTS OF THE STATE OF CONNECTICUT

Pursuant to the February 14, 2022 Lease, Operating, and Funding Agreement between the State of Connecticut, Department of Transportation and the City of New Haven for New Haven Union Station Campus, the Successful Bidder as *Contractor* shall comply with certain provisions required as stated herein per enclosed Exhibit "A" regarding work affecting Union Station Campus.

315. ADDITIONAL REQUIREMENTS OF THE CAPITAL FUNDING AGREEMENT

In the event any work affecting Union Station Campus is funded through the State of Connecticut Department of Transportation (CTDOT) Capital Funding Agreement, there are certain special requirements with which the Contractor shall comply. Pursuant to the Capital Funding Agreement between the State of Connecticut, Department of Transportation and the City of New Haven for New Haven Union Station Campus, the Successful Bidder as *Contractor* shall comply with certain provisions required as stated herein per enclosed Exhibit "A-1" regarding work affecting Union Station Campus.

The following list amends Item 4.B.1, Project Administration Requirements, in Exhibit A-1, with regard to Form 819 Requirements:

Section 1.20 General Clauses for Facilities Construction, of CTDOT Form 818 applies. The following list amends Item 4.B.1, Project Administration Requirements, in Exhibit A-1, with regard to Form 819 Requirements:

1.20-1.01.01 Definitions, add statement: General references to Commissioner, Department, Manager of Contracts, Owner and Engineer and the like shall also mean NHPA and City as applicable in the conduct of the Project.

1.20-1.02.01. Contract bidding and award: Delete reference to this section. Follow the procedures included in the City/NHPA Project Manual.

1.20-1.02.03 Examination of contract, documents, and work site, add statement: References to *DOT contracts* shall also mean *NHPA and City* as applicable in the conduct of the Project.

1.20-1.03.07 Insurance: This section is not applicable. Follow Section 313 of the Special Conditions.

1.20-1.05.01 Authority of Engineer. add statement: The contractor shall also notify NHPA, City, and CTDOT of its claim against the Union Station Partnership with regard to work on the Project.

1.20-1.07.05 Load restrictions, add statement: “With regard to vehicle weights and storage of construction materials, the Contractor shall review the loads imposed by the vehicles or stored materials with the Engineer prior to activity within the parking garage or within the building.” Also, delete the third sentence in paragraph (b), Storage of Construction Materials/Equipment on Structures.

1.20-1.07.06 Sanitary provisions, add statement: In lieu of portable toilets, the Contractor may use the public restrooms provided that it does not create a nuisance.

1.20-1.07.07 Safety, and public convenience, add statement: Contractor shall provide a clear zone suitable for the design, speed and travel way geometry, subject to review and approval by the Engineer.

1.20-1.08.02 Construction field office, add statement: Contractor need not maintain a field office at the Project site. As a minimum, Contractor shall have an e-mail address where communications may be received as well as Contractor shall provide a mobile phone number at which Contractor can be reached at all times. Contractor’s superintendent shall have in its use a smartphone with email access during the day to facilitate electronic communications. Existing vacant space as approved by Owner and in as-is condition may be utilized for a temporary construction field office. Contractor shall

make all necessary improvements to utilize the space for its office use, and comply with all applicable laws.

1.20-1.09.06.A(1), Partial Payments: Monthly and Semi-monthly Estimates: Delete sentence: “Retainage will not be held.” Substitute with sentence: “Retainage of 2% of the total work completed and stored will be held until the contractor has submitted an approved Affirmative Action Plan to CHRO, and CHRO has granted approval.”

316. LABOR COMPLIANCE

1. Nondiscrimination: The Applicant will comply with Connecticut General Statutes § 4a-60, as may be amended, which prohibits the Applicant from discriminating or permitting discrimination against any person or group of persons on the grounds of race, color, religious creed, age, marital status, national origin, ancestry, sex, mental retardation, mental disability, or physical disability, including, but not limited to, blindness, unless it is shown by such contractor that such disability prevents performance of the work involved, in any manner prohibited by the laws of the United States or of the State of Connecticut. The Applicant will comply with Connecticut General Statutes § 4a-60a, as may be amended, which prohibits the Applicant from discriminating or permitting discrimination against any person or group of persons on the grounds of sexual orientation.

2. Affirmative Action: The Applicant will comply with Connecticut General Statutes § 4a-60, which prohibits the Applicant from engaging in or permitting discrimination in the performance of the work involved as well as requires that the company take affirmative action to ensure that all job applicants with job related qualifications are employed and that employees are, when employed, treated in a nondiscriminatory manner.

3. Executive Order Number 3: The Applicant will comply with Executive Order Number Three, which gives the State Labor Commissioner continuing jurisdiction over Agreement performance in regard to nondiscrimination. It empowers the State Labor Commissioner to cancel, terminate or suspend the Assistance Agreement for violation of or noncompliance with the order or any state or federal law concerning nondiscrimination.

4. Executive Order Number 16: The Applicant will comply with Executive Order Number Sixteen, of Governor John G. Rowland promulgated August 4, 1999, regarding Violence in the Workplace Prevention. The Assistance Agreement may be cancelled, terminated or suspended by the State for violation or noncompliance with said Executive Order No. Ver. 9.14.Mun Page 6 Sixteen.

5. Executive Order Number 17: The Applicant will comply with Executive Order Number Seventeen, which gives the State Labor Commissioner jurisdiction in respect to

Agreement performance in regard to listing all employment openings with the Connecticut Employment Service.

317. CASH FLOW SCHEDULE

The Contractor shall submit a detailed Cash Flow Schedule, which shall be updated monthly, stating its anticipated invoices to NHPA. The Contractor shall submit monthly invoices for payment based upon the work completed and approved but not to exceed the amount set forth in such Cash Flow Schedule as periodically updated.

The first Cash Flow Schedule shall be submitted within ten (10) days of the Notice of Award. Failure of the Contractor to properly project cash flow needs may result in a delay of payment to the Contractor. No interest expenses will be paid to the Contractor for any reason. The Contractor shall be responsible for any ineligible costs.

318. REQUIREMENTS OF PROGRAM MANAGER

New Haven Parking Authority (“Owner”) has engaged Turner Construction Company (or any successor) as its current professional construction program manager (“Program Manager”). The Contractor, identified by Turner as “Trade Contractor”, shall agree to the terms of the “Trade Contract Attachment”, copy of form enclosed in the Bid Documents and restated below:

The Trade Contractor acknowledges and agrees (i) that the role of the Program Manager is to function solely on behalf of and for the benefit of the Owner, (ii) that the Trade Contractor waives all claims, whether in contract, tort or otherwise, that it may now or hereafter have against the Program Manager, (iii) that the Program Manager shall be an additional insured on the insurance policies of the Trade Contractor and that all such policies shall contain a waiver of subrogation in favor of the Program Manager and (iv) that the Trade Contractor shall defend, indemnify and hold harmless Owner and Program Manager from any and all claims, demands, and suits (including, but not limited to suits for bodily injury and property damage) in any way arising out of or related to their respective contracts or alleged failure of Trade Contractor to perform its responsibilities or obligations.

The Trade Contractor further acknowledges that it must, at its own expense; work cooperatively with all other Trade Contractors on site to coordinate its work with the work of such Trade Contractors, including modifying its schedule and activities. To further such coordination it must, when requested by the Program Manager, submit to the Program Manager, a current updated copy of its detailed schedule to demonstrate the status of such coordination and, if the Program Manager deems it necessary, to modify its schedules and operations as and in the manner required by the Program Manager and to execute its work in the manner shown on the revised schedule. It is agreed that any such modifications required by the Program Manager or any resulting work shall not result in

any claims against the Program Manager or the Owner and all such claims are waived. While the Program Manager may have the right to take such action, in no respect shall the Owner or the Program Manager be obligated to do so.

319. COST-PLUS EXTRA WORK BY SUBCONTRACTORS

Add the following paragraph as applicable to General Conditions Section 139.c.2:

(e) All extra work performed by a subcontractor will be according to the above requirements as if the work were performed directly by the Contractor. Extra work performed by a subcontractor will be paid as actual cost plus fifteen percent (15%) to the subcontractor and five percent (5%) to the General Contractor. If there are second and third-tier subcontractors, the aggregate mark-up for all subcontractors involved shall be fifteen percent (15%). The maximum mark-up for all subcontractors plus General Contractor is twenty percent (20%).

For work at the Union Station Campus, add the following sentence as applicable to General Conditions Sections 139 and 140 which supersedes:

Refer to applicable provisions in CTDOT Form 819, including but not limited to, Sections 1.20.1.04.05 and 1.20.1.09.04.

320. GUARANTEES

Work guaranteed for a period greater than one year, as described in the General Conditions, shall have a written guarantee. The guarantee will be as described in the related specification section governing that work or elsewhere in the specification. The guarantee shall be submitted prior to final payment for the project. Unless otherwise noted all work shall be guaranteed free from defects in material and workmanship for a period of one year minimum from the date of final completion.

321. PROTECTION/SAFETY MEASURES

- A. Caution shall be exercised by the Contractor at all times for the protection of persons and property and all safety regulations and other provisions of applicable Federal, State and local laws, Building and Construction codes, including the requirements of the Occupational Safety and Health Administration shall be observed.
- B. The drawings do not include standards or guidelines for construction safety. The Contractor shall be responsible for the adequacy and safety of all construction methods and the safe prosecution of the Work, including but not limited to forms, false-work, scaffolding, protective barricades, and protective rails. It is expressly stipulated that any examination and/or approval by the Engineer of the Contractor's plans for such items as well as for any other items needed for the prosecution of the work will cover only general conformance with the design concept of the project and

general compliance with the information given in the Contract Documents. Contractor shall assume full and complete responsibility for safe prosecution of the Work at all times and for obtaining satisfactory results.

- C. During the course of the performance of the Work under the Contract, if any operation, practice, or condition is deemed by the Engineer to be unsafe, the Contractor, when notified verbally and later confirmed in writing by the Engineer, shall take such corrective action immediately as appropriate.
- D. Nothing in the contract documents shall be construed as relieving the Contractor from full responsibility of safe prosecution of the Work at all times. In the event the Owner, the Engineer or its representative are held by court of administrative body to be liable for personal injuries or damages to property arising from deficiencies in the job-site safety, the Contractor shall promptly indemnify and hold them harmless.
- E. All appropriate safety measures need to be taken during construction due to the continuous operation of the Facilities.
- F. The delivery and setup of any scaffolding and cranes will be coordinated in advance with the Owner, Architect/Engineer, and Authorities Having Jurisdiction as not to interfere or endanger any persons or property inside or outside of building. Scaffolding and cranes will be setup and operated by qualified personnel only. All personnel using scaffolding, cranes and ladders will do so by OSHA standards.
- G. Demolished material is to be contained and secured at the damaged area and brought to ground level as soon as possible to avoid debris falling on pedestrians below.
- H. Install tarps/nets below work area on scaffolding/cranes/ladder to catch any falling debris.
- I. Dust and dirt resulting from demolition and removal shall be controlled by erecting dust-proof partitions or barriers and hanging dust cloths to contain/collect the dust and debris from the construction activities. The Contractor is responsible for preventing the spread of construction dirt and debris into all areas of operation in and outside of the building. Contractor will wet the debris and other materials or use other approved methods to prevent the spread of dust to occupied portions of the building and site. Use of water will not be permitted when it will result in a hazardous condition such as slippery floors, flooding, or pollution.
- J. Any dust/debris generated by construction shall require that the area to be partitioned off and an air-filtering device installed inside partition to absorb all dust and debris created from the work operation. Cover any adjacent existing HVAC return grills and smoke detectors prior to generating dust or debris or using volatile cleaning/finishing products. Coordinate with NHPA and applicable Authorities Having Jurisdiction.

- K. Any debris/dust that collects on ground level that poses a tripping-slipping hazard shall be removed immediately.
- L. Contain all dust and debris at the level/immediate location that it is being generated at. Store in a suitable container with a cover so that if it is dropped the contents won't spill out if knocked over. Secure container to crane, scaffolding or as otherwise applicable.
- M. Entrances to building, tenant spaces, public areas as well as all walkways, pathways, travel-ways etc. will be kept clear and have adequate overhead protection from falling debris. If an entrance or travel-way has to be closed, the contractor will provide barriers and signage directing people to next entrance or alternate travel-way.
- N. The Contractor shall at all times provide protection against the weather so as to maintain their work, materials, apparatus and fixtures free from injury or damage. At the end of the days work all new work likely to be damaged shall be covered.
- O. Any work damaged by failure to provide above protection shall be removed and replaced with new work at the Contractor's expense.
- P. The Contractor shall pay the cost of repair or replacement from theft or damage to existing equipment, material or work due to negligence by the Contractor in securing the project site and adjacent areas affected by the Contractor's operations.

322. CALL BEFORE-YOU-DIG

The Contractor's attention is called to the fact that they are obligated, by State Law, to notify the Public Utilities Control Authority (1-800-922-4455) 48 hours prior to beginning any digging or discharging of explosives. This "One Call Before You Dig" system will assure that each utility company will have marked its lines in the field before any digging activity commences. The Contractor assumes all responsibilities for any damage to the various utility services, and all liabilities arising therefrom.

The Contractor shall make the necessary arrangements with the respective Utility Companies and provide grades for resetting and adjusting of private utility company manholes and grade boxes, and the relocation of poles and hydrants; all at no additional costs to NHPA or the City. Any delays, which are caused by conflicts with utility lines, shall not be considered as a basis of extending the time for completion.

323. LAWS

All work will be in conformance with any and all applicable laws of the Federal Government, State of Connecticut, and City of New Haven relating to the Contract and are hereby included by reference.

324. REPORTS, RECORDS AND DATA

The contractor and each of its subcontractors shall submit to NHPA, schedules of quantities and costs, progress schedules, payroll reports, estimates, records and other data as NHPA may request concerning the work performed or to be performed under this contract.

325. TRAFFIC AND CONSTRUCTION

With reference to the street and sidewalk work, the Contractor shall maintain and protect traffic in accordance with the following additional requirements:

1. Where referred to herein, “Authorized Work Hours” are as approved by public agencies having jurisdiction.
2. At no time shall work occur on any portion of this project without prior written approval from City and/or State as applicable for work outside Authorized Work Hours.
3. All trenches must be either backfilled or covered with steel plate, all public rights-of-way clean of debris, material, equipment, supplies, etc. and all streets must be fully open to traffic as permitted at no additional cost to NHPA, City or State. It is the Contractor’s responsibility to notify NHPA and Authorities Having Jurisdiction immediately, should conditions require the delay of opening any street after permitted times.
4. No detouring of traffic is allowed on City or State roadways, sidewalks and rights-of-way; however, detours of traffic within the off-street project site may be permitted with the prior written consent of NHPA and Authorities Having Jurisdiction.
5. The Contractor shall maintain access to all driveways except as approved in writing as part of Contractor’s traffic control plan.
6. No plates shall be used during winter because of interference with snow plowing.
7. The Contractor shall provide and install all new pavement markings damaged or removed during construction, and as shown on the drawings.

8. Prior to the commencement of any activity which could interfere in or impede the normal movement of traffic, the Contractor shall notify NHPA and Authorities Having Jurisdiction and request an extra-duty police officer to act as a trafficman.
9. No street or sidewalk shall be obstructed to traffic at any time, unless specifically approved by NHPA and Authorities Having Jurisdiction.
10. All costs for traffic maintenance and protection, including labor, equipment, and services involved in the erection, maintenance, moving, adjusting, relocating, and storing of all traffic control devices such as signs, barricades, cones, drums, and markings shall be included in the total contract price as part of applicable line items and no separate payments for this work will be made.

326. CITY STREET SIGNS

Any signs disturbed or removed by the Contractor, whether shown on the plans or not, shall be reset or replaced at the Contractor's expense as directed by the Engineer or by NHPA having jurisdiction. Any traffic control devices damaged due to negligence shall be replaced by the Contractor at its expense.

327. OTHER CONSTRUCTION AND CONTRACTORS

The Contractor's attention is called to the following:

Utility Companies' crews may be working at the project site from time to time. It shall be the Contractor's responsibility to coordinate and schedule its operations so as not to cause any conflicts between themselves and the various utilities. All costs incurred in coordinating and scheduling the various operations shall be included in the Total Bid Price and no separate payments for this work will be allowed. NHPA may also have additional contractors working on site besides the ones identified in Special Conditions 307.

328. WATER POLLUTION ABATEMENT

Under no circumstances shall the Contractor allow sanitary sewage to be discharged into any storm sewer, river, brook, stream, creek, storm ditch, or the New Haven Harbor. In case of the failure of any component of the sewer system, the Contractor shall take immediate action to ensure that sanitary sewage does not discharge into any storm sewer, river, brook, stream, creek, storm ditch, or the New Haven Harbor. These immediate actions shall include whatever labor (including overtime), materials, and equipment as may be required and all work shall be done at no cost to NHPA or Authorities Having Jurisdiction. If no prompt action is taken, NHPA and Authorities Having Jurisdiction may

proceed with corrective work and deduct whatever costs are incurred from future payments to the Contractor.

329. EXISTING SEWERS AND CULVERTS (STORM AND SANITARY)

The Contractor shall be responsible for maintaining and protecting all existing sewers and culverts encountered in the work under this contract. Hand excavation and adequate bracing and shoring shall be employed where required to ensure the structural integrity of said existing structures.

The Contractor shall save the City of New Haven, the Greater New Haven Water Pollution Control Authority, the State of Connecticut and the NHPA harmless and shall be solely responsible for any liabilities or damages arising from its work near, under or through existing sewers and culverts. The Contractor shall repair and replace, as required by the Engineer, any existing sewers or culverts damaged as a result of his work.

There will be no separate payment by NHPA for work covered in this section.

The Contractor shall schedule its operations so as to insure and maintain the uninterrupted flow in existing sewers at all times.

All frames, grates, covers and catch basin heads that are to be removed because of abandonment of existing manholes or catch basins or for other reasons shall be handled carefully so that they may be reused. The Engineer shall direct where they are to be delivered and stored neatly at various sites within the City, at no additional cost to NHPA.

330. DUST CONTROL

The Contractor shall be responsible for controlling dust from its operations, and when ordered by the Engineer shall use whatever methods necessary for dust control, in a manner satisfactory to the Engineer. No separate payment for this work will be made, and all costs including labor, materials, and equipment shall be considered to be included in the total contract price as part of applicable line items.

331. DAILY CLEAN - UP

The Contractor shall at the end of each workday, keep the project area clean, and free from debris, excavation materials, or any other items considered as trash. These items shall be disposed of daily in a legal manner at an approved dump site. No separate payment shall be made for any work involved in this section.

332. EXISTING CONDITIONS

The site conditions are as of the day the Contractor begins work. All work to be performed will be based on the conditions found at that time. It is the obligation of the Contractor to inform NHPA of any substantial changes in the site conditions that have occurred between the time the bid is opened and the notice to begin work. Any substantial change in the site during this period will be evaluated as to its impact on the contract cost and its impact on the notice to proceed. A substantial change may require re-bidding the entire project. This will be at the sole discretion of NHPA and the Contractor awarded the project will have no adverse claim against NHPA if such a determination has been made. No claims or extras will be allowed for any changes in site conditions due to the Contractor's discovery after the commencement of work, unless there is an approved change order.

NHPA assumes that the Contractor, during the process of developing its bid, has thoroughly examined the site or project area and has disclosed any obvious defects in the plans and specifications prior to bid and has entered into this agreement to complete all work required in the contract at the bid price submitted and accepted.

333. RIGHT TO ELIMINATE WORK

NHPA reserves the right to eliminate or remove from the Contract any of the items or portions of such items of work set forth on the Bid Form, including but not limited to the quantities to be provided or scope of the work, in the event it deems it to be in the best interest of NHPA. NHPA also has the right to terminate the Agreement with the Contractor for cause or convenience (reference General Conditions Section 145).

334. DESCRIPTION OF WORK

All materials furnished and used in the completed work shall be new, of the best quality, and recognized as standard in construction practices. Whenever a specification number of reference is given, the subsequent amendments (if any) shall be included. The standards set forth in the selection of materials and supplies are intended to conform with those standards adopted by Owner. Preference in manufacture shall be given to adopted standards, and the Contractor shall further familiarize themselves with the requirements of the Owner when the occasion or choice of materials or supplies so demands.

335. METHODS OF CONSTRUCTION

No materials shall be used which are known or found to be defective in any way. Notice shall be given to the Owner of any defective or imperfect material. Defective or unfit material, found to have been used, shall be removed and replaced by the Contractor with sound and unobjectionable material without additional expense to the Owner. All materials furnished by the Contractor are subject to thorough inspections and tests by the

Owner. The Contractor shall submit samples as required by the Owner, of the various materials used on the contract for testing purposes. All ordering lists shall be submitted for approval to the Owner by the Contractor. Materials shall not be ordered until the ordering lists have been approved.

336. REMOVAL AND SALVAGE OF MATERIAL

Items shown on the drawings as existing to be removed for reuse/reinstallation, shall be stored and protected by the Contractor until they are re-installed or delivered to the storage yards.

The existing items that will be removed from the Project Site are the property of the NHPA and/or the City or State and shall be salvaged from the Site unless otherwise directed by NHPA and/or the City or State as applicable. NHPA, the City and State each retain the right of first refusal for all salvaged items owned by them. All salvaged items that will not be re-installed at the Site must be delivered and stored to the New Haven Parking Authority at a designated location as directed by the New Haven Parking Authority, if NHPA elects to retain or legally disposed of by the Contractor; or at a designated location within the City for City-owned materials or at a designated location within the State for Stated-owned materials. Items to be re-installed are identified on Drawings, or as directed by the NHPA through the Engineer.

Once these items are removed, the Contractor must protect them from theft, damage, or vandalism prior to delivery. If NHPA, the City or State does not want a portion of the surplus or salvage material, that portion shall become the property of the Contractor to be disposed of by him after having been so directed in writing by NHPA.

There shall be no separate payment to the Contractor for all this work, but the cost shall be considered as included in the Total Contract Price as part of applicable line items.

337. TESTS AND CERTIFICATION OF MATERIALS

At the discretion of the Engineer, periodic tests may be taken to satisfy the quality of the work or materials to be used on the project. The responsibility of payment for such tests will be NHPA's unless the quality of the Contractors work or materials does not meet the specifications or as otherwise stated in the Technical Specifications. In such cases, the Contractor will pay for all unsatisfactory tests taken.

Upon request of the Engineer, the Contractor shall, at its expense, provide certifications of materials used on the project. If the Contractor chooses to do tests to prove a substitute item would be acceptable to NHPA, the Contractor shall be responsible for all costs involved to satisfy NHPA of the acceptability of the material.

338. PROJECT PHOTOGRAPHS

The contractor shall furnish NHPA with color photographs showing the initial existing conditions of the areas to be disturbed by construction and progress photographs to be taken during the course of construction showing the progression of the work and/or at times and locations which may be designated by the Owner/Engineer. The Contractor shall provide electronic files (JPEG) of all photographs or similar format if approved by Owner/Engineer. Electronic files shall be formatted for later printing (by the Owner/Engineer, at their discretion) and shall be 5 megapixels minimum.

Electronic files of all submitted photographs shall be provided with suitable file names showing project number, facility name, photo number (in sequence), date taken, vantage point, and description of work that the photograph is representing. Alternatively, the Contractor may prepare a spreadsheet listing this information to coincide with the photograph number for matching.

Upon start of construction and every work week thereafter (until the work is substantially complete), the Contractor shall take photos of the construction. Submission of the photographs shall coincide with submission of Contractor's payment requisition or once per month as a minimum.

Contractor shall take representative photographs of the work in progress, at critical milestones of the work, and at the various stages of multi-stage work. When photographing the various stages of multi-stage work, the Contractor shall endeavor to duplicate the vantage point of the photographs so that the photographs can be properly compared and the full process of the multi-stage work can be reviewed.

Contractor shall take photos in sufficient quantity to represent the work in progress, at critical milestones of the work, and at the various stages of multi-stage work. Contractor is responsible for providing the sufficient quality and quantity of the photographs. Contractor shall note that should the photographs be of poor-quality or be of insufficient quantity, as solely determined by the Owner/Engineer, the photographs may be rejected and new photographs shall be submitted. NHPA reserves the right to seek additional information / photographs in addition to what is provided.

All costs of furnishing these photographs shall be included in the Contract Price. No separate payment will be made.

END OF SPECIAL CONDITIONS

**DRAFT AGREEMENT
BY AND BETWEEN
NEW HAVEN PARKING AUTHORITY
AND
[REDACTED] COMPANY
REGARDING ELEVATOR AND ESCALATOR SERVICES
AT
NEW HAVEN PARKING AUTHORITY FACILITIES
NEW HAVEN, CONNECTICUT
NHPA PROJECT #21-011**

PART I

This Agreement, consisting of Parts I and II, entered into effective this [REDACTED] day of [REDACTED], 2025 by and between the New Haven Parking Authority (hereinafter referred to as "NHPA"), a special purpose municipal authority created by Special Act 51-473 of the General Assembly of the State of Connecticut, as amended, with offices at 232 George Street, New Haven, CT 06510, and [REDACTED] having offices at [REDACTED] (hereinafter referred to as "CONTRACTOR").

WITNESSETH THAT:

WHEREAS, NHPA requires the servicing, repair and preventive maintenance of its elevators and escalators; and

WHEREAS, as a result of Request for Proposals, CONTRACTOR has been selected as the successful proposer offering the services in the best interest of NHPA; and

WHEREAS, CONTRACTOR has agreed to perform the services set forth hereunder;

NOW, THEREFORE, AND IN CONSIDERATION OF THE FOREGOING, NHPA and CONTRACTOR hereby agree as follows:

SECTION 1: ENGAGEMENT OF CONTRACTOR

101. NHPA hereby engages CONTRACTOR, and CONTRACTOR hereby agrees to perform the Services in accordance with the terms and conditions and for the consideration set forth herein. With regard to services at the Union Station Campus (Union Station Building, Union Station Garage, and State Street Station), all references to the Station Manager, Parking Manager and/or Brokerage Manager contained in this Agreement or as referenced relate to the New Haven Parking Authority solely in its capacity as the duly authorized Station Manager, Parking Manager and Brokerage Manager of the Union Station Campus pursuant to its Management Agreement with the City of New Haven (the "Management Agreement") and its

responsibilities as the Station Manager, Parking Manager and/or Brokerage Manager pursuant to the 2022 New Haven Union Station Lease, Operating and Funding Agreement between the State of Connecticut and the City of New Haven ("LOFA"). No reference to the Station Manager, Parking Manager and/or Brokerage Manager herein contained shall be construed as creating any liability of the Station Manager, Parking Manager and/or Brokerage Manager for any obligation in any capacity other than as the duly authorized Station Manager, Parking Manager and/or Brokerage Manager of the Premises pursuant to the LOFA and Management Agreement.

102. The person in charge of administering this Agreement on behalf of NHPA shall be _____ or such other person as NHPA shall designate in writing.

103. The person responsible for the Services to be rendered on behalf of CONTRACTOR shall be _____, _____, or such other qualified person as is designated in writing by CONTRACTOR and accepted by NHPA.

104. The CONTRACTOR shall have and maintain all applicable and necessary licenses, certifications, permits, and/or similar approvals. Upon request, such documentation shall be made available to NHPA, and others as required by law.

105. The CONTRACTOR shall not subcontract any services to be performed under this Agreement without the prior written approval of NHPA. Any subcontractor shall have and maintain applicable and necessary licenses, permits, and/or similar approvals and shall be made available upon request by NHPA, and others as required by law. The firm of _____ is hereby approved as the _____ subcontractor. The firm of _____ is hereby approved as the _____ subcontractor.

106. Independent Contractor: It is the express intention of the parties that CONTRACTOR and/or its Subcontractors shall be at all times an *independent contractor*, and not an employee of NHPA. CONTRACTOR retains the right to provide services for others during the term of this Agreement and is not required to devote CONTRACTOR's services exclusively to NHPA. CONTRACTOR will propose CONTRACTOR's own hours of work and will, in consultation with NHPA, determine the appropriate means and methods of carrying out the work and project. NHPA shall not provide CONTRACTOR with any employee benefits, and all payments to CONTRACTOR for services and work hereunder will be reported to appropriate taxing authorities via a Form 1099 or equivalent.

SECTION 2: SCOPE OF SERVICES

201. CONTRACTOR shall perform the services set forth under this Agreement in a satisfactory manner, as reasonably determined by NHPA. CONTRACTOR shall make such revisions or modifications to its work, at its own cost and expense, as may be required by NHPA.

202. The Services to be performed by the CONTRACTOR shall include the following with respect to the Project, as further described in Section 210 hereof: _____

203. The services to be performed by CONTRACTOR with respect to the repair and preventive maintenance of NHPA's elevators and escalators shall include but not be limited to those

as set forth in Exhibit “ ”, which is attached hereto and made a part hereof. The elevators to be serviced are located at the Air Rights Garage, Crown Street Garage, Granite Square Garage, Temple Medical Garage, Temple Street Garage, 270 State Street Garage, Union Station Garage, and Union Station Building and State Street Station and their passageways (bridges and tunnels) to train platforms. There are also two escalators to be serviced at the Union Station Building.

204. Unless otherwise specified in this Agreement, CONTRACTOR shall submit all written materials required to be submitted under this Agreement in electronic and paper format as well as printed copies upon request.

205. In performing the Services, CONTRACTOR shall consult with NHPA and shall meet, as appropriate, with NHPA and with other persons or entities, including Federal, State, and local officials and the like, as deemed necessary at the discretion of NHPA.

206. In performing the services required under this Agreement, any designs or other materials submitted by CONTRACTOR shall conform to the applicable provisions of Federal, State, and local laws and regulations including, but not limited to, the requirements of the Basic Building Code of the State of Connecticut, applicable zoning regulations, fire safety regulations, Americans with Disabilities Act, and any other applicable laws. ADA, etc.

207. CONTRACTOR shall provide all plans and materials, as applicable, to NHPA at least 10 days prior to the commencement of work. It is understood that NHPA will review all plans and materials submitted by CONTRACTOR as part of the Services, and CONTRACTOR shall revise, at its sole expense, all submitted plans or other materials which do not conform to applicable laws and regulations in effect during performance of the Services. CONTRACTOR shall indemnify NHPA for any costs or damages arising directly or indirectly from plans or other materials which contain errors or omissions, or which do not conform to applicable laws and regulations, irrespective of whether NHPA has approved such plans or materials.

208. Insurance and Indemnity Requirements:

- A. The following shall be listed as additional insureds to all policies on a primary and non-contributory basis for insurance coverages required as set forth below, to the extent allowed by law: the New Haven Parking Authority/Park New Haven, the City of New Haven, and the State of Connecticut, and their respective officers, representatives, agents, servants, employees, successors and assigns. NHPA reserves the right to add entities to this list.
- B. With respect to the operations performed by the Contractor and those performed for the Contractor by its subcontractors, the Contractor shall carry, and/or require its subcontractors to carry, for the duration of the Contract, with the required additional insureds, the minimum liability insurance coverage set forth in the following items “B(1)” through “B(8)” at the Contractor’s expense:

1. **Worker's Compensation and Employers' Liability Insurance** as required by the laws of the State of Connecticut: Workers Compensation with Statutory Limits and Employers' Liability with policy limit amounts not less than:
 - a. \$1,000,000 Each Accident (bodily injury by accident);
 - b. \$1,000,000 Disease – Policy limit (bodily injury by disease); and
 - c. \$1,000,000 Disease – Each Employee (bodily injury by disease).

When work is to be performed over or adjacent to navigable water, each Workers' Compensation policy shall contain the U.S. Longshoreman's and Harbor Workers' Act endorsement with the limits in accordance with the laws of the United States.

2. **Builder's Risk Insurance:** In the event the performance of any Contract involves **construction or demolition work** performed by Contractor or its subcontractor(s), provide coverage in an amount equal to or greater than the dollar value of the construction contract. The New Haven Parking Authority shall be named as Loss Payee. The City of New Haven and the State of Connecticut shall be listed as additional insureds.
3. **Owners' Protective Liability Insurance:** In the event the performance of any Contract involves **construction or demolition work** performed by Contractor or its subcontractor(s). provide coverage for the benefit and in the name of each of the New Haven Parking Authority, the City of New Haven, and the State of Connecticut, with policy limit amounts of not less than One Million Dollars (\$1,000,000) each occurrence and Two Million Dollars (\$2,000,000) aggregate.
4. **Commercial General Liability Insurance, including Contractual Liability Insurance,** for all damages arising out of bodily injuries to, or death of, all persons and/or out of injury to, or destruction of, property, with policy limit amounts not less than the following One Million Dollars (\$1,000,000) each occurrence, and, subject to that limit per accident, a total (or aggregate) limit of Two Million Dollars (\$2,000,000).
5. **Automobile Liability Insurance** covering the operation of all motor vehicles, including those hired or borrowed, that are used in connection with the Project for all damages arising out of bodily injuries to, or death of, all persons and/or out of injury to, or destruction of, property, providing a One Million Dollars (\$1,000,000) combined single limit.
6. **Umbrella/Excess Liability** with limits of Five Million Dollars (\$5,000,000) Each Occurrence and Aggregate. The Umbrella/Excess must apply over the Products & Completed Operations. This Item B(6) shall be in addition to any umbrella/excess liability insurance that the Contractor may secure to satisfy the minimum limits required for Item B(4) Commercial General Liability and Item B(5) Automobile Liability Insurance using Umbrella Liability Insurance.

7. In the event the performance of any Contract involves **environmentally regulated substances or hazardous material exposure(s)**, Contractor's **Pollution Liability Insurance** with respect to the work and activities of the Contractor and/or their subcontractors, including but not limited to handling, transporting or disposing of any hazardous substances and/or environmentally regulated materials and any sudden and/or non-sudden pollution or impairment of the environment, including clean-up costs and defense with limits of liability specifically written for such Contract in the amount of at least Five Million Dollars (\$5,000,000). The Contractor and/or their subcontractors shall comply with all federal, state, and/or local laws, rules and regulations and shall obtain any additional coverage required by federal, state, or local government agencies. The Contractor's Pollution Liability Insurance shall be in effect from the date of written notice to proceed authorizing the work relating to the hazardous substances or other environmentally regulated materials and extend through the completion of the work.
8. In the event the performance of any Contract involves **construction or demolition work** performed by Contractor or its subcontractor(s) within fifty (50) feet of the railroad right-of way or State-owned rail property, with applicability determined by the State of Connecticut Department of Transportation, **Railroad Protective Liability Insurance** providing coverage of at least Two Million Dollars (\$2,000,000) for each accident or occurrence resulting in damages from (1) bodily injury to or death of all persons and/or (2) injury to or destruction of property and subject to that limit per accident or occurrence, an aggregate coverage of at least Six Million Dollars (\$6,000,000) for all damages during the policy period, and with all entities falling within any of the following listed categories named as insured parties: (i) the owner of the railroad right-of-way, including the State of Connecticut, (ii) the owner of any railcar licensed or permitted to travel within that affected portion of railroad right-of-way, (iii) the operator of any railcar licensed or permitted to travel within that affected portion of the railroad right-of-way, and (iv) any other party with an insurable interest. If such insurance is required by the State of Connecticut Department of Transportation, the Contractor shall obtain (or require its subcontractor to obtain, as applicable) such insurance and submit evidence of the minimum coverage indicated above to the NHPA and the City prior to the commencement of the rail-related work and/or activities. The Contractor or its subcontractor, as applicable, shall maintain such coverage until the work and/or activities is/are accepted. The following railroads have insurable interests including Metro-North Commuter Railroad Company, Metropolitan Transportation Authority (MTA), National Railroad Passenger Corporation (AMTRAK), CSX Transportation, Inc. & New York Central Lines, LLC, Providence & Worcester Railroad Company (P&W), and Transit America Services Inc./Alternate Concepts Inc. A Joint Venture.
9. In the event the performance of any Contract involves professional services, the Contractor or its applicable Subcontractors shall provide **Professional Liability Insurance** insuring against liability for professional services performed under this Contract in the amount of not less than Two Million Dollars (\$2,000,000) per

occurrence, Two Million Dollars (\$2,000,000) aggregate. This policy shall remain in full force and effect from the date of any Contract through the longer of the expiration of the statute of limitations for actions against professional service providers (inclusive of extended injury limitation) or three (3) years from the date of completion of work by the Consultant or its subconsultant. It is understood that no terms and conditions of such insurance policy may be changed except upon the prior written approval of NHPA, which approval shall not be unreasonably withheld. This policy shall also include **pollution and environmental impairment coverage**, if such insurance is applicable to the services performed by the Consultant or subconsultant under any Contract, in the minimum amount of Two Million Dollars (\$2,000,000). The Consultant or subconsultant may provide pollution and environmental impairment coverage as stand-alone policy rather than as part of this Professional Liability Insurance policy.

10. **Policy Requirements:**

- a. All insurance coverages shall be primary.
 - b. All insurance policies shall be written by insurance company or companies satisfactory to the New Haven Parking Authority, as applicable, having a Financial Strength Rating of “A-” or higher and a Financial Size Rating of VIII or higher from A.M. Best Company.
 - c. Each insurance policy shall require that the insurance company agrees to investigate and defend the insured against all potential claims for damages, even if groundless.
 - d. All insurance policies shall also include a **Waiver of Subrogation**.
11. If any insurance policy is written on a “Claims Made” basis, the policy must be continually renewed for a minimum of two (2) years from the completion date of this Contract. If the policy is replaced and/or the retroactive date is changed, then the expiring policy must be endorsed to extend the reporting period for claims for the policy in effect during the contract for two (2) years from the completion date.
12. **Insurance Certificates:** The Contractor shall present original, completed Certificates of Insurance to the New Haven Parking Authority, 232 George Street, New Haven, CT 06510 prior to contract issuance. Contractor shall provide renewal certificates at least 30 days prior to the expiration date of the policies. Should any of the above-described policies be cancelled, limits reduced or coverage altered, 30 days written notice must be given to the New Haven Parking Authority.

C. **Indemnification:**

1. **For the purposes of this Paragraph 208.C, the following definitions shall apply:**

Indemnified Parties: The State of Connecticut, including CTDOT and any office, department, board, council, commission, institution or other agency or entity of the

State of Connecticut, the City of New Haven, and the New Haven Parking Authority.

Claims: All actions, suits, claims, demands, investigations and proceedings of any kind, open, pending or threatened, whether mature, unmatured, contingent, known or unknown, at law or in equity, in any forum.

Contractor Parties: A Contractor's members, directors, officers, shareholders, partners, managers, principal officers, representatives, agents, servants, consultants, employees or any one of them or any other person or entity with whom the Contractor is in privity of oral or written contract and the Contractor intends for such other person or entity to Perform under the Contract in any capacity.

Records: All working papers and such other information and materials as may have been accumulated by the Contractor in performing under the Contract, including but not limited to, documents, data, plans, books, computations, drawings, specifications, notes, reports, records, estimates, summaries, memoranda and correspondence, kept or stored in any form.

2. Contractor's Indemnification Obligation:

The Contractor shall indemnify, defend and hold harmless the State, the City of New Haven, and the New Haven Parking Authority and each of their officers, representatives, agents, servants, employees, successors and assigns from and against any and all (1) Claims arising, directly or indirectly, in connection with the Contract, including the acts of commission or omission (collectively, the "Acts") of the Contractor or Contractor Parties; and (2) liabilities, damages, losses, costs and expenses, including but not limited to, attorneys' and other professionals' fees, arising, directly or indirectly, in connection with Claims, Acts or the Contract. The Contractor shall use counsel reasonably acceptable to the Indemnified Parties in carrying out its obligations under this section. The Contractor's obligations under this section to indemnify, defend and hold harmless against Claims includes Claims concerning confidentiality of any part of or all of the Contractor's bid, proposal or any Records, any intellectual property rights, other proprietary rights of any person or entity, copyrighted or uncopyrighted compositions, secret processes, patented or unpatented inventions, articles or appliances furnished or used in the performance of this Contract.

The Contractor shall not be responsible for indemnifying or holding the State, the City of New Haven, and the New Haven Parking Authority harmless from any liability arising due to the negligence of the State, the City of New Haven, and the New Haven Parking Authority or any third party acting under the direct control or supervision of the Indemnified parties.

The Contractor shall reimburse the Indemnified Parties for any and all damages to the real or personal property of the Indemnified Parties caused by the Acts of the

Contractor or any Contractor Parties. The Indemnified Parties shall give the Contractor reasonable notice of any such Claims.

The Contractor's duties under this section shall remain fully in effect and binding in accordance with the terms and conditions of the Contract, without being lessened or compromised in any way, even where the Contractor is alleged or is found to have merely contributed in part to the Acts giving rise to the Claims and/or where the State is alleged or is found to have contributed to the Acts giving rise to the Claims.

This section shall survive the Termination of the Contract and shall not be limited by reason of any insurance coverage.

209. All of the materials prepared by CONTRACTOR under this Agreement shall be the sole and exclusive property of NHPA, and CONTRACTOR shall label all drawings and documents accordingly. NHPA shall use materials prepared by CONTRACTOR under this Agreement solely for the purpose of this Project contemplated herein.

210. The Basic Services to be provided by CONTRACTOR shall consist of the Scope of Services as attached hereto as Exhibit " [REDACTED]".

SECTION 3: INFORMATION AND ITEMS TO BE FURNISHED TO THE CONTRACTOR

301. NHPA will provide CONTRACTOR with all documents, data, and other materials in its possession appropriate to the services to be performed hereunder, and will use its best efforts to secure materials or information from other sources requested by CONTRACTOR for the purpose of CONTRACTOR carrying out services under this agreement; Provided, However, that CONTRACTOR shall be responsible for verifying all information provided by NHPA.

SECTION 4: TIME OF PERFORMANCE

401. The Term of this Agreement shall commence effective as of [REDACTED], 2025 and shall expire on June 30, [REDACTED]. The "First Year" of the Term shall be for a period of [REDACTED] months commencing on [REDACTED], 2025 and continuing through June 30, [REDACTED], and the Compensation for the months in excess of 12 months shall be appropriately prorated based on the First Year annual amount. Thereinafter each successive "Year" of the Term shall commence on July 1 and run through June 30 of the next calendar.

Termination. This Agreement shall terminate at the expiration of the Term, or renewal thereof, without the necessity of any notice from NHPA to terminate the same. NHPA also reserves the right to terminate specific facilities at its sole discretion upon notice to CONTRACTOR.

Holding Over/Contract Term Extension. Upon mutual consent of the parties, in the absence of any agreement extending the Term hereof, this Agreement may continue on a month-to-month basis terminable by either party upon thirty (30) days' prior written notice. Such month-to-month term extension shall be subject to all conditions, provisions and obligations of this Agreement except that the compensation may be increased by application of the Producer Price Index for Metals and Metal Products and the International Union of Elevator CONTRACTOR's Labor Rate then in effect, or other such method as may be mutually agreed by the parties, as verified by proper documentation.

402. NHPA shall not be responsible or liable to CONTRACTOR or to those claiming by, through or under CONTRACTOR, for any loss or damage which may be occasioned by or through the acts or omissions of other persons, or otherwise, or for any loss or damage resulting to CONTRACTOR, or those claiming by, through or under CONTRACTOR, or its their property. To the maximum extent permitted by law, CONTRACTOR agrees to provide its services at CONTRACTOR's own risk.

SECTION 5: COMPENSATION

501. NHPA shall compensate the CONTRACTOR for satisfactory performance of the services required under this Agreement in a maximum amount not to exceed [REDACTED] Dollars and [REDACTED] Cents (\$[REDACTED]).

A. Base Price.

BASE PRICING

Location

Air Rights Garage

Crown Street Garage

Granite Square Garage

Temple Medical Garage

Temple Street Garage

270 State Street Garage

State Street Station

Union Station Garage Elevators

Union Station Main Elevators

Union Station Tunnel Elevators

Union Station Building Escalators

Total:

Year 1	Year 2	Year 3	Year 4	Year 5

GRAND TOTAL (Years 1 - 5): \$ _____

B. Billing Suspension

Full-Service Maintenance billing will be suspended for each elevator car upon being taken out of service for modernization. Maintenance for each elevator car will resume at current contract rate at the conclusion of the 12-month modernization warranty period.

C. Added Options.

1. Dedicated Preventative Maintenance – Monday Mornings. In the event this option is selected, CONTRACTOR will provide an additional four (4) hours of preventive maintenance every Monday from 8 AM to 12 PM. In the event a Holiday falls on a Monday, then this service will be provided on the following Tuesday. The additional cost to the base price and modified maintenance fees is \$ [REDACTED] per month in Year 1 and thereafter may be increased by an amount not greater than [REDACTED] % annually effective July 1 of each successive year. NHPA hereby elects to activate this option until written notice to the contrary

2. Dedicated Resident Technician – Full Time. In the event this option is selected, CONTRACTOR will provide a full-time technician dedicated solely to NHPA for maintenance and call backs. This provides an immediate response and attention to NHPA facilities. This option is applicable with a minimum one-year contractual commitment due to the necessity of CONTRACTOR having to hire an additional technician for its work force, and is in lieu of the base and modified maintenance fees. The particular technician selected for this service is subject to NHPA's written consent, which consent may not be unreasonably withheld. The cost in Year 1 is \$ [REDACTED] per month and thereafter may be increased by an amount not greater than [REDACTED] % annually effective July 1 of each successive year.

D. Additional Services & Emergency Minor Adjustment Callback Service

1. In the event NHPA elects to have CONTRACTOR provide Additional Services and Emergency Adjustment Callback Service, NHPA shall pay the following rates together with costs:

NOTE:

Regular Time = Monday - Friday 8:00 AM - 4:30 PM.

Overtime (1.7X) = Monday - Friday 4:30 PM - 8:00 AM & Saturday 12:00 AM - 11:59 PM

Sunday/Holiday (2X) = Sunday and Holidays 12:00 AM - 8:00 AM following day

Regular Time Hourly Rate-Mechanic \$ /hr

Regular Time Hourly Rate-Helper \$ /hr

Regular Time Hourly Rate-Team \$ /hr

Overtime Hourly Rate-Mechanic \$ /hr

Overtime Hourly Rate-Helper \$ /hr

Overtime Hourly Rate-Team \$ /hr

Sunday/Holiday Hourly-Mechanic \$ /hr

Sunday/Holiday Hourly-Helper	\$ /hr
Sunday/Holiday Hourly-Team	\$ /hr

2. These rates may be adjusted effective on July 1 of each year of the Term in accordance with documented increase in CONTRACTOR's standard rates, not to exceed % per year.

E. Other Work. Other work requested by NHPA may also be performed by CONTRACTOR by negotiation upon mutually acceptable terms.

502. Compensation provided under this Section 5 constitutes full and complete payment for all costs assumed by CONTRACTOR in performing this Agreement including but not limited to salaries; taxes; fees; supervision; equipment; cost of materials and supplies; insurance; overhead; printing and reproduction; meetings, consultations, and presentations; postage; telephone; clerical support; travel; and all similar expenses.

503. Payments to CONTRACTOR under this Agreement shall be made by NHPA on approval of payment requisitions certified by a principal of CONTRACTOR submitted not more often than once a month, unless otherwise allowed by NHPA at its sole discretion. Each requisition shall be in a form acceptable to NHPA and shall set forth the services performed, an itemized cost breakdown allocating the expenses to a particular project or activity and cost center, the percentage of completion of the work or the hours of work expended, as applicable, and the compensation due to CONTRACTOR based upon the fee amount set forth in Section 501. Provided that the total contract amount is not exceeded unless otherwise increased by amendment, NHPA and CONTRACTOR may mutually agree to adjust line items to best meet Project needs. NHPA may, prior to making any payment under this Agreement, require CONTRACTOR to submit to it such additional information with respect to CONTRACTOR's costs as it deems necessary.

SECTION 6: TERMS AND CONDITIONS

601. This Agreement is subject to and incorporates the provisions attached hereto as New Haven Parking Authority Contract for Services Part II, Terms and Conditions. In the event any provision of said Part II conflicts with any provision of this Part I of this Agreement, Part I shall be controlling.

602. This Agreement, its terms and conditions and any claims arising therefrom, shall be governed by Connecticut law. The CONTRACTOR shall comply with all applicable laws, ordinances, and codes of the State of Connecticut, the City of New Haven, and NHPA and shall commit no trespass on any private property in performing services under this Agreement.

603. THE PARTIES AGREE THAT THEY WAIVE A TRIAL BY JURY AS TO ANY AND ALL CLAIMS, CAUSES OF ACTION OR DISPUTE ARISING OUT OF THIS AGREEMENT OR SERVICES TO BE PROVIDED PURSUANT TO THIS AGREEMENT. NOTWITHSTANDING ANY SUCH CLAIM, DISPUTE, OR LEGAL ACTION, THE CONTRACTOR SHALL CONTINUE TO PERFORM SERVICES UNDER THIS AGREEMENT IN A TIMELY MANNER, UNLESS OTHERWISE DIRECTED BY NHPA.

NO PARTY WILL SEEK TO CONSOLIDATE ANY SUCH ACTION IN WHICH A JURY TRIAL HAS BEEN WAIVED WITH ANY OTHER ACTION IN WHICH A JURY TRIAL CANNOT BE OR HAS NOT BEEN WAIVED.

604. NHPA and the CONTRACTOR each binds itself, its partners, successors, assigns and legal representatives to the other party to this Agreement and to the partners, successors, assigns and legal representatives of such other party with respect to all covenants of this Agreement.

605. This Agreement incorporates all the understandings of the parties hereto and supersedes any and all agreements reached by the parties prior to the execution of this Agreement, whether oral or written.

606. If any provision of this Agreement is held invalid, the balance of the provisions of the Agreement shall not be affected thereby if the balance of the provisions of this Agreement would then continue to conform to the requirements of applicable laws.

607. Any waiver of the terms and conditions of this Agreement by either of the parties hereto shall not be construed to be a waiver of any other term or condition of this Agreement.

608. NHPA may, from time to time request changes in the scope of services of the CONTRACTOR to be performed hereunder. Such changes which are mutually agreed upon by and between NHPA and the CONTRACTOR, shall be incorporated in written amendments executed by both parties to this Agreement.

609. Pursuant to all applicable requirements set forth in the 2022 Lease, Operating, and Funding Agreement between the State of Connecticut, Department of Transportation and the City of New Haven for New Haven Union Station Campus, the CONTRACTOR shall comply with certain applicable provisions required as stated herein per enclosed Exhibit "A", regarding work affecting New Haven Union Station Campus.

610. Pursuant to all applicable requirements set forth in the Capital Funding Agreement between the State of Connecticut, Department of Transportation and the City of New Haven for New Haven Union Station Campus, the CONTRACTOR shall comply with certain applicable provisions required as stated herein per enclosed Exhibit "A-1", regarding work affecting New Haven Union Station Campus.

611. Except as otherwise specifically provided in this Agreement, whenever under this Agreement approvals, authorizations, determinations, satisfactions or waivers are required or permitted, such approvals, authorizations, determinations, satisfactions or waivers shall be effective and valid only when given in writing signed by a duly authorized officer of NHPA or the CONTRACTOR, and delivered in hand or sent by mail, postage prepaid, to the principal office of the party to whom it is directed, which until changed by written notice from one party to the other, are as follows:

NHPA:
New Haven Parking Authority

Attn: Executive Director
232 George Street
New Haven, CT 06510

With a copy to:
Rini and Associates
Attn: Joseph L. Rini, Esq.
216 Crown Street
New Haven, CT 06510
riniassoc@gmail.com

&

Cohen and Wolf, P.C.
Attn: Peter Okragly, Esq.
1115 Broad Street
Bridgeport, CT 06604
pokragly@cohenandwolf.com

CONTRACTOR

CONTRACTOR:

[Redacted Contractor Information]

IN WITNESS WHEREOF, the parties hereto have caused this Agreement to be duly executed four (4) counterparts of this Agreement as of the day and year first above written.

WITNESS:

NEW HAVEN PARKING AUTHORITY*

By: _____

Its: _____

*As to Union Station Campus only (Union Station Building, Union Station Garage, and State Street Station), pursuant to this Agreement, New Haven Parking Authority Acting as Station Manager, Parking Manager, and Brokerage Manager pursuant to the New Haven Union Station Campus, Lease, Operating and Funding Agreement and Management Agreement

(Duly Authorized)

CONTRACTOR COMPANY

By: _____

Its: _____

WITNESS:
(Duly Authorized)

DRAFT

NEW HAVEN PARKING AUTHORITY

CONTRACT FOR SERVICES

PART II: TERMS AND CONDITIONS

1. **Termination of Contract for Cause.** If, through any cause, the CONTRACTOR shall fail to fulfill in a timely and proper manner the CONTRACTOR's obligations under this Contract, or if the CONTRACTOR shall violate any of the covenants, agreements, or stipulations of this Contract, the New Haven Parking Authority ("NHPA") shall thereupon have the right to terminate this Contract by giving written notice to the CONTRACTOR of such termination and specifying the effective date thereof. In such event, all finished or unfinished documents, data, studies, and reports prepared by the CONTRACTOR under this Contract shall, at the option of NHPA, become NHPA's property, and the CONTRACTOR shall be entitled to receive just and equitable compensation for any satisfactory work completed on such documents.

Notwithstanding the above, the CONTRACTOR shall not be relieved of liability to NHPA for damages sustained by NHPA by virtue of any breach of the Contract by the CONTRACTOR, and NHPA may withhold any payments to the CONTRACTOR for the purpose of setoff until such time as the exact amount of damages due to NHPA from the CONTRACTOR is determined.

2. **Termination for Convenience of NHPA.** NHPA may terminate this Contract at any time by a notice in writing from NHPA to the CONTRACTOR. If the Contract is terminated by NHPA as provided herein, the CONTRACTOR will be paid an amount which bears the same ratio to the total compensation as the services actually performed bear to the total services of the CONTRACTOR covered by this Contract, less payments of compensation previously made.

3. **Changes.** NHPA may, from time to time, request changes in the scope of the services of the CONTRACTOR to be performed as described herein. Such changes, including but not limited to, any increase or decrease in the amount of the fees to be paid to the CONTRACTOR's compensation, which are mutually agreed upon by and between NHPA and the CONTRACTOR, shall be incorporated in written amendments to this Contract.

4. **Personnel.**

(a) The CONTRACTOR represents that it has, or will secure at its own expense, all personnel required in performing the services under this Contract. Such personnel shall not be employees of or have any contractual relationship with NHPA.

(b) All the services required hereunder will be performed by the CONTRACTOR or under the CONTRACTOR's supervision and all personnel engaged in the work shall be fully qualified and shall be authorized or permitted under Federal, State or local law to perform such services.

(c) No person who is serving sentence in a penal or correctional institution shall be employed on work under this Contract.

5. Anti-Kickback Rules. Salaries of architects, draftsmen, technical engineers, technicians and other persons performing work under this Contract shall be paid unconditionally and not less often than once a month without deduction or rebate on any account except only such payroll deductions as are mandatory by law or permitted by the applicable regulations issued by the Secretary of Labor pursuant to the "Anti-Kickback Act" of June 13, 1934 (48 Stat. 948; 62 Stat. 740; 63 Stat. 108; Title 18 U.S.C., Section 874; and Title 40 U.S.C., Section 276c). The CONTRACTOR shall comply with applicable "Anti-Kickback" regulations and shall insert appropriate provisions in all subcontracts covering work under this Contract to ensure compliance by subcontractors with such regulations, and shall be responsible for the submissions of affidavits required of subcontractors thereunder except as the Secretary of Labor may specifically provide for variations of or exemptions from the requirements thereof.

6. Equal Employment Opportunity. During the performance of this Contract, the CONTRACTOR agrees as follows:

- a. To comply with all applicable provisions of Executive Order 11246 and Executive Order 11375, Connecticut Fair Employment Practices Act, and the contract compliance ordinance of the City of New Haven, including all standards and regulations which are promulgated by the government authorities who established such acts and requirements, and all standards and regulations are incorporated herein by reference;
- b. Not to discriminate against any employee or applicant for employment because of race, color, religion, age, sex, physical disability or national origin. The CONTRACTOR will take affirmative action to ensure that applicants are employed, and that employees are treated during employment, without regard to race, color, religion, sex, age, national origin or physical handicap. Such action shall include, but not be limited to, the following: employment, upgrading, demotion or transfer, recruitment or recruitment advertising, layoff or termination, rates of pay or other forms of compensation, and selection for training, including apprenticeship;
- c. To take such action, with respect to any SUBCONTRACTOR, as NHPA may direct as a means of enforcing the provisions of sub-paragraphs (a) through (e) herein.
- d. To file, along with its SUBCONTRACTORS, if any, compliance reports with NHPA in the form and to the extent prescribed in the contract by the contract compliance director of the City of New Haven. Compliance reports filed at such times as directed shall contain information as to the employment practices, policies, programs and statistics of the CONTRACTOR and its subcontractors, if any;

- e. To include the provisions of sub-paragraphs (a) through (e) of this equal opportunity clause in every subcontract or purchase order so that said provisions will be binding upon each such SUBCONTRACTOR or vendor;

7. Discrimination Because of Certain Labor Matters. No person employed on the work covered by this Contract shall be discharged or in any way discriminated against because they have filed any complaint or instituted or caused to be instituted any proceeding or has testified or is about to testify in any proceeding under or related to the labor standards applicable hereunder to their employer.

8. Compliance with Law. The CONTRACTOR shall comply with all applicable laws, ordinances, and codes of the Federal, State, and local governments, and shall commit no trespass on any public or private property in performing any of the work embraced by the Contract.

9. Subcontracting. None of the services covered by this Contract shall be subcontracted without the prior written consent of NHPA. The CONTRACTOR shall be as fully responsible to NHPA for the acts and omissions of its subcontractors, and of persons either directly or indirectly employed by them, as it is for the acts and omissions of persons directly employed by the CONTRACTOR. The CONTRACTOR shall insert in each subcontract appropriate provisions requiring compliance with the labor standards provisions of this Contract.

10. Assignability. The CONTRACTOR shall not assign any interest in this Contract, and shall not transfer any interest in the same (whether by assignment or novation) without the prior written approval of NHPA; Provided, However, that claims for money due or to become due the CONTRACTOR from NHPA under this Contract, if any, may be assigned to a bank, trust, company, or other financial institution, or to a Trustee in Bankruptcy, without such approval. Notice of any such assignment or transfer shall be furnished promptly to NHPA.

11. Interest of NHPA Officials. No member of the governing body of NHPA, and no other officer, employee, or agent of NHPA who exercises any function or responsibilities in connection with the carrying out of the Project to which this Contract pertains, shall have any personal interest, direct or indirect, in this Contract.

12. Interest of CONTRACTOR. The CONTRACTOR covenants that it presently has no interest and shall not acquire any interest, direct or indirect, in the above-described Project Area or any parcels therein or any other interest which would conflict in any manner or degree with the performance of its services hereunder. The CONTRACTOR further covenants that in the performance of this Contract no person having any such interest shall be employed.

13. Findings Confidential. All of the services performed, prepared or assembled by the CONTRACTOR under this Contract are confidential and the CONTRACTOR agrees that they shall not be made available to any individual or organization without the prior written approval of NHPA.

14. Audit. NHPA reserves the right to audit the CONTRACTOR's books of account in relation to this Contract any time during the period of this Agreement or at any time during the

twelve-month period immediately following the closing or termination of this Contract. In the event NHPA elects to make such an audit, the CONTRACTOR shall immediately make available to NHPA all records pertaining to this Contract, including, but not limited to, payroll records, bank statements and cancelled checks.

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Exhibit B
Scope of Services

SCOPE OF SERVICES

A brief description of the items to be included in the scope of services follows.
CONTRACTOR.

21-011 DRAFT Elevator Service Agreement

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EXHIBIT “A”

REQUIREMENTS OF THE STATE OF CONNECTICUT

PURSUANT TO THE 2022 LEASE, OPERATING, AND FUNDING AGREEMENT BETWEEN THE CITY OF NEW HAVEN AND THE STATE OF CONNECTICUT, DEPARTMENT OF TRANSPORTATION FOR NEW HAVEN UNION STATION CAMPUS, THE CONTRACTOR SHALL COMPLY WITH CERTAIN PROVISIONS REQUIRED AS STATED HEREIN

I. INSURANCE REQUIREMENTS AT NEW HAVEN UNION STATION
CAMPUS FOR CONTRACTORS

- A. The following shall be listed as additional insureds to all policies on a primary and non-contributory basis for insurance coverages required by Items B(4), B(5), B(6), B(7), and B(8) to the extent allowed by law: the New Haven Parking Authority/Park New Haven, the City of New Haven, (and, as applicable, the State of Connecticut), and their respective officers, representatives, agents, servants, employees, successors and assigns. NHPA reserves the right to add entities to this list.
- B. With respect to the operations performed by the Contractor and those performed for the Contractor by its subcontractors, the Contractor shall carry, and/or require its subcontractors to carry, for the duration of the Contract, with the required additional insureds, the minimum liability insurance coverage set forth in the following items “B(1)” through “B(8)” at the Contractor’s expense:
1. **Worker’s Compensation and Employers’ Liability Insurance** as required by the laws of the State of Connecticut: Workers Compensation with Statutory Limits and Employers’ Liability with policy limit amounts not less than:
 - a. \$1,000,000 Each Accident (bodily injury by accident);
 - b. \$1,000,000 Disease – Policy limit (bodily injury by disease); and
 - c. \$1,000,000 Disease – Each Employee (bodily injury by disease).

When work is to be performed over or adjacent to navigable water, each Workers’ Compensation policy shall contain the U.S. Longshoreman’s and Harbor Workers’ Act endorsement with the limits in accordance with the laws of the United States.

2. **Builder’s Risk Insurance (***unless otherwise specified, this relates to NHPA Construction Contracts ONLY***)**: in an amount equal to or greater than the

dollar value of the construction contract. The New Haven Parking Authority shall be named as Loss Payee. The City of New Haven (and, as applicable, the State of Connecticut) shall be listed as additional insureds.

3. **Owners' Protective Liability Insurance (**unless otherwise specified, this relates to NHPA Construction Contracts ONLY**):** for the benefit and in the name of the New Haven Parking Authority with policy limit amounts of not less than One Million Dollars (\$1,000,000) each occurrence and Two Million Dollars (\$2,000,000) aggregate.
4. **Commercial General Liability Insurance, including Contractual Liability Insurance,** for all damages arising out of bodily injuries to, or death of, all persons and/or out of injury to, or destruction of, property, with policy limit amounts not less than the following One Million Dollars (\$1,000,000) each occurrence, and, subject to that limit per accident, a total (or aggregate) limit of Two Million Dollars (\$2,000,000).
5. **Automobile Liability Insurance** covering the operation of all motor vehicles, including those hired or borrowed, that are used in connection with the Project for all damages arising out of bodily injuries to, or death of, all persons and/or out of injury to, or destruction of, property, providing a One Million Dollars (\$1,000,000) combined single limit.
6. **Umbrella/Excess Liability (**unless otherwise specified, depending on the scope of work**)** with limits of One Million Dollars (\$1,000,000) Each Occurrence and Aggregate. This Item B(6) shall be in addition to any umbrella/excess liability insurance that the Contractor may secure to satisfy the minimum limits required for Item B(4) Commercial General Liability and Item B(5) Automobile Liability Insurance using Umbrella Liability Insurance.
7. In the event the performance of any Contract involves **environmentally regulated substances or hazardous material exposure(s)**, Contractor's **Pollution Liability Insurance** with respect to the work and activities of the Contractor and/or their subcontractors, including but not limited to handling, transporting or disposing of any hazardous substances and/or environmentally regulated materials and any sudden and/or non-sudden pollution or impairment of the environment, including clean-up costs and defense with limits of liability specifically written for such Contract in the amount of at least Five Million Dollars (\$5,000,000). The Contractor and/or their subcontractors shall comply with all federal, state, and/or local laws, rules and regulations and shall obtain any additional coverage required by federal, state, or local government agencies. The Contractor's Pollution Liability Insurance shall be in effect from the date of written notice to proceed authorizing the work relating to the hazardous substances or other environmentally regulated materials and extend through the completion of the work.

8. In the event the performance of any Contract involves **construction or demolition work** performed by Contractor or its subcontractor(s) within fifty (50) feet of the railroad right-of way or State-owned rail property, with applicability determined by the State of Connecticut Department of Transportation, **Railroad Protective Liability Insurance** providing coverage of at least Two Million Dollars (\$2,000,000) for each accident or occurrence resulting in damages from (1) bodily injury to or death of all persons and/or (2) injury to or destruction of property and subject to that limit per accident or occurrence, an aggregate coverage of at least Six Million Dollars (\$6,000,000) for all damages during the policy period, and with all entities falling within any of the following listed categories named as insured parties: (i) the owner of the railroad right-of-way, including the State of Connecticut, (ii) the owner of any railcar licensed or permitted to travel within that affected portion of railroad right-of-way, (iii) the operator of any railcar licensed or permitted to travel within that affected portion of the railroad right-of-way, and (iv) any other party with an insurable interest. If such insurance is required by the State of Connecticut Department of Transportation, the Contractor shall obtain (or require its subcontractor to obtain, as applicable) such insurance and submit evidence of the minimum coverage indicated above to the NHPA and the City prior to the commencement of the rail-related work and/or activities. The Contractor or its subcontractor, as applicable, shall maintain such coverage until the work and/or activities is/are accepted. The following railroads have insurable interests including Metro-North Commuter Railroad Company, Metropolitan Transportation Authority (MTA), National Railroad Passenger Corporation (AMTRAK), CSX Transportation, Inc. & New York Central Lines, LLC, Providence & Worcester Railroad Company (P&W), and Transit America Services Inc./Alternate Concepts Inc. A Joint Venture.
9. In the event the performance of any Contract involves professional services, the Contractor or its applicable Subcontractors shall provide **Professional Liability Insurance** insuring against liability for professional services performed under this Contract in the amount of not less than Two Million Dollars (\$2,000,000) per occurrence, Two Million Dollars (\$2,000,000) aggregate. This policy shall remain in full force and effect from the date of any Contract through the longer of the expiration of the statute of limitations for actions against professional service providers (inclusive of extended injury limitation) or three (3) years from the date of completion of work by the Consultant or its subconsultant. It is understood that no terms and conditions of such insurance policy may be changed except upon the prior written approval of NHPA, which approval shall not be unreasonably withheld. This policy shall also include **pollution and environmental impairment coverage**, if such insurance is applicable to the services performed by the Consultant or subconsultant under any Contract, in the minimum amount of Two Million Dollars (\$2,000,000). The Consultant or subconsultant may provide pollution and environmental impairment coverage as stand-alone policy rather than as part of this Professional Liability Insurance policy.

10. **Policy Requirements:**

- a. All insurance coverages shall be primary.
 - b. All insurance policies shall be written by insurance company or companies satisfactory to the New Haven Parking Authority, as applicable, having a Financial Strength Rating of “A-” or higher and a Financial Size Rating of VIII or higher from A.M. Best Company.
 - c. Each insurance policy shall require that the insurance company agrees to investigate and defend the insured against all potential claims for damages, even if groundless.
 - d. All insurance policies shall also include a Waiver of Subrogation.
11. If any insurance policy is written on a “Claims Made” basis, the policy must be continually renewed for a minimum of two (2) years from the completion date of this Contract. If the policy is replaced and/or the retroactive date is changed, then the expiring policy must be endorsed to extend the reporting period for claims for the policy in effect during the contract for two (2) years from the completion date.
12. **Insurance Certificates:** The Contractor shall present original, completed Certificates of Insurance to the New Haven Parking Authority, 232 George Street, New Haven, CT 06510 prior to contract issuance. Contractor shall provide renewal certificates at least 30 days prior to the expiration date of the policies. Should any of the above-described policies be cancelled, limits reduced or coverage altered, 30 days written notice must be given to the New Haven Parking Authority.

II. STATE AND FEDERALLY REQUIRED PROVISIONS

A. The bid documents specify the applicable compliance requirements with Disadvantaged/Minority and Women Business Enterprises. Additionally, see the applicable provisions in Schedule 5 attached to this Agreement.

B. The Contractor shall comply with the applicable provisions set forth in Schedule 6 attached to this Agreement, including Title VI requirements that must flow-down to contractors and tenants: The Recipient in accordance with the provisions of Title VI of the Civil Rights Act of 1964 (78 Stat. 252, 42 U.S. C. §§ 2000d through 2000d-4) and the Regulations, hereby notifies all bidders that it will affirmatively ensure that any contract entered into pursuant to this advertisement, disadvantaged business enterprises will be afforded full opportunity to submit bids in response to this invitation and will not be discriminated against on the grounds of race, color, or national origin in consideration for an award.

C. The Contractor acknowledges that it will comply with the applicable requirements under State law administered by the Connecticut Department of Labor, including but not limited to, standard wage (CGS § 31-57f) and prevailing wage (CGS § 31-53 and § 31-53a) that may apply to services performed under this Agreement.

D. CTDOT reserves the right to review contracts/agreements (to ensure required provisions included, whether by State requirement, e.g. State nondiscrimination, or by Federal requirement, e.g., Title VI, and any federal grant-specific requirements as may apply throughout the term) and reserves the right to direct removal of contractors throughout the term as CTDOT may determine, e.g., as a result of contractor violation of requirements, contractor suspension/disbarment from State work.

E. The Contractor shall comply with the requirements set forth in the “CTDOT Administrative and Statutory Requirements” attached as Schedule 7 to this Agreement.

Schedule 5

DBE Special Provisions **Revised July 2020**

I. ABBREVIATIONS AND DEFINITIONS AS USED IN THIS SPECIAL PROVISION

A. *Broker* means a party acting as an agent for others in negotiating Contracts, Agreements, purchases, sales, etc., in return for a fee or commission.

B. *Contract, Agreement or Subcontract* means a legally binding relationship obligating a seller to furnish supplies or services (including but not limited to, construction and professional services) and the buyer to pay for them. For the purposes of this provision, a lease for equipment or products is also considered to be a Contract.

C. *Contractor* means a consultant, second party or any other entity under Contract to do business with CTDOT or, as the context may require, with another Contractor (i.e. subcontractor) to CTDOT.

D. *CTDOT* means the Connecticut Department of Transportation.

E. *Disadvantaged Business Enterprise ("DBE")* means a for profit small business concern:

1. That is at least 51 percent owned by one or more individuals who are both socially and economically disadvantaged or, in the case of a corporation, in which 51 percent of the stock is owned by one or more such individuals; and
2. Whose management and daily business operations are controlled by one or more of the socially and economically disadvantaged individuals who own it; and
3. Certified by CTDOT under Title 49 of the Code of Federal Regulations, Part 26, (Title 49 CFR Part 23 of the Code of Federal Regulations for Participation of Disadvantaged Business Enterprise in Airport Concessions)

F. *USDOT* means the U.S. Department of Transportation, including the Office of the Secretary, the Federal Highway Administration ("FHWA"), the Federal Transit Administration ("FTA"), and the Federal Aviation Administration ("FAA").

G. *USDOT-assisted Contract* means any Contract between CTDOT and a Contractor (at any tier) funded in whole or in part with USDOT financial assistance.

H. *Good Faith Efforts ("GFE")* means all necessary and reasonable steps to achieve a DBE goal or other requirement which by their scope, intensity, and appropriateness to the objective, can reasonably be expected to fulfill the program requirement.

I. *Small Business Concern* means, with respect to firms seeking to participate as DBEs in USDOT-assisted Contracts, a small business concern as defined pursuant to Section 3 of the Small Business Act and Small Business Administration ("SBA") regulations implementing it (13 CFR Part 121) that also does not exceed the cap on average annual gross receipts in 49 CFR Part 26, Section 26.65(b).

J. *Socially and Economically Disadvantaged Individual* means any individual who is a citizen (or lawfully admitted permanent resident) of the United States and who is:

1. Any individual who CTDOT finds, on a case-by-case basis, to be a socially and economically disadvantaged individual.
2. Any individuals in the following groups, members of which are rebuttably presumed to be socially and economically disadvantaged:
 - “Black Americans”, which includes persons having origins in any of the Black racial groups of Africa;
 - “Hispanic Americans”, which includes persons of Mexican, Puerto Rican, Cuban, Dominican, Central or South American, or other Spanish or Portuguese culture or origin, regardless of race;
 - “Native Americans”, which includes persons who are American Indians, Eskimos, Aleuts, or Native Hawaiians.
 - “Asian-Pacific Americans”, which includes persons whose origins are from Japan, China, Taiwan, Korea, Burma (Myanmar), Vietnam, Laos, Cambodia (Kampuchea), Thailand, Malaysia, Indonesia, the Philippines, Brunei, Samoa, Guam, the U.S. Trust Territories of the Pacific Islands (Republic of Palau), the Commonwealth of the Northern Marianas Islands, Macao, Fiji, Tonga, Kiribati, Juvalu, Nauru, or Federated States of Micronesia;
 - “Subcontinent Asian Americans”, which includes persons whose origins are from India, Pakistan, Bangladesh, Bhutan, the Maldives Islands, Nepal or Sri Lanka;
 - Women;
 - Any additional groups whose members are designated as socially and economically disadvantaged by the SBA, at such time as the SBA designation becomes effective.

K. *Commercially Useful Function (“CUF”)* means the DBE is responsible for the execution of the work of the contract and is carrying out its responsibilities by actually performing, managing, and supervising the work involved with its own forces and equipment. The DBE must be responsible for procuring, determining quantity, negotiating price, determining quality and paying for all materials (where applicable) associated with their work. The DBE must also perform at least 30% of the total cost of its contract with its own workforce.

II. ADMINISTRATIVE REQUIREMENTS

A. General Requirements

A DBE goal percentage equaling _____ percent (%) of the Contract value has been established for this Contract. This DBE goal percentage will be applied to the final Contract value to ultimately determine the required DBE goal. If additional work is required, DBE firms should be provided the appropriate opportunities to achieve the required DBE goal.

In order to receive credit toward the Contract DBE goal, the firms utilized as DBE subcontractors or suppliers must be certified as DBEs in the type of work to be counted for credit by CTDOT’s Office of Contract Compliance prior to the date of the execution of the subcontract. Neither CTDOT nor the State of Connecticut’s Unified Certification Program (UCP) makes any representation as to any DBE’s technical or financial ability to perform the work. Prime contractors are solely responsible for performing due diligence in hiring DBE subcontractors.

All DBEs shall perform a CUF for the work that is assigned to them. The Contractor shall monitor and ensure that the DBE is in compliance with this requirement. The Connecticut DBE UPC Directory of certified firms can be found on the CTDOT website <http://www.ct.gov/dot>. The directory lists certified DBE firms with a description of services that they are certified to perform. Only work identified in this listing may be counted towards the project’s

DBE goal. A DBE firm may request to have services added at any time by contacting CTDOT's Office of Contract Compliance. No credit shall be counted for any DBE firm found not to be performing a CUF.

Once a Contract is awarded, all DBEs that were listed on the pre-award DBE commitment document must be utilized. The Contractor is obligated to provide the value and items of the work originally established in the pre-award documentation to the DBE firms listed in the pre-award documentation. Any modifications to the pre-award commitment must follow the procedure established in Section II-C.

The Contractor shall designate a liaison officer who will administer the Contractor's DBE program. Upon execution of this Contract, the name of the liaison officer shall be furnished in writing to CTDOT's unit administering the Contract, CTDOT's Office of Contract Compliance and CTDOT's Office of Construction ("OOC"). Contact information for the designated liaison officer shall be furnished no later than the scheduled date for the pre-construction meeting.

The Contractor shall submit a bi-monthly report to the appropriate CTDOT unit administering the Contract. This report shall indicate what work has been performed to date, with the dollars paid and percentage of DBE goal completed.

Verified payments made to DBEs shall be included in this bi-monthly report. A sample form is included on the CTDOT website.

In addition, the report shall include:

1. A projected time frame of when the remaining work is to be completed for each DBE.
2. A statement by the Contractor either confirming that the approved DBEs are on schedule to meet the Contract goal, or that the Contractor is actively pursuing a GFE.
3. If retainage is specified in the Contract specifications, then a statement of certification that the subcontractors' retainage is being released in accordance with 1.08.01 (Revised or supplemented).

Failure by the Contractor to provide the required reports may result in CTDOT withholding an amount equal to one percent (1%) of the monthly estimate until the required documentation is received.

The Contractor shall receive DBE credit when a DBE, or any combination of DBEs, perform work under the Contract in accordance with this specification.

Only work actually performed by and/or services provided by DBEs which are certified for such work and/or services, as verified by CTDOT, can be counted toward the DBE goal. Supplies and equipment a DBE purchases or leases from the Contractor or its affiliate cannot be counted toward the goal.

Monitoring of the CUF will occur by CTDOT throughout the life of the project. If it is unclear that the DBE is performing the work specified in its subcontract with the prime Contractor, further review may be required. If it is determined that the DBE is not performing a CUF, then the work performed by that DBE will not be counted towards the DBE goal percentage.

B. Subcontract Requirements

The Contractor shall submit to CTDOT's OOC all requests for subcontractor approvals on the standard CLA-12 forms provided by CTDOT. The dollar amount and items of work identified on the CLA-12 form must, at minimum, equal the dollar value submitted in the pre-award commitment. CLA-12 forms can be found at

<http://www.ct.gov/dot/construction> under the "Subcontractor Approval" section. All DBE subcontractors must be identified on the CLA-12 form, regardless of whether they are being utilized to meet a Contract goal percentage. A copy of the legal Contract between the Contractor and the DBE subcontractor/supplier, a copy of the Title VI Contractor Assurances and a copy of the Required Contract Provision for Federal Aid Construction Contracts (Form FHWA-1273) (Federal Highway Administration projects only) must be submitted along with a request for subcontractor approval. These attachments cannot be substituted by reference.

If retainage is specified in the Contract specifications, then the subcontract agreement must contain a prompt payment mechanism that acts in accordance with Article 1.08.01 (Revised or supplemented).

If the Contract specifications do not contain a retainage clause, the Contractor shall not include a retainage clause in any subcontract agreement, and in this case, if a Contractor does include a retainage clause, it shall be deemed unenforceable.

In addition, the following documents are to be included with the CLA-12, if applicable:

- An explanation indicating who will purchase material.
- A statement explaining any method or arrangement for utilization of the Contractor's equipment.

The subcontract must show items of work to be performed, unit prices and, if a partial item, the work involved by all parties. If the subcontract items of work or unit prices are modified, the procedure established in Section II-C must be followed.

Should a DBE subcontractor further sublet items of work assigned to it, only lower tier subcontractors who are certified as a DBE firm will be counted toward the DBE goal. If the lower tier subcontractor is a non-DBE firm, the value of the work performed by that firm will not be counted as credit toward the DBE goal.

The use of joint checks between a DBE firm and the Contractor is acceptable, provided that written approval is received from the OOC prior to the issuance of any joint check. Should it become necessary to issue a joint check between the DBE firm and the Contractor to purchase materials, the DBE firm must be responsible for negotiating the cost, determining the quality and quantity, ordering the material and installing (where applicable), and administering the payment to the supplier. The Contractor should not make payment directly to suppliers.

Each subcontract the Contractor signs with a subcontractor must contain the following assurance:

"The subcontractor/supplier/manufacture shall not discriminate on the basis of race, color, national origin, or sex in the performance of this contract. The contractor shall carry out applicable requirements of 49 CFR Part 26 in the award and administration of DOT-assisted contracts. Failure by the contractor/subcontractor/supplier/manufacture to carry out these requirements is a material breach of this contract, which may result in the termination of this contract or such other remedy as the recipient deems appropriate."

C. Modification to Pre-Award Commitment

Contractors may not terminate for convenience any DBE subcontractor or supplier that was listed on the pre-award DBE commitment without prior written approval of the OOC. This includes, but is not limited to, instances in which a Contractor seeks to perform work originally designated for a DBE subcontractor with its own forces or those of an affiliate, a non-DBE firm, or with another DBE firm. Prior to approval, the Contractor must demonstrate to the satisfaction of the OOC, that it has good cause, as found in 49CFR Part 26.53 (f)(3), for termination of the DBE firm.

Before transmitting its request for approval to terminate pre-award DBE firms to the OOC, the Contractor must give written notice to the DBE subcontractor and include a copy to the OOC of its notice to terminate and/or substitute, and the reason for the notice.

The Contractor must provide five (5) days for the affected DBE firm to respond. This affords the DBE firm the opportunity to advise the OOC and the Contractor of any reasons why it objects to the termination of its subcontract and why the OOC should not approve the Contractor's action.

Once the Contract is awarded, should there be any amendments or modifications of the approved pre-award DBE submission other than termination of a DBE firm, the Contractor shall follow the procedure below that best meets the criteria associated with the reason for modification:

1. If the change is due to a scope of work revision or non-routine quantity revision by CTDOT, the Contractor must notify CTDOT's OOC in writing or via electronic mail that their DBE participation on the project may be impacted as soon as they are aware of the change. In this case, a release of work from the DBE firm may not be required; however the Contractor must concurrently notify the DBE firm in writing, and copy the OOC for inclusion in the project DBE file. This does not relieve the Contractor of its obligation to meet the Contract specified DBE goal, or of any other responsibility found in this specification.
2. If the change is due to a factor other than a CTDOT directive, a request for approval in writing or via electronic mail of the modification from the OOC must be submitted, along with an explanation of the change(s), prior to the commencement of work. The Contractor must also obtain a letter of release from the originally named DBE indicating their concurrence with the change, and the reason(s) for their inability to perform the work. In the event a release cannot be obtained, the Contractor must document all efforts made to obtain it.
3. In the event a DBE firm that was listed in the pre-award documents is **unable** or **unwilling** to perform the work assigned, the Contractor shall:
 - Notify the OOC Division Chief immediately and make efforts to obtain a release of work from the firm.
 - Submit documentation that will provide a basis for the change to the OOC for review and approval prior to the implementation of the change.
 - Use the DBE Directory to identify and contact firms certified to perform the type of work that was assigned to the unable or unwilling DBE firm. The Contractor should also contact CTDOT's Office of Contract Compliance for assistance in locating additional DBE firms to the extent needed to meet the contract goal.

Should a DBE subcontractor be terminated or fail to complete work on the Contract for any reason, the Contractor must make a GFE to find another DBE subcontractor to substitute for the original DBE. The DBE replacement shall be given every opportunity to perform at least the same amount of work under the Contract as the original DBE subcontractor.

If the Contractor is unable to find a DBE replacement:

- The Contractor should identify other contracting opportunities and solicit DBE firms in an effort to meet the Contract DBE goal requirement, if necessary, and provide documentation to support a GFE. (Refer to GFE in Section III.)

- The Contractor must demonstrate that the originally named DBE, who is unable or unwilling to perform the work assigned, is in default of its subcontract, or identify other issues that affected the DBE firm's ability to perform the assigned work. **The Contractor's ability to negotiate a more advantageous agreement with another subcontractor is not a valid basis for change.**

III. GOOD FAITH EFFORTS

The DBE goal is **NOT** reduced or waived for projects where the Contractor receives a Pre-Award GFE determination from the Office of Contract Compliance prior to the award of the Contract. It remains the responsibility of the Contractor to make a continuing GFE to achieve the specified Contract DBE goal. The Contractor shall pursue every available opportunity to obtain additional DBE firms and document all efforts made in such attempts.

At the completion of all Contract work, the Contractor shall submit a final report to CTDOT's unit administering the Contract indicating the work done by and the dollars paid to DBEs. Only verified payments made to DBEs performing a CUF will be counted towards the Contract goal.

Goal attainment is based on the total Contract value, which includes all construction orders created during the Contract. If the Contractor does not achieve the specified Contract goal for DBE participation or has not provided the value of work to the DBE firms originally committed to in the pre-award submission, the Contractor shall submit documentation to CTDOT's unit administering the Contract detailing the GFE made during the performance of the Contract to satisfy the goal.

A GFE should consist of the following, where applicable (CTDOT reserves the right to request additional information):

1. A detailed statement of the efforts made to replace an unable or unwilling DBE firm, and a description of any additional subcontracting opportunities that were identified and offered to DBE firms in order to increase the likelihood of achieving the stated goal.
2. A detailed statement, including documentation of the efforts made to contact and solicit bids from certified DBEs, including the names, addresses, and telephone numbers of each DBE firm contacted; the date of contact and a description of the information provided to each DBE regarding the scope of services and anticipated time schedule of work items proposed to be subcontracted and the response from firms contacted.
3. Provide a detailed explanation for each DBE that submitted a subcontract proposal which the Contractor considered to be unacceptable stating the reason(s) for this conclusion.
4. Provide documentation, if any, to support contacts made with CTDOT requesting assistance in satisfying the specified Contract goal.
5. Provide documentation of all other efforts undertaken by the Contractor to meet the defined goal. Additional documentation of efforts made to obtain DBE firms may include but will not be limited to:
 - Negotiations held in good faith with interested DBE firms, not rejecting them without sound reasons.
 - Written notice provided to a reasonable number of specific DBE firms in sufficient time to allow effective participation.
 - Those portions of work that could be performed by readily available DBE firms.

In instances where the Contractor can adequately document or substantiate its GFE and compliance with other DBE Program requirements, the Contractor will have satisfied the DBE requirement and no administrative remedies will be imposed.

IV. PROJECT COMPLETION

At the completion of all Contract work, the Contractor shall:

1. Submit a final report to CTDOT's unit administering the Contract indicating the work done by, and the dollars paid to DBEs.
2. Submit verified payments made to all DBE subcontractors for the work that was completed.
3. Submit documentation detailing any changes to the DBE pre-award subcontractors that have not met the original DBE pre-award commitment, including copies of the Department's approvals of those changes.
4. Retain all records for a period of three (3) years following acceptance by CTDOT of the Contract and those records shall be available at reasonable times and places for inspection by authorized representatives of CTDOT and Federal agencies. If any litigation, claim, or audit is started before the expiration of the three (3) year period, the records shall be retained until all litigation, claims, or audit findings involving the records are resolved.

If the Contractor does not achieve the specified Contract goal for DBE participation in addition to meeting the dollar value committed to the DBE subcontractors identified in the pre-award commitment, the Contractor shall submit documentation to CTDOT's unit administering the Contract detailing the GFE made during the performance of the Contract to satisfy the goal.

V. SHORTFALLS

A. Failure to meet DBE goals

As specified in (II-A) above, attainment of the Contract DBE goal is based on the final Contract value. The Contractor is expected to achieve the amount of DBE participation originally committed to at the time of award; however, additional efforts must be made to provide opportunities to DBE firms in the event a Contract's original value is increased during the life of the Contract.

The Contractor is expected to utilize the DBE subcontractors originally committed in the DBE pre-award documentation for the work and dollar value that was originally assigned.

If a DBE is terminated or is unable or unwilling to complete its work on a Contract, the Contractor shall make a GFE to replace that DBE with another certified DBE to meet the Contract goal.

The Contractor shall immediately notify the OOC of the DBE's inability or unwillingness to perform, and provide reasonable documentation and make efforts to obtain a release of work from the firm.

If the Contractor is unable to find a DBE replacement, then the Contractor should identify other contracting opportunities and solicit DBE firms in an effort to meet the Contract DBE goal requirement, if necessary, and provide documentation to support a GFE.

When a DBE is unable or unwilling to perform, or is terminated for just cause, the Contractor shall make a GFE to find other DBE opportunities to increase DBE participation to the extent necessary to at least satisfy the Contract goal.

For any DBE pre-award subcontractor that has been released appropriately from the project, no remedy will be assessed, provided that the Contractor has met the criteria described in Section II-C.

B. Administrative Remedies for Non-Compliance:

In cases where the Contractor has failed to meet the Contract specified DBE goal or the DBE pre-award commitment, and where no GFE has been demonstrated, then one or more of the following administrative remedies will be applied:

1. A reduction in Contract payments to the Contractor as determined by CTDOT, not to exceed the shortfall amount of the **DBE goal**. The maximum shortfall will be calculated by multiplying the Contract DBE goal (adjusted by any applicable GFE) by the final Contract value, and subtracting any verified final payments made to DBE firms by the Contractor.
2. A reduction in Contract payments to the Contractor determined by CTDOT, not to exceed the shortfall amount of the **pre-award commitment**. The maximum shortfall will be calculated by subtracting any verified final payments made by the Contractor to each DBE subcontractor from the amount originally committed to that subcontractor in the pre-award commitment.
3. A reduction in Contract payments to the Contractor determined by CTDOT for any pre-award DBE subcontractor who has not obtained the dollar value of work identified in the DBE pre-award commitment and has not followed the requirements of Section II-C or for any DBE firm submitted for DBE credit that has not performed a CUF.
4. The Contractor being required to submit a written DBE Program Corrective Action Plan to CTDOT for review and approval, which is aimed at ensuring compliance on future projects.
5. The Contractor being required to attend a Non-Responsibility Meeting on the next contract where it is the apparent low bidder.
6. The Contractor being suspended from bidding on contracts for a period not to exceed six (6) months.

VI. CLASSIFICATIONS OTHER THAN SUBCONTRACTORS

A. Material Manufacturers

Credit for DBE manufacturers is 100% of the value of the manufactured product. A manufacturer is a firm that operates or maintains a factory or establishment that produces on the premises the materials or supplies obtained by the Contractor.

If the Contractor elects to utilize a DBE manufacturer to satisfy a portion of, or the entire specified DBE goal, the Contractor must provide the OOC with:

- Subcontractor Approval Form (CLA-12) indicating the firm designation,
- An executed "Affidavit for the Utilization of Material Suppliers or Manufacturers" (sample attached), and
- Substantiation of payments made to the supplier or manufacturer for materials used on the project.

B. Material Suppliers (Dealers)

Credit for DBE dealers/suppliers is limited to 60% of the value of the material to be supplied, provided such material is obtained from an approved DBE dealer/supplier.

In order for a firm to be considered a regular dealer, the firm must own, operate, or maintain a store, warehouse, or other establishment in which the materials, supplies, articles or equipment of the general character described by the specifications and required under the contract are bought, kept in stock, and regularly sold or leased to the public in the usual course of business. At least one of the following criteria must apply:

- To be a regular dealer, the firm must be an established, regular business that engages, as its principal business and under its own name, in the purchase and sale or lease of the products in question.
- A person may be a regular dealer in such bulk items as petroleum products, steel, cement, gravel, stone, or asphalt without owning, operating or maintaining a place of business if the person both owns and operates distribution equipment for the products. Any supplementing of the regular dealers' own distribution equipment shall be by long term lease agreement, and not on an ad hoc or contract to contract basis.
- Packagers, brokers, manufacturers' representatives, or other persons who arrange or expedite transactions are not regular dealers within the meaning of this paragraph.

If the Contractor elects to utilize a DBE supplier to satisfy a portion or the entire specified DBE goal, the Contractor must provide the OOC with:

- Subcontractor Approval Form (CLA-12) indicating the firm designation,
- An executed "Affidavit for the Utilization of Material Suppliers or Manufacturers" (sample attached), and
- Substantiation of payments made to the supplier or manufacturer for materials used on the project.

C. Brokering

- Brokering of work for DBE firms who have been listed by the Department as certified brokers is allowed. Credit for those firms shall be applied following the procedures in Section VI-D.
- Brokering of work by DBEs who have been approved to perform subcontract work with their own workforce and equipment is not allowed, and is a Contract violation.
- Firms involved in the brokering of work, whether they are DBEs and/or majority firms who engage in willful falsification, distortion or misrepresentation with respect to any facts related to the project shall be referred to the U.S. DOT, Office of the Inspector General for prosecution under Title 18, U.S. Code, Part I, Chapter 47, Section 1020.

D. Non-Manufacturing or Non-Supplier DBE Credit

Contractors may count towards their DBE goals the following expenditures with DBEs that are not manufacturers or suppliers:

- Reasonable fees or commissions charged for providing a bona fide service such as professional, technical, consultant or managerial services and assistance in the procurement of essential personnel, facilities, equipment materials or supplies necessary for the performance of the Contract, provided that the fee or commission is determined by the OOC to be reasonable and consistent with fees customarily allowed for similar services.
- The fees charged only for delivery of materials and supplies required on a job site when the hauler, trucker, or delivery service is a DBE, and not the manufacturer, or regular dealer of the materials and supplies, and provided that the fees are determined by the OOC to be reasonable and not excessive as compared with fees customarily allowed for similar services.
- The fees or commissions charged for providing bonds or insurance specifically required for the performance of the Contract, provided that the fees or commissions are determined by CTDOT to be reasonable and not excessive as compared with fees customarily allowed for similar services.

E. Trucking

While technically still considered a subcontractor, the rules for counting credit for DBE trucking firms are as follows:

- The DBE must own and operate at least one fully licensed, insured, and operational truck used on the Contract.
- The DBE receives credit for the total value of the transportation services it provides on the Contract using trucks it owns, insures and operates using drivers it employs.
- The DBE may lease trucks from another DBE firm, including an owner-operator who is certified as a DBE. The DBE who leases trucks from another DBE receives credit for the total value of the transportation services the lessee DBE provides on the Contract.
- The DBE may lease trucks from a non-DBE firm; however the DBE may only receive credit for any fees or commissions received for arranging transportation services provided by the non-DBE firms. Additionally, the DBE firm must demonstrate that they are in full control of the trucking operation for which they are seeking credit.

VII. Suspected DBE Fraud

In appropriate cases, CTDOT will bring to the attention of the USDOT any appearance of false, fraudulent, or dishonest conduct in connection with the DBE program, so that USDOT can take the steps, e.g. referral to the Department of Justice for criminal prosecution, referral to USDOT Inspector General, action under suspension and debarment or Program Fraud and Civil Penalties rules provided in 49 CFR Part 31.

**CONNECTICUT DEPARTMENT OF TRANSPORTATION
(OFFICE OF CONSTRUCTION)
BUREAU OF ENGINEERING AND CONSTRUCTION**

This affidavit must be completed by the State Contractor's DBE notarized and attached to the contractor's request to utilize a DBE supplier or manufacturer as a credit towards its DBE contract requirements; failure to do so will result in not receiving credit towards the contract DBE requirement.

State Contract No. _____

Federal Aid Project No. _____

Description of Project _____

I, _____, acting in behalf of _____,
(Name of person signing Affidavit) (DBE person, firm, association or corporation)

of which I am the _____ certify and affirm that _____
(Title of Person) (DBE person, firm, association or corporation)

is a certified Connecticut Department of Transportation DBE. I further certify and affirm that I have read and understand 49 CFR, Sec. 26.55(e)(2), as the same may be revised.

I further certify and affirm that _____ will assume the actual and
(DBE person, firm, association or Corporation)

for the provision of the materials and/or supplies sought by _____.

If a manufacturer, I operate or maintain a factory or establishment that produces, on the premises, the materials, supplies, articles or equipment required under the contract an of the general character described by the specifications.

If a supplier, I perform a commercially useful function in the supply process. As a regular dealer, I, at a minimum, own and operate the distribution equipment for bulk items. Any supplementing of my distribution equipment shall be by long-term lease agreement, and not on an ad hoc or contract-by-contract basis.

I understand that false statements made herein are punishable by Law (Sec. 53a-157), CGS, as revised).

(Name of Corporation or Firm)

(Signature & Title of Official making the Affidavit)

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

Notary Public (Commissioner of the Superior Court)

My Commission Expires _____

CERTIFICATE OF CORPORATION

I, _____, certify that I am the _____
(Official) (President)

of the Corporation named in the foregoing instrument; that I have been duly authorized to affix the seal of the Corporation to such papers as require the seal; that _____, who signed said instrument on behalf of the Corporation, was then _____ of said corporation; that said instrument was duly signed for and in behalf of said Corporation by authority of its governing body and is within the scope of its corporation powers.

(Signature of Person Certifying)

(Date)

GENERAL

Schedule 6

TITLE VI CONTRACTOR ASSURANCES

During the performance of this contract, the contractor, for itself, its assignees and successors in interest (hereinafter referred to as the "contractor") agrees as follows:

1. **Compliance with Regulations:** The contractor (hereinafter includes consultants) will comply with the Regulations relative to Nondiscrimination in Federally-assisted programs of the United States Department of Transportation Federal Highway Administration and Federal Transit Administration, as they may be amended from time to time, which are herein incorporated by reference and made a part of this contract.

2. **Nondiscrimination:** The contractor, with regard to the work performed by it during the contract, will not discriminate on the grounds of race, color, national origin, sex, age, disability, income or Limited English Proficiency in the selection and retention of subcontractors, including procurements of materials and leases of equipment. The contractor will not participate directly or indirectly in the discrimination prohibited by the Acts and Regulations, including employment practices when the contract covers any activity, project, or program set forth in Appendix B of 49 CFR Part 21.

3. **Solicitations for Subcontracts, Including Procurements of Materials and Equipment:** In all solicitations, either by bidding, or negotiation made by the contractor for work to be performed under a subcontract, including procurements of materials, or leases of equipment, each potential subcontractor or supplier will be notified by the contractor of the contractor's obligations under this contract and Acts and the Regulations relative to Non-discrimination on the grounds of race, color, or national origin.

4. **Information and Reports:** The contractor will provide all information and reports required by the Acts, the Regulations, and directives issued pursuant thereto and will permit access to its books, records, accounts, other sources of information, and its facilities as may be determined by the Recipient or the Federal Highway Administration or Federal Transit Administration to be pertinent to ascertain compliance with such Acts, Regulations, and instructions. Where any information required of a contractor is in the exclusive possession of another who fails or refuses to furnish this information, the contractor will so certify to the Recipient or the Federal Highway Administration or the Federal Transit Administration, as appropriate, and will set forth what efforts it has made to obtain the information.

5. **Sanctions for Non-compliance:** In the event of the contractor's non-compliance with the Non-discrimination provisions of this contract, the Recipient will impose such contract sanctions as it or the Federal Highway Administration or the Federal Transit Administration may determine to be appropriate, including, but not limited to:

- a. withholding contract payments to the contractor under the contract until the contractor complies; and/or
- b. cancelling, terminating, or suspending a contract, in whole or in part.

TITLE VI CONTRACTOR ASSURANCES - page 2

6. **Incorporation of Provisions:** The contractor will include the provisions of paragraphs one through six in every subcontract, including procurements of materials and leases of equipment, unless exempt by the Acts, the Regulations and directives issued pursuant thereto. The contractor will take action with respect to any subcontract or procurement as the Recipient or the Federal Highway Administration or the Federal Transit Administration may direct as a means of enforcing such provisions including sanctions for noncompliance. Provided, that if the contractor becomes involved in, or is threatened with, litigation by a subcontractor, or supplier because of such direction, the contractor may request the Recipient to enter into any litigation to protect the interests of the Recipient. In addition, the contractor may request the United States to enter into the litigation to protect the interests of the United States.

TITLE VI CONTRACTOR ASSURANCES - page 3

During the performance of this contract, the contractor, for itself, its assignees, and successors in interest (hereinafter referred to as the "contractor") agrees to comply with the following non-discrimination statutes and authorities; including but not limited to:

Pertinent Non-Discrimination Authorities:

- Title VI of the Civil Rights Act of 1964 (42 U.S.C. § 2000d et seq., 78 stat. 252), (prohibits discrimination on the basis of race, color, national origin); and 49 CFR Part 21.
- The Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, (42 U.S.C. § 4601), (prohibits unfair treatment of persons displaced or whose property has been acquired because of Federal or Federal-aid programs and projects);
- Federal-Aid Highway Act of 1973, (23 U.S.C. § 324 et seq.), (prohibits discrimination on the basis of sex);
- Section 504 of the Rehabilitation Act of 1973, (29 U.S.C. § 794 et seq.), as amended, (prohibits discrimination on the basis of disability); and 49 CFR Part 27;
- The Age Discrimination Act of 1975, as amended, (42 U.S.C. § 6101 et seq.), (prohibits discrimination on the basis of age);
- Airport and Airway Improvement Act of 1982, (49 USC § 4 71, Section 4 7123), as amended, (prohibits discrimination based on race, creed, color, national origin, or sex);
- The Civil Rights Restoration Act of 1987, (PL 100-209), (Broadened the scope, coverage and applicability of Title VI of the Civil Rights Act of 1964, The Age Discrimination Act of 1975 and Section 504 of the Rehabilitation Act of 1973, by expanding the definition of the terms "programs or activities" to include all of the programs or activities of the Federal-aid recipients, sub-recipients and contractors, whether such programs or activities are Federally funded or not);
- Titles II and III of the Americans with Disabilities Act, which prohibit discrimination on the basis of disability in the operation of public entities, public and private transportation systems, places of public accommodation, and certain testing entities (42 U.S.C. §§ 12131-12189) as implemented by Department of Transportation regulations at 49 C.F.R. parts 37 and 38;
- The Federal Aviation Administration's Non-discrimination statute (49 U.S.C. § 47123) (prohibits discrimination on the basis of race, color, national origin, and sex);
- Executive Order 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations, which ensures discrimination against minority populations by discouraging programs, policies, and activities with disproportionately high and adverse human health or environmental effects on minority and low-income populations;
- Executive Order 13166, Improving Access to Services for Persons with Limited English Proficiency, and resulting agency guidance, national origin discrimination includes discrimination because of limited English proficiency (LEP). To ensure compliance with Title VI, you must take reasonable steps to -ensure that LEP persons have meaningful access to your programs (70 Fed. Reg. at 74087 to 74100);
- Title IX of the Education Amendments of 1972, as amended, which prohibits you from discriminating because of sex in education programs or activities (20 U .S.C. 1681 et seq)

Schedule 7

CTDOT ADMINISTRATIVE AND STATUTORY REQUIREMENTS

1. For the purposes of this Schedule,

“Agency” means CTDOT;

“Business Associate” is defined in 45 C.F.R. § 160.103;

“Contract” means this Agreement;

“Contractor” means CITY; and

“Contractor Parties” means City Parties.

2. Whistleblowing. This Contract may be subject to the provisions of Section 4-61dd of the Connecticut General Statutes. In accordance with this statute, if an officer, employee or appointing authority of the Contractor takes or threatens to take any personnel action against any employee of the Contractor in retaliation for such employee's disclosure of information to any employee of the contracting state or quasi-public agency or the Auditors of Public Accounts or the Attorney General under the provisions of subsection (a) of such statute, the Contractor shall be liable for a civil penalty of not more than five thousand dollars for each offense, up to a maximum of twenty per cent of the value of this Contract. Each violation shall be a separate and distinct offense and in the case of a continuing violation, each calendar day's continuance of the violation shall be deemed to be a separate and distinct offense. The State may request that the Attorney General bring a civil action in the Superior Court for the Judicial District of Hartford to seek imposition and recovery of such civil penalty. In accordance with subsection (f) of such statute, each large state contractor, as defined in the statute, shall post a notice of the provisions of the statute relating to large state contractors in a conspicuous place which is readily available for viewing by the employees of the Contractor.

3. Forum and Choice of Law. The parties deem the Contract to have been made in the City of Hartford, State of Connecticut. Both parties agree that it is fair and reasonable for the validity and construction of the Contract to be, and it shall be, governed by the laws and court decisions of the State of Connecticut, without giving effect to its principles of conflicts of laws. To the extent that any immunities provided by Federal law or the laws of the State of Connecticut do not bar an action against the State, and to the extent that these courts are courts of competent jurisdiction, for the purpose of venue, the complaint shall be made returnable to the Judicial District of Hartford only or shall be brought in the United States District Court for the District of Connecticut only, and shall not be transferred to any other court, provided, however, that nothing here constitutes a waiver or compromise of the sovereign immunity of the State of Connecticut. The Contractor waives any objection which it may now have or will have to the laying of venue of any Claims in any forum and further irrevocably submits to such jurisdiction in any suit, action or proceeding.

4. Sovereign Immunity. The parties acknowledge and agree that nothing in the Solicitation or the Contract shall be construed as a modification, compromise or waiver by the State of any rights or defenses of any immunities provided by Federal law or the laws of the State of Connecticut to the State or any of its officers and employees, which they may have had, now have or will have with respect to all matters arising out of the Contract. To the extent that this section conflicts with any

other section, this section shall govern.

5. Audit and Inspection of Plants, Places of Business and Records.

- (a) The State and its agents, including, but not limited to, the Connecticut Auditors of Public Accounts, Attorney General and State's Attorney and their respective agents, may, at reasonable hours, inspect and examine all of the parts of the Contractor's and Contractor Parties' plants and places of business which, in any way, are related to, or involved in, the performance of this Contract.
- (b) The Contractor shall maintain, and shall require each of the Contractor Parties to maintain, accurate and complete Records. The Contractor shall make all of its and the Contractor Parties' Records available at all reasonable hours for audit and inspection by the State and its agents.
- (c) The State shall make all requests for any audit or inspection in writing and shall provide the Contractor with at least twenty-four (24) hours' notice prior to the requested audit and inspection date. If the State suspects fraud or other abuse, or in the event of an emergency, the State is not obligated to provide any prior notice.
- (d) The Contractor shall pay for all costs and expenses of any audit or inspection which reveals information that, in the sole determination of the State, is sufficient to constitute a breach by the Contractor under this Contract. The Contractor shall remit full payment to the State for such audit or inspection no later than 30 days after receiving an invoice from the State. If the State does not receive payment within such time, the State may setoff the amount from any moneys which the State would otherwise be obligated to pay the Contractor in accordance with this Contract's setoff provision.
- (e) The Contractor shall keep and preserve or cause to be kept and preserved all of its and Contractor Parties' Records until three (3) years after the latter of (i) final payment under this Agreement, or (ii) the expiration or earlier termination of this Agreement, as the same may be modified for any reason. The State may request an audit or inspection at any time during this period. If any Claim or audit is started before the expiration of this period, the Contractor shall retain or cause to be retained all Records until all Claims or audit findings have been resolved.
- (f) The Contractor shall cooperate fully with the State and its agents in connection with an audit or inspection. Following any audit or inspection, the State may conduct and the Contractor shall cooperate with an exit conference.
- (g) The Contractor shall incorporate this entire Section verbatim into any contract or other agreement that it enters into with any Contractor Party.

6. Protection of Confidential Information.

- (a) Contractor and Contractor Parties, at their own expense, have a duty to and shall protect from a Confidential Information Breach any and all Confidential Information which they come to possess or control, wherever and however stored or maintained, in a commercially reasonable manner in accordance with current industry standards.
- (b) Each Contractor or Contractor Party shall develop, implement and maintain a comprehensive data - security program for the protection of Confidential Information. The safeguards contained in such program shall be consistent with and comply with the safeguards for

protection of Confidential Information, and information of a similar character, as set forth in all applicable federal and state law and written policy of the Agency or State concerning the confidentiality of Confidential Information. Such data-security program shall include, but not be limited to, the following:

1. A security policy for employees related to the storage, access and transportation of data containing Confidential Information;
2. Reasonable restrictions on access to records containing Confidential Information, including access to any locked storage where such records are kept;
3. A process for reviewing policies and security measures at least annually;
4. Creating secure access controls to Confidential Information, including but not limited to passwords; and
5. Encrypting of Confidential Information that is stored on laptops, portable devices or being transmitted electronically.

- (c) The Contractor and Contractor Parties shall notify the Agency and the Connecticut Office of the Attorney General as soon as practical, but no later than twenty-four (24) hours, after they become aware of or suspect that any Confidential Information which Contractor or Contractor Parties have come to possess or control has been subject to a Confidential Information Breach. If a Confidential Information Breach has occurred, the Contractor shall, within three (3) business days after the notification, present a credit monitoring and protection plan to the Commissioner of Administrative Services, the Agency and the Connecticut Office of the Attorney General, for review and approval. Such credit monitoring or protection plan shall be made available by the Contractor at its own cost and expense to all individuals affected by the Confidential Information Breach. Such credit monitoring or protection plan shall include, but is not limited to reimbursement for the cost of placing and lifting one (1) security freeze per credit file pursuant to Connecticut General Statutes § 36a-701a. Such credit monitoring or protection plans shall be approved by the State in accordance with this Section and shall cover a length of time commensurate with the circumstances of the Confidential Information Breach. The Contractors' costs and expenses for the credit monitoring and protection plan shall not be recoverable from the Agency, any State of Connecticut entity or any affected individuals.
- (d) The Contractor shall incorporate the requirements of this Section in all subcontracts requiring each Contractor Party to safeguard Confidential Information in the same manner as provided for in this Section.
- (e) Nothing in this Section shall supersede in any manner Contractor's or Contractor Party's obligations pursuant to HIPAA or the provisions of this Contract concerning the obligations of the Contractor as a Business Associate of the Agency.

7. Executive Orders and Other Enactments.

- (a) All references in this Contract to any Federal, State, or local law, statute, public or special act, executive order, ordinance, regulation or code (collectively, "Enactments") shall mean Enactments that apply to the Contract at any time during its term, or that may be made applicable to the Contract

during its term. This Contract shall always be read and interpreted in accordance with the latest applicable wording and requirements of the Enactments. At the Contractor's request, the Agency shall provide a copy of these Enactments to the Contractor. Unless otherwise provided by Enactments, the Contractor is not relieved of its obligation to perform under this Contract if it chooses to contest the applicability of the Enactments or the Agency's authority to require compliance with the Enactments.

(b) This Contract is subject to the provisions of Executive Order No. 3 of Governor Thomas J. Meskill, promulgated June 16, 1971, concerning labor employment practices, Executive Order No. 17 of Governor Thomas J. Meskill, promulgated February 15, 1973, concerning the listing of employment openings and Executive Order No. 16 of Governor John G. Rowland promulgated August 4, 1999, concerning violence in the workplace, all of which are incorporated into and are made a part of the Contract as if they had been fully set forth in it.

(c)The Contract may be subject to (1) Executive Order No. 14 of Governor M. Jodi Rell, promulgated April 17, 2006, concerning procurement of cleaning products and services; (2) Executive Order No. 61 of Governor Dannel P. Malloy promulgated December 13, 2017 concerning the Policy for the Management of State Information Technology Projects, as issued by the Office of Policy and Management, Policy ID IT-SDLC-17-04; and (3) Executive Order Nos. 13F and 13G of Governor Ned Lamont, promulgated September 3, 2021 and September 10, 2021, respectively, concerning protection of public health and safety during COVID-19 pandemic, as extended by Executive Order No. 14A of Governor Ned Lamont, promulgated September 30, 2021. If any of the Executive Orders referenced in this section is applicable, it is deemed to be incorporated into and made a part of the Contract as if fully set forth in it.

EXHIBIT A-1

ADDITIONAL REQUIREMENTS OF THE CAPITAL FUNDING AGREEMENT FOR NEW HAVEN UNION STATION CAMPUS

1. Retention of Records and Records Accessibility

A. All services performed by the Contractor (the “Services”) shall be subject to the inspection and approval of the State (CTDOT), the City of New Haven (the “City”), and New Haven Parking Authority (“NHPA”) at all times, and the Contractor shall furnish all information concerning the Services. CTDOT, the City, and NHPA or their representatives shall have the right, at reasonable hours, to inspect or examine the part of the plant or place of business or any books, records, and other documents of Contractor, or its subcontractors of any tier (collectively, “Contractor”) pertaining to work performed under this Agreement and shall allow such representatives free access to any and all such plants, places of business, books and records. CTDOT, the City and NHPA or their representatives will give the Contractor or its subcontractor at least twenty-four (24) hours’ notice of such intended examination. At CTDOT’s, City’s or NHPA’s request, the Contractor and/or its subcontractors shall provide CTDOT, City, and NHPA with hard copies or an electronic format of any data or information in the possession or control of the Contractor or Subcontractor which pertains to CTDOT’s, City’s, and NHPA’s business under this agreement.

B. The Contractor shall retain and maintain accurate records and documents relating to performance of services under this agreement for a minimum of three (3) years starting from the date of submission of the final expenditure report with the following qualifications and shall make them available for inspection and audit by CTDOT, City, and NHPA or their representative:

- (1) If any litigation, claim or audit is started before the expiration date of the three-year period, the records shall be retained until all litigation, claims or audit findings involving the records have been resolved; and
- (2) Records for the purchase of equipment (i.e., non-expendable, tangible personal property) acquired with Funding pursuant to this Agreement shall be retained for three years after the final disposition of said property.

C. The Contractor shall require all subcontractors and others performing the Project to retain and maintain accurate records and documents relating to performance on the Project for a minimum of three (3) years from the expiration of the contract and shall make them available for inspection and audit by the Operations Committee and CTDOT, City, and NHPA or their representative. The Contractor must incorporate this paragraph verbatim into any agreement it enters into with any subcontractor or other party performing under this Agreement.

2. Employees & Subcontractors

A. The Contractor shall maintain, and shall require its subcontractors and other parties to the Agreement, to maintain complete control over its employees and all of its contractors engaged to perform work for the Project. Before hiring outside contractors/subcontractors or entering into contractual agreements with persons, partnerships or companies related to performance of the Project, the Contractor will notify CTDOT, City, and NHPA.

B. The Contractor shall require all of its subcontractors or other parties connected to this Project to flow down all applicable requirements for the Project as set forth in this Agreement. CTDOT, City, and NHPA reserve the right to review any contract between the Contractor and/or its subcontractors or other affected parties performing the services on the Project prior to the Contractor or executing such contract. CTDOT, City, and NHPA reserve the right to direct the Consultant, and the Parties, by way of their representatives comprising the New Haven Union Station Partnership Operations Committee, to direct the Contractor to remove any employee, subcontractor, or other relevant party, or personnel of the Contractor throughout the duration of the Project as a result of the party's suspension or disbarment from State, City, or NHPA work or violation of requirements under this Agreement in its sole discretion.

C. In performance of the Project, the Contractor shall comply with all requirements under State law for Set-aside goal setting and reporting to the Commission on Human Rights and Opportunities.

D. The Contractor shall comply with State law and regulations administered by the Connecticut Department of Labor, including but not limited to, standard wage (CGS § 31-57f) and prevailing wage (CGS § 31-53 and § 31-53a) as applicable to performance of the Project or under this Agreement.

3. Americans with Disabilities Act

The Contractor shall ensure the Project complies with the terms of the Americans with Disabilities Act of 1990 during the Project period. The Contractor represents that it is familiar with the terms of this Act and that it is in compliance with the law. Failure of the Contractor to satisfy this standard during the Project period, as it may be amended, will render the Contract voidable at the option of CTDOT, City, and NHPA upon notice to the Consultant. The Contractor warrants that it will hold the State including CTDOT, City, and NHPA harmless from any liability, which may be imposed upon the State, CTDOT, City, and/or NHPA as a result of any failure of the Contractor or its subcontractors to be in compliance with this Act.

4. Project Administration Requirements

The Contractor shall comply with the following Project Administration requirements:

A. The Contractor is responsible for its construction contract administration of the Project. CTDOT, City, and NHPA reserve the right to review all services provided by Contractor and to

inspect all work performed by Construction Contractors as to confirm following the applicable construction standards.

B. The Contractor shall administer the Project as required in accordance with the following requirements:

(1). The following provisions of the State of Connecticut, Department of Transportation, Standard Specifications for Roads, Bridges, Facilities and Incidental Construction, Form 819, which each the Contractor or Subcontractor, as applicable, will incorporate into its agreements with, and ensure compliance by, its Contractors and Subcontractors of any tier.

1. Section 1.20-1.03.04 Requirements of Performance Contract Bond and Payment Bond,
2. Section 1.20-1.05.03 Conformity with Plans and Specifications,
3. Section 1.20-1.05.10 Inspection,
4. Section 1.20-1.05.11 Removal of Defective or Unauthorized Work,
5. Section 1.20-1.05.12 Payrolls to extent required to ensure compliance with prevailing wage requirements,
6. Section 1.20-1.05.13 Examining and Copying Contractor's Records,
7. Section 1.20-1.05.14 Termination for Convenience, so the Parties are able to terminate any contract if determined to be in the best interest of the Project,
8. Section 1.20-1.06.08 Warranties, Guarantee and Instruction Sheets,
9. Sections 1.20-1.07.1 through 1.07.18 inclusive, Legal Relations and Responsibilities,
10. Section 1.20-1.10 Environmental Compliance, and
11. Certain Sections of 1.20 General Clauses for Facility Construction to be provided within the Construction Documents.
12. The version of the Standard Specifications in effect at the date of completion of the design phase for the Project is the version that must be followed and complied with for the construction phase.

(2). The Contractor shall submit to CTDOT, City, and NHPA progress reports for the Project no less frequently than every calendar month in the form and format as may be required by CTDOT, City and NHPA.

(3). The Contractor shall submit invoices to NHPA on a monthly basis or as a result of substantial progress as reported in the Agreement. Invoices shall be submitted electronically on the proper form with all required supporting documentation including progress reports and any supporting documentation requested by CTDOT, City, and NHPA to facilitate payment and/or any appropriate reimbursements. CTDOT, City, and NHPA shall not reimburse the Contractor for any non-eligible expenditures or expenditures incurred prior to execution of this Agreement and NHPA's issuance of written authorization to proceed. Payments to the Contractor shall be made by NHPA, once funds are received by NHPA, pursuant to the applicable procedures of the LOFA and Capital Funding Agreement, upon approval of payment requisitions certified by a principal

of the Contractor submitted not more often than once a month, unless otherwise allowed by NHPA at its sole discretion.

(4). The Contractor must notify CTDOT, City, and NHPA in writing of the completion of the Project and provide a final project Progress Report and final total expenditure information.

(5). No funds shall be expended by the Contractor after the expiration of the Term of this Agreement. Any Funds expended after the end date of the Grant shall be considered ineligible and must be returned to CTDOT, City, and NHPA.

C. The Project shall be constructed in accordance with all applicable State of Connecticut and federal laws and regulations and the applicable requirements of the LOFA, the Standard Specifications, and the State of Connecticut Requirements. The Contractor shall impose, and require its Subcontractors and other parties connected to the Agreement to impose, these requirements on all parties it contracts with in performing the Project.

TECHNICAL SPECIFICATIONS

DIVISION 1

GENERAL REQUIREMENTS

SECTION 01 01 00

SUMMARY OF WORK

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

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

1.02 INTENT OF PLANS AND SPECIFICATIONS

- A. The intent of the Plans and Specifications is to describe The Work which the Contractor undertakes to do, in full compliance with the Contract, and it is understood that the Contractor will furnish, unless otherwise provided in the Contract, all materials, machinery, equipment, tools, supplies, transportation, labor, and all other incidentals necessary to the satisfactory prosecution and completion of the Work. The Plans and Specifications are complementary, and what is called for by either is as binding as if called for by both.
- B. The General Conditions and Special Conditions shall control where in conflict with the Standard Specifications. However, such portions of the Standard Specifications not in conflict or not rendered meaningless by the General Conditions or Special Conditions shall remain in full force and effect and be binding on the parties hereto.
- C. In the event the Contractor discovers any error or discrepancy in the Contract Documents, he shall immediately call upon the Engineer for his decision. The Engineer shall then make such corrections and interpretations as may be deemed necessary for the fulfillment of the intent of the Specifications, General Conditions and Special Conditions, Plans and other Contract Documents, as construed by him and his decision shall be final.

1.03 SUMMARY OF WORK

- A. The following items shall be considered as the Base Bid:

Proposal Item 1 – General Provisions:

- A. General Mobilization/Demobilization/Miscellaneous Coordination.

This line item shall consists of all labor, materials, tools and equipment required for setting-up general plant, storage/staging areas and facilities required to facilitate construction or as otherwise required by applicable Federal, State and Local laws; and the general mobilization of equipment required for the completion of the work as shown within the Bid Documents and all expenses for de-mobilization off the site upon completion of all work as shown within the Bid Documents. It will be the contractor's responsibility to obtain all necessary permits to perform the work.

Electricity (power) and water required for the completion of the work shall be furnished by the Owner at existing fixtures or outlets (The Owner will not provide any temporary pipes, cables, etc.). If the capacity of existing utilities is insufficient for the contractor's use, the Contractor shall be responsible for supplementing this capacity as required at no cost to the Owner. The contractor shall provide temporary lighting within designated work areas, as required.

The Contractor shall furnish, install, maintain, relocate and remove all signs, barricades, cones, warning lights, and other safety control devices and temporary signage required for the proper execution of the project. The Engineer and the Owner shall review the safety control device placement before work begins and prior to the beginning of work on any subsequent construction stages. Any deficiencies in the location or arrangement of devices shall be corrected by the contractor before starting work or as the work progresses towards completion. **Contractor shall note that while this Proposal Item 1.A shall include the procurement and installation of all applicable safety & traffic control devices (i.e. barricades, etc.) as well as the coordination and installation of temporary signage, the material procurement of the temporary signage shall be included in Proposal Item 6.**

The Contractor shall provide and maintain adequate protection of all preexisting architectural, structural, mechanical, electrical, plumbing components and/or features within the confines of in the work areas that are to remain in-place. The work shall include the dismantling of any preexisting architectural, structural, mechanical, electrical, plumbing components and/or features within the confines of in the work areas (such as the temporary moving/relocation of tenant furniture, equipment, etc.) which might be required in order to perform the work specified. The temporarily dismantled installations shall be reinstalled as soon as possible to a condition equal to or better than the condition existing prior to the commencement of construction.

Work shall also include the provision of an effective ventilation system to safely remove all dust and hazardous fumes generated from demolition, any surface treatment applications, or other work. Contractor shall be required to remove any and all loose/spalled overhead or vertical concrete from the structure (concrete framing elements or deck) prior to the start of any demolition activities to prevent any deteriorated concrete from being jarred loose in an uncontrolled fashion. Contractor shall be required to coordinate all aspects of his work with NHPA management and operations staff as well as facility security personnel throughout construction.

The contractor shall submit to the Owner/Engineer documentation of all pre-existing non-functioning electrical/mechanical systems within the entire work area. This documentation should be based on the contractor's condition survey performed immediately prior to the scheduled mobilization. The contractor shall not start the mobilization until the Owner approves of this submittal.

This work also consists of items not otherwise specifically indicated or shown on the plans but which are ancillary to the specified scope of work being performed, or part of the overall Scope of Work or otherwise not noted or assigned to other Proposal Items.

Contractor shall note that payment for this item shall be distributed in proportion to the total amount of all contract work complete in place unless otherwise approved in writing by NHPA.

B. Provision of Bonds, Permits, and Insurance.

Work shall consist of the costs associated with the procurement of all bonds, permits, and insurance necessary for this project. Provision of bonds shall include, but not be limited to, Labor & Material Bonds, Performance Bonds, etc. It shall be the contractor's sole responsibility to obtain all necessary permits to perform the work, including, but not limited to, Building, Electrical, Mechanical, Plumbing, and Street Obstruction permits, if required. Insurance requirements are described in General Conditions Section 111 and Special Conditions Section 313.

Proposal Item 2 – Work related to the 270 State Street Parking Garage:

A. Modernization of the Hydraulic Elevators at the 270 State Street Parking Garage.

Work shall consist of the repair and modernization of the two (2) hydraulic elevators serving the 270 State Street Parking Garage, all as detailed in the specifications, along with all other work required for the satisfactory performance of this work item. Contractor shall note that work shall include re-finishing of all associated metal surfaces (i.e. entrances, etc.) designated to remain.

B. Electrical Coordination Work to Support the Elevator Repairs and Modernization at the 270 State Street Parking Garage.

Work shall consist of all electrical work and coordination to support the demolition, power, lighting, and HVAC (or otherwise mechanical) repairs and improvements to support the work, all as shown on the drawings, in accordance with the specifications, and/or otherwise directed by the Engineer, along with all other work required for the satisfactory performance of this work item.

C. HVAC/Mechanical Improvements at the 270 State Street Parking Garage:

Work shall consist of all HVAC/mechanical work and coordination to support the demolition, HVAC (or otherwise mechanical) repairs and improvements to support the work, all as shown on the drawings, in accordance with the specifications, and/or otherwise directed by the Engineer, along with all other work required for the satisfactory performance of this work item.

D. Installation of Fire Alarm System

Work shall consist of the installation of a new fire alarm system. Work shall include verification of the work prior to start of work, installation of new devices and panels, new associated conduit, wire and boxes for notification and initiating circuit wiring, along with all other work required for the satisfactory performance of the work.

Proposal Item 3 – Work related to the Temple Medical Parking Garage:

- A. Modernization of the Hydraulic Elevators at the Temple Medical Parking Garage.

Work shall consist of the repair and modernization of the two (2) hydraulic elevators serving the Temple Medical Parking Garage, all as detailed in the specifications, along with all other work required for the satisfactory performance of this work item. Contractor shall note that work shall include re-finishing of all associated metal surfaces (i.e. entrances, etc.) designated to remain.

- B. Electrical Coordination Work to Support Elevator Repairs and Modernization at the Temple Medical Parking Garage.

Work shall consist of all electrical work and coordination to support the demolition, power, lighting, and HVAC (or otherwise mechanical) repairs and improvements to support the work, all as shown on the drawings, in accordance with the specifications, and/or otherwise directed by the Engineer, along with all other work required for the satisfactory performance of this work item.

- C. HVAC/Mechanical Improvements at the Temple Medical Parking Garage:

Work shall consist of all HVAC/mechanical work and coordination to support the demolition, HVAC (or otherwise mechanical) repairs and improvements to support the work, all as shown on the drawings, in accordance with the specifications, and/or otherwise directed by the Engineer, along with all other work required for the satisfactory performance of this work item.

- D. Architectural Repairs and Improvements:

1. Installation of Epoxy Flooring:

Work shall consist of the installation of a new epoxy flooring system throughout the elevator lobby floors on Levels 1, 2, 3 & 4 at the Temple Medical Parking Garage. Work shall include proper surface preparation of existing concrete surfaces to remain to receive new flooring system as recommended by the manufacturer and approved by the Engineer, preparation and installation of a mock-up sample for review and approval by Owner/Engineer, installation of new flooring system, curing and finishing, along with all other work required for the satisfactory performance of this work item.

Contractor shall note that Work shall include the provision and installation of a mock-up of the full epoxy flooring system. Mock-up shall be installed in actual work location for Owner and Engineer to review, and shall consist of a minimum area as required by the Manufacturer (or a minimum of 2 feet by 2 feet square; whichever is greater) for review and acceptability of performance characteristics. Contractor shall not proceed with installation of remaining system until an acceptable mock-up has been provided to the Owner/Engineer for review. The accepted mock-up shall be considered the expected standard of appearance, quality and workmanship for the Work, and any portion of Work, not excluding the Work in its entirety if necessitated, not performed to this standard shall be removed and replaced at no cost to Owner. Contractor shall note separate Bid Item pricing for provision of mock-up sample.

Work shall also consist of the provision and installation of new detectable warning surfaces, within the handicap ramps of the 1st, 2nd, 3rd and 4th Level elevator lobbies, to replace those existing. Work shall include the removal of the existing warning surfaces, followed by surface preparation to receive the new warning surface as recommended by the manufacturer and approved by the Engineer, placement of the new warning surface, curing, along with all other work required for the satisfactory performance of this work item. Color of the new detectable warning surface to be Brick Red.

- a. Provision and Installation of Mock-up Sample.
 - b. Installation of Flooring System throughout the Elevator Lobbies
 - c. Installation of New Tactile Warning Surfaces.
2. Installation of Exterior Insulation and Finish System (EIFS) related to the Vinyl Wall Coverings

Work shall consist of the installation of a complete Exterior Insulation and Finish System (EIFS), as specified, on designated surfaces. Work shall include the proper preparation of applicable substrate surfaces, followed by the installation of a complete Exterior Insulation and Finish System (EIFS) on designated surfaces, all in accordance with manufacturer's recommendations and as approved by the Engineer, along with all other work required for the satisfactory performance of this work item (reference Bid Item 3.D.3 for additional information). EIFS shall be compatible with the substrate encountered. Each coat application shall be contrasting color with final coat colors as scheduled or as directed by the Owner/Engineer to be submitted for verification prior to application.

3. Installation of Vinyl Wall Coverings/Murals and Window Coverings/Film

Work shall consist of the preparation, fabrication and installation of exterior-grade vinyl-cling wall coverings and window coverings all as designated on the drawings; Contractor shall note that electronic files shall be provided by the Owner and are anticipated to be of a PDF-format (although alternative format may be available upon coordination with the Owner). Work shall include obtaining the designated electronic files, preparation and fabrication of the covering/film material, followed by installation of the coverings/film at the designated locations, along with all other work required for the satisfactory performance of this work item.

Contractor shall note that, although all coverings shall be full height from floor to ceiling, the individual locations vary in horizontal length, and therefore shall prepare the wall coverings accordingly. Contractor shall be responsible for verifying all dimensions prior to start of work.

Contractor shall note that the Owner's preferred vendor for installation of graphics is Pinpoint Promotions, 53 Hancock Street, Stratford, CT (tel: (203) 301-4273, contact: Mr. TJ Andrews) or approved equal. All costs associated with the preparation and installation of the wall coverings are to be borne by the Contractor and are considered to be included in the Contract Price.

4. Installation of New Signage

Work shall consist of the provision of all materials, labor and equipment to furnish and install new aluminum signage as shown on the Drawings. Work shall include review and verification of placement of all new signage, followed by the installation of the new signage, inclusive of, but not limited to, coordination of stencil-cutting, the provision of all necessary mounting materials, support hardware and fasteners as required, priming and painting, application of vinyl-applied lettering, along with all other work required for the satisfactory performance of this work item; acceptable manufacturer shall be SignLite (tel: 203-239-6799) or approved equal.

5. Installation of Precast Bollards

Work shall include the placement and installation of precast concrete bollards. Work shall include the verification of locations to receive new bollards, followed by the procurement and placement of the concrete bollards, all as shown on the drawings and directed by the engineer, along with all other work required for the satisfactory performance of this work item.

Contractor shall note that work shall also include the installation of a non-sag polyurethane cove joint around the full perimeter of the bollards.

6. Modifications to Concrete Curbing

Work shall consist of the placement and installation of new concrete curbing, as shown on the Drawings or as directed by the Engineer. Work shall include marking areas for review by Engineer prior to start of work, selective demolition and surface preparation as required, placement of new reinforcing steel, placement of 5000 psi concrete, tooling and sealing of all joints, finishing and curing, along with all other work required for the satisfactory performance of this work item.

Contractor shall note that tooling and sealing of all control, construction and cove joints shall be incidental to this work item; all control joints shall continue up and down the associated vertical faces of the curbing as required. Contractor shall note that tooling of joints shall be performed at time of concrete placement; sawcutting of joints after concrete cures will not be allowed. Contractor shall also note that all joints shall incorporate non-sag polyurethane sealant; use of self-leveling polyurethane sealant shall be prohibited.

7. Painting of Various Surfaces

Work shall consist of the application of a coating to designated soffit (overhead), storefront and door surfaces. Work shall include surface preparation as required, followed by the application of a coating to designated surfaces, all as scheduled per the drawings and specifications, along with all other work required for the satisfactory performance of this work item. Coatings shall be compatible with the substrate encountered. Each coat application shall be contrasting color with final coat color as scheduled or as directed by the Owner/Engineer to be submitted for verification prior to application; final color to be chosen by the Owner/Architect/Engineer.

8. Miscellaneous Metal Work:

Work shall consist of the provision of all materials, labor and equipment required for the fabrication and installation of new metal work typically associated with the new lighting fixtures, as designated on the drawings or as directed by the Engineer. Work shall include, but not be limited to, all associated coordination work, such as the provision of all fasteners, shimming and leveling, etc. required for the installation of new metal components, welding as required, priming and painting, along with all other work required for the satisfactory performance of the work. Contractor shall reference Bid Item 3.B for lighting work.

Work shall also include review and verification of assembly requirements in the field with the Owner/Engineer prior to start of work. Contractor shall note that details and elevations shown in the Contract Drawings are schematic-in-nature, and do not depict all field conditions; Contractor shall provide shop drawings displaying all requirements, inclusive of all necessary sections, elevations, etc. to fully depict actual field conditions.

Proposal Item 4 – Work related to the Temple Street Parking Garage:

A. Modernization of the Hydraulic Elevators at the Temple Street Parking Garage.

Work shall consist of the repair and modernization of the one (1) hydraulic elevator serving the Temple Street Parking Garage, all as detailed in the specifications, along with all other work required for the satisfactory performance of this work item. Contractor shall note that work shall include re-finishing of all associated metal surfaces (i.e. entrances, etc.) designated to remain.

B. Modernization of the Traction Elevators at the Temple Street Parking Garage.

Work shall consist of the repair and modernization of the four (4) traction elevators serving the Temple Street Parking Garage, all as detailed in the specifications, along with all other work required for the satisfactory performance of this work item. Contractor shall note that work shall include re-finishing of all associated metal surfaces (i.e. entrances, etc.) designated to remain.

- C. Electrical Coordination Work to Support Elevator Repairs and Modernization at the Temple Street Parking Garage.

Work shall consist of all electrical work and coordination to support the demolition, power, lighting, and HVAC (or otherwise mechanical) repairs and improvements to support the work, all as shown on the drawings, in accordance with the specifications, and/or otherwise directed by the Engineer, along with all other work required for the satisfactory performance of this work item.

- D. HVAC/Mechanical Improvements at the Temple Street Parking Garage:

Work shall consist of all HVAC/mechanical work and coordination to support the demolition, HVAC (or otherwise mechanical) repairs and improvements to support the work, all as shown on the drawings, in accordance with the specifications, and/or otherwise directed by the Engineer, along with all other work required for the satisfactory performance of this work item.

Proposal Item 5 – Work related to the Air Rights Parking Garage:

- A. Modernization of the Traction Elevators at the Air Rights Parking Garage.

Work shall consist of the repair and modernization of the four (4) traction elevators serving the Air Rights Parking Garage, all as detailed in the specifications, along with all other work required for the satisfactory performance of this work item. Contractor shall note that work shall include re-finishing of all associated metal surfaces (i.e. entrances, etc.) designated to remain.

- B. Electrical Coordination Work to Support Elevator Repairs and Modernization at the Air Rights Parking Garage.

Work shall consist of all electrical work and coordination to support the demolition, power, lighting, and HVAC (or otherwise mechanical) repairs and improvements to support the work, all as shown on the drawings, in accordance with the specifications, and/or otherwise directed by the Engineer, along with all other work required for the satisfactory performance of this work item.

- C. HVAC Improvements at the Air Rights Parking Garage:

Work shall consist of all HVAC/mechanical work and coordination to support the demolition, HVAC (or otherwise mechanical) repairs and improvements to support the work, all as shown on the drawings, in accordance with the specifications, and/or otherwise directed by the Engineer, along with all other work required for the satisfactory performance of this work item.

Proposal Item 6 – Provision of Temporary Traffic Control Signage and Related Graphics:

Work shall consist of the provision of any and all temporary signage and graphics for use during construction, for Work impacting the interiors of the Parking Garages. All temporary signage shall be of a professional nature, as approved by Owner prior to procurement and prior to its installation, and shall consist of specified materials, along with all other work required for the satisfactory performance of this work item. All temporary signage required for the successful execution of the repair work shall become the property of NHPA unless otherwise approved.

Contractor shall note that while this Allowance shall solely pertain to the procurement of the applicable temporary signage, all required coordination with applicable parties to organize the temporary work areas both inside and outside of the facility, followed by the proposing and installation of associated temporary signage, along with the procurement and provision of temporary traffic control devices (i.e. barricades, etc.) shall be included in Bid Item 1.A, General Mobilization/Demobilization.

Proposal Item 7 – Miscellaneous Contingency Allowance.

This contingency allowance shall pertain to any and all necessary work that may arise due to unforeseen conditions not covered by the Proposal Documents and which may need to be performed at the direction of the Owner/Engineer. Work shall include the Contractor coordinating with applicable parties to properly identify the scope of the additional work required, followed by the Contractor providing a written proposal for the required repairs for review and approval.

Upon approval of Contractor's proposal by the owner; payment for this item of work shall be made on a time and material basis at cost plus 15% verified by appropriate backup documentation, or alternately by acceptable lump sum as approved by the Owner. If the work is performed by a subcontractor, the General Contractor will be allowed to add an additional 5% to the time and material costs of the subcontractor.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION (Not Applicable)

END OF SECTION 01 01 00

SECTION 01 02 60

UNIT PRICES

PART 1 - GENERAL

1.01 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.

1.02 SUMMARY:

- A. This Section specifies administrative and procedural requirements for unit prices.
 - 1. A unit price is an amount proposed by Bidders and stated on the Bid Form as a price per unit of measurement for materials and/or services that will be added to or deducted from the Contract Sum by Change Order in the event the estimated quantities of Work required by the Contract Documents are increased or decreased.
 - 2. Unit prices include all necessary labor, materials, equipment and incidentals, overhead, profit and applicable taxes.
 - 3. Refer to individual Specification Sections for construction activities requiring the establishment of unit prices. Methods of measurement and payment for unit prices are specified in those Sections.
- B. Schedule: A "Unit Price Schedule" is included at the end of this Section; reference Part 3.01. Specification Sections referenced in the Schedule contain requirements for materials and methods described under each unit price.
 - 1. The Owner reserves the right to reject the Contractor's measurement of work-in-place that involves use of established unit prices, and to have this Work measured by an independent surveyor acceptable to the Contractor at the Owner's expense.

PART 2 - PRODUCTS (Not Applicable).

PART 3 - EXECUTION

3.01 UNIT PRICE SCHEDULE

- A. Unit prices for all items are as shown in the Bid Forms shall be considered an integral part of this Section.

3.02 PAYMENT FOR EXTRA WORK

- A. Extra work which results from any of the changes as specified and for which no unit price is provided in the Contract, shall not be started until receipt of a written authorization or work order from the Owner, which authorization shall state the items of work to be performed and the method of payment for each item. The Contractor shall not be entitled to payment for work performed without such authorization.
- B. If it is practicable to pay for Extra Work on the unit price, a fair and equitable sum shall be fixed by agreement of the parties and shown in an Extra Work Order Agreement. Work to be performed directly by the Contractor should be submitted showing a detailed breakdown of labor and material costs to which a fifteen percent markup should be added for overhead and profit.
- C. Work to be performed by the subcontractor should be submitted showing a detailed breakdown of labor and materials by the subcontractor to which a five percent markup should be added by the Contractor for overhead and profit.
- D. When the Owner deems it impracticable to handle any Extra Work on the unit price, or if agreement of the parties cannot be reached, the work may be ordered done and paid for on a Force Account basis, as follows:
 - 1. Labor: The Contractor will be paid the actual amount of wages for all labor and foremen who are actually engaged in such work, to which cost shall be added fifteen percent of the sum of such wages. A foreman shall not be used when there are less than three laborers employed, except with the written consent of the Engineer.
 - 2. Welfare and Pension Fund: The Contractor will receive the actual additional amount of contributions paid for regular and uniform health and welfare benefits, pension fund benefits or other benefits, to which zero percent shall be added, when such amounts are required by collective bargaining agreement or other employment contract generally applicable to the class of labor employed on the Work.

3. Insurance and Tax: The Contractor will receive the actual cost or increase in cost of Contractor's Public Liability and Property Damage insurance, Workmen's Compensation tax, and Social Security tax required for Force Account work. The Contractor shall furnish satisfactory evidence of the cost or rates paid for such insurance and tax.
4. Materials: The Contractor will receive the actual cost for all materials, including freight charges as shown by the original paid invoices, which become an integral part of the finished work, to which shall be added 15 percent of the sum thereof.

The Contractor will be reimbursed for any materials used in the construction of such work as sheeting, false-work, form lumber, etc., which are not an integral part of the finished work. The amount of reimbursement shall be agreed upon in writing before such work is begun, and no percent shall be added. The salvage value of such materials shall be taken into consideration in the reimbursement agreed upon.

5. Equipment: For any machinery or special equipment (other than small tools), the use of which has been authorized by the Engineer, the Contractor will be paid as following:
 - a. For his own equipment, he will be paid by the monthly rate in accordance with the latest edition of Means Construction Cost Data.
 - b. For rental equipment, he will be paid for the actual invoice amount as shown by the original paid invoices.

The equipment shall be of a type and size reasonably required to complete the Extra Work. Compensation will not be allowed for transportation to or from the Work or for the time required for setting up and removing the equipment from the Work or for equipment of a type, size or condition unsuitable for the Work.

3.03 CANCELED ITEMS

- A. It shall be in the sole judgment and sole discretion of the Engineer or its representatives to cancel or alter any or all portions of the Contract due to circumstances either unknown at the time of bidding or arising after the Contract was entered into. Should such actions result in elimination or non-completion of any portion of the Contract, payment shall be made as follows:

1. For the canceled work completed by the Contractor, payment shall be made to the Contractor for the actual number of units or items completed at the Contract unit prices. For canceled work partially completed by the Contractor, payment shall be made to the Contractor for the partially completed units or items as specified in Payment for Extra Work.
2. For materials obtained by the Contractor for the unfinished (uncompleted) portions of the canceled work, that have been inspected, tested and accepted by the Engineer, and that have not been incorporated in the canceled work, payment shall be made to the Contractor for the actual costs for all such materials, including freight charges, as shown by the original paid invoices, to which shall be added 10 percent of the sums thereof. The materials, when so paid for by the Owner, shall become the property of the Owner.

3.04 PARTIAL PAYMENTS

- A. The Engineer shall review the Contractor's pay request for materials in-place and completed, the amount of work performed, and the value thereof, at the Contract Unit Prices. From the amount so determined there shall be deducted five percent to be retained until after the completion of the entire work to the satisfaction of the Engineer, and the balance certified to the Owner for payment. No payment shall be made for stored materials.
- B. If stored matter is lost or damaged prior to incorporation in the Work, the materials shall be replaced or satisfactory repaired at the Contractor's expense. The Contractor shall pay and be responsible for cost of storage, if any, of said materials.

3.05 ADJUSTMENT OF UNIT PRICES BASED ON ACTUAL QUANTITIES PERFORMED

- A. For unit price bid items, the quantities as listed in the schedule of bid items are estimates only. The Contractor will be required to complete the work specified in accordance with the Contract and at the quoted unit prices, whether quantities greater or less than the estimated amounts are involved.

END OF SECTION 01 02 60

SECTION 01 02 70

APPLICATIONS FOR PAYMENT

PART 1 - GENERAL

1.01 Related Documents

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

1.02 Summary

This Section specifies administrative and procedural requirements governing the Contractor's Applications for Payment.

1.03 Application for Payment

- A. Each Application for Payment shall be consistent with previous applications and payments as certified by the Architect/Engineer and paid for by the Owner.
 - 1. The initial Application for Payment, the Application for Payment at time of Substantial Completion, and the final Application for Payment involve additional requirements.
- B. Payment Application Times: Each progress payment date is as indicated in the Agreement. The period of construction Work covered by each Application or Payment is the period indicated in the Agreement.
- C. Payment Application Forms: Use AIA Document G 702 and Continuation Sheets G 703 as the form for Application for Payment. Contractor shall note that although AIA forms are being utilized for document format, AIA Contract Terms do not apply.
- D. Application Preparation: Complete every entry on the form, inclusive of notarization and execution by person authorized to sign legal documents on behalf of the Owner. Incomplete applications will be returned without action.
 - 1. Entries shall match data on the Bid Form's Schedule of Values and Contractor's Construction Schedule. Use updated schedules if revisions have been made.

2. Include amounts of Change Orders and Construction Change Directives issued prior to the last day of the construction period covered by the application.
 3. Quantity of “Stored Materials” shall not be submitted for payment. **Contractor shall only be allowed to apply for payment for “Completed Work.”**
 4. **Contractor shall include an updated schedule with each payment requisition.**
- E. Transmittal: Submit three (3) executed copies of each Application for Payment to the Engineer/Architect by means ensuring receipt within 24 hours; one copy shall be complete, including waivers of lien and similar attachments, when required.
1. Submit one (1) draft copy of each Application to the Engineer/Architect and one (1) to the Owner for purposes of review prior to executing the official submission.
 2. Transmit each copy with a transmittal form listing attachments, and recording appropriate information related to the application in a manner acceptable to the Engineer/Architect.
- F. Waivers of Mechanics Lien: With each Application for Payment submit waivers of mechanics liens from subcontractors or sub-subcontractors and suppliers for the construction period covered by the current application.
1. Submit partial waivers on each item for the amount requested, prior to deduction for retainage, on each item.
 2. When an application shows completion of an item, submit final or full waivers.
 3. The Owner reserves the right to designate which entities involved in the Work must submit waivers.
 4. Waiver Delays: Submit each Application for Payment with the Contractor's waiver of mechanics lien for the period of construction covered by the application.
 - a. Submit final Application for Payment with or preceded by final waivers from every entity involved with performance of Work covered by the application who could lawfully be entitled to a lien.

5. Waiver Forms: Submit waivers of lien on forms, and executed in a manner, acceptable to Owner.
- G. Initial Application for Payment: Administrative actions and submittals that must precede or coincide with submittal of the first Application for Payment include the following in addition to requirements of the General and Special Conditions:
1. List of subcontractors
 2. List of principal suppliers and fabricators
 3. Schedule of Values to match Bid Form
 4. Contractor's Construction Schedule (preliminary if not final)
 5. Schedule of principal products
 6. Schedule of unit prices
 7. Schedule of Submittals (preliminary if not final)
 8. List of Contractor's staff assignments
 9. List of Contractor's principal consultants
 10. Copies of building permits
 11. Copies of authorizations and licenses from governing authorities for performance of the Work
 12. Initial progress report
 13. Report of pre-construction meeting
 14. Certificates of insurance and insurance policies
 15. Performance and payment bonds (if required)
 16. Data needed to acquire Owner's insurance
 17. Initial settlement survey and damage report, if required
- H. Application for Payment at Substantial Completion: Following issuance of the Certificate of Substantial Completion, submit an Application for Payment; this application shall reflect any Certificates of Partial Substantial Completion issued previously for Owner occupancy of designated portions of the Work.
- I. Administrative actions and submittals that shall proceed or coincide with this application include:
1. Occupancy permits and similar approvals
 2. Warranties (guarantees)
 3. Maintenance Agreements
 3. Test/adjust/balance records
 4. Maintenance Instructions
 5. Meter readings
 6. Start-up performance reports
 7. Change Over information related to Owner's occupancy, use, operation and maintenance
 8. Final Cleaning

9. Application for reduction of retainage, and consent of surety
 10. Advice on shifting insurance coverages
 11. Final progress photographs
 12. List of incomplete Work, recognized as exceptions to Architect's Certificate of Substantial Completion
 13. Requirements of the General and Special Conditions
- J. Final Payment Application: Administrative actions and submittals that must precede or coincide with submittal of the final payment Application for Payment include the following:
1. Project Completion closeout requirements
 2. Completion of items specified for completion after Substantial Completion
 3. Transmittal of required Project construction records to Owner
 4. Proof that taxes, fees and similar obligations have been paid
 5. Removal of temporary facilities and services
 6. Removal of surplus materials, rubbish and similar elements
 7. Requirements of the General and Special Conditions

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION (Not Applicable)

END OF SECTION 01 02 70

SECTION 01 03 50

MODIFICATION PROCEDURES

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SUMMARY

- A. This Section specifies administrative and procedural requirements for handling and processing contract modifications. Refer to General Conditions for additional information.
- B. Related Sections: The following Sections contain requirements that relate to this Section:
 - 1. Division I Section 01026 "Unit Prices"
 - 2. Division I Section 01027 "Applications for Payment" for administrative procedures Governing Applications for Payment
 - 3. Division I Section 01300 "Submittals" for requirements for the Construction Schedule
 - 4. Division I Section 01631 "Product Substitutions" for administrative procedures for handling requests for substitutions made after award of the Contract

1.03 CHANGE ORDER PROPOSAL REQUESTS

- A. Owner Initiated Proposal Requests: The Engineer/Architect will issue a detailed description of proposed changes in the Work that will require adjustment to the Contract Sum or Contract Time. If necessary, the description will include supplemental or revised Drawings and Specifications.
 - 1. Proposal requests issued are for information only. Do not consider them as an instruction either to stop work in progress or to execute the proposed change.

2. Submit an estimate of cost necessary to execute the change to the Engineer/Architect for the Owner's review.
 - a. Include a list of quantities of products required and unit costs, with the total amount of purchases to be made. Where requested, furnish survey data to substantiate quantities.
 - b. Indicate applicable delivery charges, equipment rental, and amounts of trade discounts.
 - c. Include a statement indicating the effect the proposed change in the Work will have on the Contract Time.
- B. Contractor Initiated Proposals: When latent or unforeseen conditions require modifications to the Contract, the Contractor may propose changes by submitting a request for a change to the Engineer/Architect.
 1. Include a statement outlining the reasons for the change and the effect of the change on the Work. Provide a complete description of the proposed change. Indicate the effect of the proposed change on the Contract Sum and Contract Time.
 2. Include a list of quantities of products required and unit costs, with the total amount of purchases to be made. Where requested, furnish survey data to substantiate quantities.
 3. Indicate applicable delivery charges, equipment rental, and amounts of trade discounts.
 4. Comply with requirements in Section 01631, Product Substitutions, if the proposed change requires an equal or substitution of one product or system for a product or system specified.
- C. Proposal Request Form: Use "Change Order Request" proposal form as required by Owner for Change Order Proposal Requests.

1.04 CONSTRUCTION CHANGE DIRECTIVE

- A. If the Owner and the Contractor disagree on the terms of a Proposal Request, the Engineer/Architect may issue a Construction Change Directive on a "Construction Change Directive" form as required by the Owner. The Construction Change Directive instructs the Contractor to proceed with a change in the Work, for subsequent inclusion in a Change Order.

1. The Construction Change Directive contains a complete description of the change in the Work. It also designates the method to be followed to determine change in the Contract Sum or Contract Time.
- B. Maintain detailed records on a time and material basis of work required by the Construction Change Directive.
 1. After completion of the change, submit an itemized account and supporting data necessary to substantiate cost and time adjustments to the Contract.
 2. The final value shall be negotiated based on the supporting data to determine the value of the work.

1.05 CHANGE ORDER PROCEDURES

- A. With the Owner's approval of a Proposal Request, the Engineer/Architect will issue a Change Order for signatures of the Engineer/Architect, Owner and the Contractor on a "Change Order" form as required by the Owner.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION (Not Applicable)

END OF SECTION 01 03 50

SECTION 01 04 00

PROJECT COORDINATION

PART 1 - GENERAL

1.01 Related Documents

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

1.02 Summary

- A. This Section specifies administrative and supervisory requirements necessary for project coordination including, but not necessarily limited to:
 - 1. Coordination
 - 2. Administrative and supervisory personnel
 - 3. General installation provisions
 - 4. Cleaning and protection
- B. Progress meetings, coordination meetings and pre-installation conferences are to be determined in consultation with the Owner.
- C. Requirements for the Contractor's Construction Schedule are included in Section "Submittals".

1.03 Coordination

- A. Coordination: Coordinate construction activities included under various Sections of these Specifications to assure efficient and orderly installation of each part of the Work. Coordinate construction operations included under different Sections of the Specifications that are dependent upon each other for proper installation, connection, and operation.
 - 1. Where installation of one part of the Work is dependent on installation of other components, either before or after its own installation, schedule construction activities in the sequence required to obtain the best results.
 - 2. Where availability of space is limited, coordinate installation of different components to assure maximum accessibility for required maintenance, service and repair.

3. Make adequate provisions to accommodate items scheduled for later installation.
- B. When necessary, prepare memoranda for distribution to each party involved outlining special procedures required for coordination. Include such items as required notices, reports, and attendance at meetings.
 1. Prepare similar memoranda for the Owner and separate Contractors where coordination of their Work is required.
- C. Administrative Procedures: Coordinate scheduling and timing of required administrative procedures with other construction activities to avoid conflicts and ensure orderly progress of the Work. Such administrative activities include, but are not limited to, the following:
 1. Preparation of schedules
 2. Installation and removal of temporary facilities
 3. Delivery and processing of submittals
 4. Progress meetings
 5. Project close out activities
- D. 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 in, the Work. Refer to other sections for disposition of salvaged materials that are designated as Owner's property.

1.04 Submittals

- A. Coordination Drawings: Prepare and submit coordination Drawings where close and careful coordination is required for installation of products and materials fabricated off-site by separate entities, and where limited space availability necessitates maximum utilization of space for efficient installation of different components.
 1. Show the interrelationship of components shown on separate Shop Drawings.
 2. Indicate required installation sequences.
 3. Comply with requirements contained in Section "Submittals".

- B. Within 15 calendar days of the Contractor's receipt of the official Notice to Proceed, the Contractor shall submit a listing of principal staff assignments, including the Superintendent and other personnel in attendance at the site. Individuals should be identified, particularly key personnel. The listing of staff should include a brief description of individual duties and responsibilities; addresses, telephone numbers, pager numbers and portable telephone numbers as appropriate so that key personnel can be reached at all times.
 - 1. Post copies of the list in the project meeting room, the temporary field office, and each temporary telephone.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION

3.01 General Installation Provisions

- A. Inspection of Conditions: Require the Installer of each major component to inspect both the substrate and conditions under which Work is to be performed. Do not proceed until unsatisfactory conditions have been corrected in an acceptable manner.
- B. Manufacturer's Instructions: Comply with manufacturer's written installation instructions and recommendations, to the extent that those instructions and recommendations are more explicit or stringent than requirements contained in Contract Documents.
- C. Inspect materials or equipment immediately upon delivery and then again prior to installation. Reject damaged and defective items.
- D. Provide attachment and connection devices and methods necessary for securing work. Secure Work true to line and level. Allow for expansion and building movement.
- E. Provide uniform joint widths in exposed Work. Arrange joints in exposed work to obtain the best visual effect. Refer questionable choices to the Engineer for final decision.
- F. Measurements and dimensions should all be rechecked before starting each and every installation.

- G. Install each component during weather conditions and Project status that will ensure the best possible results. Isolate each part of the completed construction from incompatible material as necessary to prevent deterioration.
- H. Coordinate temporary enclosures with required inspections and tests, to minimize the necessity of uncovering completed construction for the purpose of inspection.
- I. Mounting Heights: Where mounting heights are not indicated, install individual components at standard mounting heights recognized within the industry for the particular application indicated. Refer questionable mounting height decisions to the Engineer for final decision.

3.02 Cleaning and Protection

- A. During handling and installation, clean and protect construction in progress and adjoining materials in place. Apply protective covering where required to ensure protection from damage or deterioration at Substantial Completion.
- B. Clean and maintain completed construction as frequently as necessary through the remainder of the construction period. Adjust and lubricate operable components to ensure operability without damaging effects.
- C. Limiting Exposures: Supervise construction activities to ensure that no part of the construction, completed or in progress, is subject to harmful, dangerous, damaging, or otherwise deleterious exposure during the construction period. Where applicable, such exposures include, but are not limited to, the following:
 - 1. Excessive static or dynamic loading
 - 2. Excessively high or low temperatures
 - 3. Air contamination or pollution
 - 4. Water or ice
 - 5. Solvents and chemicals
 - 6. Puncture and abrasion
 - 7. Heavy traffic
 - 8. Soiling, staining and corrosion
 - 9. Bacteria
 - 10. Combustion
 - 11. Electrical current
 - 12. Unusual wear or other misuse
 - 13. Contact between incompatible materials
 - 14. Destructive testing

- 15. Misalignment
- 16. Excessive weathering and unprotected storage
- 17. Improper shipping and handling
- 18. Theft and vandalism

END OF SECTION 01 04 00

SECTION 01 04 50

CUTTING AND PATCHING

PART 1 - GENERAL

1.01 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.

1.02 SUMMARY:

- A. This Section specifies administrative and procedural requirements for cutting and patching.
- B. Refer to other Sections for specific requirements and limitations applicable to cutting and patching individual parts of the Work.
 - 1. Requirements of this Section apply to existing plumbing and electrical installations.
- C. Demolition of selected portions of the building for alterations is included in Section "Selective Demolition."

1.03 SUBMITTALS:

- A. Cutting and Patching Proposal: Where approval of procedures for cutting and patching is required before proceeding, submit a proposal describing procedures well in advance of the time cutting and patching will be performed and request approval to proceed. Include the following information, as applicable, in the proposal:
 - 1. Describe the extent of cutting and patching required and how it is to be performed; indicate why it cannot be avoided.
 - 2. Describe anticipated results in terms of changes to existing construction; include changes to structural elements and operating components as well as changes in the building's appearance and other significant visual elements.
 - 3. List products to be used and firms or entities that will perform the Work.
 - 4. Indicate dates when cutting and patching is to be performed.

5. List utilities that will be disturbed or affected, including those that will be relocated and those that will be temporarily out-of-service. Indicate how long service will be disrupted.
6. Where cutting and patching involves addition of reinforcement to structural elements, submit details and engineering calculations to show how reinforcement is integrated with the original structure.
7. Approval by the Consultant to proceed with cutting and patching does not waive the Consultant's right to later require complete removal and replacement of a part of the Work found to be unsatisfactory.

1.04 QUALITY ASSURANCE:

- A. Requirements for Structural Work: Do not cut and patch structural elements in a manner that would reduce their load-carrying capacity or load-deflection ratio.
 1. Obtain approval of the cutting and patching proposal before cutting and patching the following structural elements:
 - a. Foundation construction
 - b. Bearing and retaining walls
 - c. Structural concrete
 - d. Structural steel
 - e. Lintels
 - f. Timber and primary wood framing
 - g. Structural decking
 - h. Stair systems
 - i. Miscellaneous structural metals
 - j. Exterior curtain wall construction
 - k. Equipment supports
 - l. Piping, ductwork, vessels and equipment
- B. Operational and Safety Limitations: Do not cut and patch operating elements or safety related components in a manner that would result in reducing their capacity to perform as intended, or result in increased maintenance, or decreased operational life or safety.
 1. Obtain approval of the cutting and patching proposal before cutting and patching the following operating elements or safety related systems:
 - a. Shoring, bracing, and sheeting
 - b. Primary operational systems and equipment
 - c. Air or smoke barriers
 - d. Water, moisture, or vapor barriers

- e. Membranes and flashings
- f. Fire protection systems
- g. Noise and vibration control elements and systems
- h. Control systems
- i. Communication systems
- j. Conveying systems
- k. Electrical wiring systems

C. Visual Requirements: Do not cut and patch construction exposed on the exterior or in occupied spaces, in a manner that would, in the Consultant's opinion, reduce the building's aesthetic qualities, or results in visual evidence of cutting and patching. Remove and replace Work cut and patched in a visually unsatisfactory manner.

1. If possible retain the original installer or fabricator to cut and patch the following categories of exposed Work, or if it is not possible to engage the original installer or fabricator, engage another recognized experienced and specialized firm:

- a. Processed concrete finishes
- b. Stonework and stone masonry
- c. Ornamental metal
- d. Matched-veneer woodwork
- e. Preformed metal panels
- f. Window wall system
- g. Stucco and ornamental plaster
- h. Acoustical ceilings
- i. Terrazzo
- j. Finished wood flooring
- k. Fluid-applied flooring
- l. Carpeting
- m. Aggregate wall coating
- n. Wall covering
- o. Swimming pool finishes
- p. HVAC enclosures, cabinets or covers

PART 2 - PRODUCTS

2.01 MATERIALS:

- A. Use materials that are identical to existing materials. If identical materials are not available or cannot be used where exposed surfaces are involved, use materials that match existing adjacent surfaces to the fullest extent possible with regard to visual effect. Use materials whose installed performance will equal or surpass that of existing materials.

PART 3 – EXECUTION

3.01 INSPECTION:

- A. Before cutting existing surfaces examine surfaces to be cut and patched and conditions under which cutting and patching is to be performed. Take corrective action before proceeding, if unsafe or unsatisfactory conditions are encountered.
 - 1. Before proceeding, meet at the site with parties involved in cutting and patching, including mechanical and electrical trades. Review areas of potential interference and conflict. Coordinate procedures and resolve potential conflicts before proceeding.

3.02 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 the Project that might be exposed during cutting and patching operations.
- C. Avoid interference with use of adjoining areas or interruption of free passage to adjoining areas.
- D. Take all precautions necessary to avoid cutting existing pipe, conduit or ductwork serving the building, but scheduled to be removed or relocated until provisions have been made to bypass them.

3.03 PERFORMANCE

- A. General: Employ skilled workmen 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 activities and the subsequent fitting and patching required to restore surfaces to their original condition.
- B. Cutting: Cut existing construction using methods least likely to damage elements to be retained or adjoining construction. Where possible review proposed procedures with the original installer and comply with the original installer's recommendations.
1. In general, where cutting is required use hand or small power tools designed for sawing or grinding, not hammering and chopping. Cut holes and slots neatly to size required with minimum disturbance of adjacent surfaces. Temporarily cover openings when not in use.
 2. To avoid marring existing finished surfaces, cut or drill from the exposed or finished side into concealed surfaces.
 3. Cut through concrete and masonry using a cutting machine such as a carborundum saw or diamond core drill.
 4. Comply with requirements of applicable Sections of Division-2 where cutting and patching requires excavating and backfilling.
 5. By-pass utility services such as pipe or conduit, before cutting, where services are shown or required to be removed, relocated or abandoned. Cut-off pipe or conduit in walls or partitions to be removed. Cap, valve or plug and seal the remaining portion of pipe or conduit to prevent entrance of moisture or other foreign matter after by-passing and cutting.
- C. Patching: Patch with durable seams that are as invisible as possible. Comply with specified tolerances.
1. Where feasible, inspect and test patched areas to demonstrate integrity of the installation.
 2. 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. Where removal of walls or partitions extends one finished area into another, patch and repair floor and wall surfaces in the new space to provide an even

surface of uniform color 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 smooth painted surface, extend final paint coat over entire unbroken surface containing the patch, after the patched area has received primer and second coat and in accordance with the manufacturer's written recommendations.

4. Patch, repair or re-hang existing ceilings as necessary to provide an even plane surface of uniform appearance.

3.04 CLEANING

- A. Thoroughly clean areas and spaces where cutting and patching is performed or used as access. Remove completely paint, mortar, oils, putty and items of similar nature. Thoroughly clean piping, conduit and similar features before painting or other finishing is applied. Restore damaged pipe covering to its original condition.

END OF SECTION 01 04 50

SECTION 01 09 50

REFERENCE STANDARDS AND DEFINITIONS

PART 1 - GENERAL

1.01 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.

1.02 DEFINITIONS

- A. General: Basic Contract definitions are included in the Conditions of the Contract.
- B. Indicated: The term "indicated" refers to graphic representations, notes or schedules on the Drawings, or other Paragraphs or Schedules in the Specifications, and similar requirements in the Contract Documents. Where terms such as "shown," "noted," "scheduled," and "specified" are used, it is to help the reader locate the reference; no limitation on location is intended.
- C. Directed: Terms such as "directed," "requested," "authorized," "selected," "approved," "required," and "permitted" mean "directed by the Consultant," "requested by the Consultant," and similar phrases.
- D. Approve: The term "approved," where used in conjunction with the Consultant's action on the Contractor's submittals, applications, and requests, is limited to the Consultant's duties and responsibilities as stated in the Conditions of the Contract.
- E. Regulation: The term "Regulations" includes laws, ordinances, statutes, and lawful orders issued by authorities having jurisdiction, as well as rules, conventions, and agreements within the construction industry that control performance of the Work.
- F. Furnish: The term "furnish" is used to mean "supply and deliver to the Project site, ready for unloading, unpacking, assembly, installation, and similar operations."
- G. Install: The term "install" is used to describe operations at Project site including the actual "unloading, unpacking, assembly, erection, placing, anchoring, applying, working to dimension, finishing, curing, protecting, cleaning, and similar operations."
- H. Provide: The term "provide" means "to furnish and install, complete and ready for the intended use."

- I. Installer: An "Installer" is the Contractor or an entity engaged by the Contractor, either as an employee, subcontractor, or contractor of lower tier for performance of a particular construction activity, including installation, erection, application, and similar operations. Installers are required to be experienced in the operations they are engaged to perform.
1. The term "experienced," when used with the term "Installer," means having a minimum of five previous projects similar in size and scope to this Project, being familiar with the special requirements indicated, and having complied with requirements of the authority having jurisdiction.
 2. Trades: Use of titles such as "carpentry" is not intended to imply that certain construction activities must be performed by accredited or unionized individuals of a corresponding generic name, such as "carpenter". It also does not imply that requirements specified apply exclusively to trades persons of the corresponding generic name.
 3. Assignment of Specialists: Certain Sections of the Specifications require that specific construction activities shall be performed by specialists who are recognized experts in the operations to be performed. The specialists must be engaged for those activities, and assignments are requirements over which the Contractor has no choice or option. Nevertheless, the ultimate responsibility for fulfilling Contract requirements remains with the Contractor.
 - a. This requirement shall not be interpreted to conflict with enforcement of building codes and similar regulations governing the Work. It is also not intended to interfere with local trade union jurisdictional settlements and similar conventions.
- J. Project Site is the space available to the Contractor for performance of construction activities, either exclusively or in conjunction with others performing other work as part of the Project. The extent of the Project Site is shown on the Drawings and may or may not be identical with the description of the land on which the Project is to be built.
- K. Testing Laboratories: A "testing laboratory" is an independent entity engaged to perform specific inspections or tests, either at the Project Site or elsewhere, and to report on and, if required, to interpret results of those inspections or tests.

1.03 SPECIFICATION FORMAT AND CONTENT EXPLANATION

- A. Specification Format: These Specifications are organized into Divisions and Sections based on the Construction Specifications Institute's 16-Division format and MASTER FORMAT numbering system.
- B. Specification Content: This Specification uses certain conventions in the use of language and the intended meaning of certain terms, words, and phrases when used in particular situations or circumstances. These conventions are explained as follows:
 - 1. Abbreviated Language: Language used in Specifications and other Contract Documents is the abbreviated type. Words and meanings shall be interpreted as appropriate. Words that are implied, but not stated shall be interpolated as the sense required. Singular words will be interpreted as plural and plural words interpreted as singular where applicable and the context of the Contract Documents so indicates.
 - 2. Imperative and streamlined language is used generally in the Specifications. Requirements expressed in the imperative mood are to be performed by the Contractor. At certain locations in the text, for clarity, subjective language is used to describe responsibilities that must be fulfilled indirectly by the Contractor, or by others when so noted.
 - a. The words "shall be" shall be included by inference wherever a colon (:) is used within a sentence or phrase.

1.04 INDUSTRY STANDARDS

- A. Applicability of Standards: Except where the Contract Documents include more stringent requirements, applicable construction industry standards have the same force and effect as if bound or copied directly into the Contract Documents to the extent referenced. Such standards are made a part of the Contract Documents by reference.
- B. Publication Dates: Comply with the standard in effect as of the date of the Contract Documents.
- C. Conflicting Requirements: Where compliance with two or more standards is specified, and the standards may establish different or conflicting requirements for minimum quantities or quality levels, refer requirements that are different, but apparently equal, and uncertainties to the Consultant for a decision before proceeding.

1. **Minimum Quantity or Quality Levels:** The quantity or quality level shown or specified shall be the minimum provided or performed. The actual installation may comply exactly with the minimum quantity or quality specified, or it may exceed the minimum within reasonable limits. In complying with these requirements, indicated numeric values are minimum or maximum, as appropriate for the context of the requirements. Refer uncertainties to the Consultant for a decision before proceeding.
- D. **Copies of Standards:** Each entity engaged in construction on the Project is required to be familiar with industry standards applicable to that entity's construction activity. Copies of applicable standards are not bound with the Contract Documents.
1. Where copies of standards are needed for performance of a required construction activity, the Contractor shall obtain copies directly from the publication source.
- E. **Abbreviations and Names:** Trade association names and titles of general standards are frequently abbreviated. Where such acronyms or abbreviations are used in the Specifications or other Contract Documents, they mean the recognized name of the trade association, standards generating organization, authority having jurisdiction, or other entity applicable to the context of the text provision. Refer to the "Encyclopedia of Associations," published by Gale Research Co., available in most libraries.
- F. **Abbreviations and Names:** Trade association names and titles of general standards are frequently abbreviated. The following acronyms or abbreviations, as referenced in Contract Documents, are defined to mean the associated names. Names and addresses are subject to change and are believed to be, but are not assured to be, accurate and up to date as of date of Contract Documents.

AA Aluminum Association
900 19th St., NW, Suite 300
Washington, DC 20006 (202) 862-5100

AASHTO Amer. Assoc. of State Highway and Transportation Officials
444 North Capitol St., Suite 225
Washington, DC 20001 (202) 624-5800

ACI American Concrete Institute
P.O. Box 19150
Detroit, MI 48219 (313) 532-2600

ACIL American Council of Independent Laboratories
1725 K St., NW
Washington, DC 20006 (202) 887-5872

AI Asphalt Institute
P.O. Box 14052
Lexington, KY 40512-4052 (606) 288-4960

AIA American Institute of Architects
1735 New York Ave., NW
Washington, DC 20006 (202) 626-7300

APA American Plywood Assoc.
P.O. Box 11700
Tacoma, WA 98411 (206) 565-6600

ARMA Asphalt Roofing Manufacturers Assoc.
6288 Montrose Rd.
Rockville, MD 20852 (301) 231-9050

ASC Adhesive and Sealant Council
1627 K Street, NW, Suite 1000
Washington, DC 20006 (202) 452-1500

ASPE American Society of Plumbing Engineers
3617 Thousand Oaks Blvd., Suite 210
Westlake, CA 91362 (805) 495-7120

ASTM American Society for Testing and Materials
1916 Race St.
Philadelphia, PA 19103 (215) 299-5400

AWS American Welding Society
550 LeJeune Road, NW
P.O. Box 351040
Miami, FL 33135 (305) 443-9353

BANC Brick Association of North Carolina
P.O. Box 13290
Greensboro, NC 27415-3290 (919) 273-5566

BHMA Builders' Hardware Manufacturers Assoc.
355 Lexington Ave., 17th Floor
New York, NY 10017 (212) 661-4261

BIA Brick Institute of America
11490 Commerce Park Drive, Suite 300
Reston, VA 22091 (703) 620-0010

CRSI Concrete Reinforcing Steel Institute
933 Plum Grove Rd.
Schaumburg, IL 60173 (312) 517-1200

EJMA Expansion Joint Manufacturers Assoc.
25 N. Broadway
Tarrytown, NY 10591 (914) 332-0040

HPMA Hardwood Plywood Manufacturers Assoc.
1825 Michael Farraday Drive
P.O. Box 2789
Reston, VA 22090 (703) 435-2900

IEEE Institute of Electrical and Electronic Engineers
345 E. 47th St.
New York, NY 10017 (212) 705-7900

NAPA National Asphalt Pavement Assoc.
Calvert Building, Suite 620
6811 Kenilworth Ave.
Riverdale, MD 20737 (301) 779-4880

NCMA National Concrete Masonry Assoc.
P.O. Box 781
Herndon, VA 22070 (703) 435-4900

NEC National Electric Code (from NFPA)

NECA National Electrical Contractors Assoc.
7315 Wisconsin Ave.
Bethesda, MD 20814 (301) 657-3110

NFPA National Fire Protection Assoc.
One Batterymarch Park
P.O. Box 9101
Quincy, MA 02269-9101 (617) 770-3000

NPCA National Paint and Coatings Assoc.
1500 Rhode Island Ave., NW
Washington, DC 20005 (202) 462-6272

NRCA National Roofing Contractors Assoc.
One O'Hare Centre
6250 River Road, Suite 8030
Rosemont, IL 60018 (708) 318-6722

PCA Portland Cement Assoc.
5420 Old Orchard Road
Skokie, IL 60077 (312) 966-6200

PCI Prestressed Concrete Institute
175 W. Jackson Blvd.
Chicago, IL 60604 (312) 786-0300

PDI Plumbing and Drainage Institute
800 Turnpike St, Suite 300
North Andover, MA 01845 (800) 589-8956

RMA Rubber Manufacturers Assoc.
1400 K St., NW
Washington DC 20005 (202) 682-4800

SSPC Steel Structures Painting Council
4400 Fifth Ave.
Pittsburgh, PA 15213 (412) 268-3327

WRI Wire Reinforcement Institute
1760 Reston Parkway, Suite 403
Reston, VA 22090 (703) 790-9790

- G. Federal Government Agencies: Names and titles of federal government standard or Specification producing agencies are often abbreviated. The following acronyms or abbreviations referenced in the Contract Documents indicate names of standard or Specification producing agencies of the federal government. Names and addresses are subject to change but are believed to be, but are not assured to be, accurate and up to date as of the date of the Contract Documents.

CE Corps of Engineers
(U.S. Department of the Army)
Chief of Engineers - Referral
Washington, DC 20314 (202) 272-0660

CFR Code of Federal Regulations
Available from the Government Printing Office
N. Capitol St. between G and H St. NW
Washington, DC 20402 (202) 783-3238
(Material is usually first published in the "Federal Register")

CPSC Consumer Product Safety Commission
5401 Westbard Ave.
Bethesda, MD 20816 (800) 638-2772

CS Commercial Standard
(U.S. Department of Commerce)
Government Printing Office
Washington, DC 20402 (202) 377-2000

DOC Department of Commerce
14th St. and Constitution Ave., NW
Washington, DC 20230 (202) 377-2000

DOT Department of Transportation
400 Seventh St., SW
Washington, DC 20590 (202) 366-4000

EPA Environmental Protection Agency
401 M St., SW
Washington, DC 20460 (202) 382-2090

FAA Federal Aviation Administration
(U.S. Department of Transportation)
800 Independence Ave., SW
Washington, DC 20590 (202) 366-4000

NIST National Institute of Standards and Technology

(U.S. Department of Commerce)
Gaithersburg, MD 20899

(301) 975-2000

OSHA Occupational Safety and Health Administration
(U.S. Department of Labor)
Government Printing Office
Washington, DC 20402

(202) 523-6091

PS Product Standard of NBS
(U.S. Department of Commerce)
Government Printing Office
Washington, DC 20402

(202) 783-3238

1.05 GOVERNING REGULATIONS/AUTHORITIES

- A. The Consultant has contacted authorities having jurisdiction where necessary to obtain information necessary for preparation of Contract Documents. Contact authorities having jurisdiction directly for information and decisions having a bearing on the Work.
- B. Copies of Regulations: Obtain copies of the applicable regulations and retain at the Project Site, available for reference by parties who have a reasonable need for such reference.

1.06 SUBMITTALS

- A. Permits, Licenses, and Certificates: For the Owner's records, submit copies of permits, licenses, certifications, inspection reports, releases, jurisdictional settlements, notices, receipts for fee payments, judgments, and similar documents, correspondence, and records established in conjunction with compliance with standards and regulations bearing upon performance of the Work.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION (Not Applicable)

END OF SECTION 01 09 50

SECTION 01 20 00

PROJECT MEETINGS

PART 1 - GENERAL

1.01 Related Documents

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

1.02 Summary

A. This Section specifies administrative and procedural requirements for project meetings including but not limited to:

1. Pre-Construction Conference
2. Pre-Installation Conferences
3. Coordination Meetings
4. Progress Meetings

B. Construction schedules are specified in another Division-1 Section.

1.03 Pre-Construction Conference

A. The Owner or his representative shall schedule a pre-construction conference and organizational meeting at the Project Site or other convenient location no later than 15 days after execution of the Agreement and prior to commencement of construction activities. Conduct the meeting to review responsibilities and personnel assignments.

B. Attendees: The Owner, Architect/Engineer and their consultants, the Program Manager, the Contractor and its superintendent, major subcontractors, manufacturers, suppliers and other concerned parties shall each be represented at the conference by persons familiar with and authorized to conclude matters relating to the Work.

C. Agenda: Discuss items of significance that could affect progress including such topics as:

1. Tentative construction schedule
2. Critical Work sequencing

3. Designation of responsible personnel
4. Procedures for processing field decisions and Change Orders
5. Procedures for processing Applications for Payment
6. Distribution of Contract Documents
7. Submittal of Shop Drawings, Product Data and Samples
8. Preparation of record documents
9. Use of the premises
10. Office, Work and storage areas
11. Equipment deliveries and priorities
12. Safety procedures
13. First-aid
14. Security
15. Housekeeping
16. Working hours

1.04 Pre-Installation Conferences

- A. The Contractor or his representative shall conduct a pre-installation conference at the site before each construction activity that requires coordination with other construction. The Installer and representatives of manufacturers and fabricators involved in or affected by the installation, and its coordination or integration with other materials and installations that have preceded or will follow, shall attend the meeting. Advise the Architect and owner of scheduled meeting dates.
 1. Review the progress of other construction activities and preparations for the particular activity under consideration at each pre-installation conference, including requirements for:
 - a. Contract Documents
 - b. Options
 - c. Related Change Orders
 - d. Purchases
 - e. Deliveries
 - f. Shop Drawings, Product Data and quality control Samples
 - g. Possible conflicts
 - h. Compatibility problems
 - i. Time schedules
 - j. Weather limitations
 - k. Manufacturer's recommendations
 - l. Compatibility of materials
 - m. Acceptability of substrates
 - n. Temporary facilities

- o. Space and access limitations
 - p. Governing regulations
 - q. Safety
 - r. Inspection and testing requirements
 - s. Required performance results
 - t. Recording requirements
 - u. Protection
2. The Contractor or his representative shall record significant discussions and agreements and disagreements of each conference, along with the approved schedule. Distribute the record of the meeting to everyone concerned, promptly, including the Owner and Architect.
3. Do not proceed if the conference cannot be successfully concluded. Initiate whatever actions are necessary to resolve impediments to performance of Work and reconvene the conference at the earliest feasible date.

1.05 Coordination Meetings

- A. The Contractor shall conduct project coordination meetings at regularly scheduled times convenient for all parties involved. Project coordination meetings are in addition to specific meetings held for other purposes, such as regular progress meetings and special pre-installation meetings.
- B. Request representation at each meeting by every party currently involved in coordination or planning for the construction activities involved.
- C. The Contractor shall record meeting results and distribute copies to everyone in attendance and to others affected by decisions or actions resulting from each meeting.

1.06 Progress Meetings

- A. The Owner or his representative shall conduct progress meetings at the Project Site at regularly scheduled intervals.
- B. Attendees: In addition to representatives of the Owner and Engineer/Architect, each subcontractor, supplier or other entity concerned with current progress or involved in planning, coordination or performance of future activities shall be represented at these meetings by persons familiar with the Project and authorized to conclude matters relating to progress.

- C. Agenda: Review and correct or approve minutes of the previous progress meeting. Review other items of significance that could affect progress. Include topics for discussion as appropriate to the current status of the Project.
1. Contractor's Construction Schedule: Review progress since the last meeting. Determine where each activity is in relation to the Contractor's Construction Schedule, whether on time or ahead or behind schedule. Determine how construction behind schedule will be expedited; secure commitments from parties involved to do so. Discuss whether schedule revisions are required to ensure that current and subsequent activities will be completed within the Contract Time.
 2. Review the present and future needs of each entity present, including such items as:
 - a. Interface requirements
 - b. Time
 - c. Sequences
 - d. Deliveries
 - e. Off-site fabrication problems
 - f. Access
 - g. Site utilization
 - h. Temporary facilities and services
 - i. Hours of Work
 - j. Hazards and risks
 - k. Housekeeping
 - l. Quality and Work standards
 - m. Change Orders
 - n. Documentation of information for payment requests
 3. Schedule Updating: Revise the construction schedule after each progress meeting where revisions to the schedule have been made or recognized. Issue the revised schedule prior to the next meeting.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION (Not Applicable)

END OF SECTION 01 20 00

SECTION 01 30 00

SUBMITTALS

PART 1 - GENERAL

1.01 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.

1.02 SUMMARY

- A. This Section specifies administrative and procedural requirements for submittals required for performance of the Work, including:
 - 1. Contractor's construction schedule
 - 2. Submittal schedule
 - 3. Daily construction reports
 - 4. Shop Drawings
 - 5. Product Data
 - 6. Samples
- B. Administrative Submittals: Refer to other Division-1 Sections and other Contract Documents for requirements for administrative submittals. Such submittals include, but are not limited to:
 - 1. Permits
 - 2. Applications for payment
 - 3. Performance and payment bonds
 - 4. Insurance certificates
 - 5. List of Subcontractors
- C. The Schedule of Values submittal is included in Section "Applications for Payment."
- D. Inspection and test reports are included in Section "Quality Control Services."

1.03 SUBMITTAL PROCEDURES

- A. Coordination: Coordinate preparation and processing of submittals with performance of construction activities. Transmit each submittal sufficiently in advance of performance of related construction activities to avoid delay.
 - 1. Coordinate each submittal with fabrication, purchasing, testing, delivery,

other submittals and related activities that require sequential activity.

2. Coordinate transmittal of different types of submittals for related elements of the Work so processing will not be delayed by the need to review submittals concurrently for coordination.
 - a. The Consultant reserves the right to withhold action on a submittal requiring coordination with other submittals until related submittals are received.
3. Processing: Allow sufficient review time so that installation will not be delayed as a result of the time required to process submittals, including time for re-submittals.
 - a. Allow two weeks for initial review. Allow additional time if processing must be delayed to permit coordination with subsequent submittals. The Consultant will promptly advise the Contractor when a submittal being processed must be delayed for coordination.
 - b. If an intermediate submittal is necessary, process the same as the initial submittal.
 - c. Allow two weeks for reprocessing each submittal.
 - d. No extension of Contract Time will be authorized because of failure to transmit submittals to the Consultant sufficiently in advance of the Work to permit processing.

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

1. Provide a space approximately 4" x 5" on the label or beside the title block on Shop Drawings to record the Contractor's review and approval markings and the action taken.
2. Include the following information on the label for processing and recording action taken.
 - a. Project name
 - b. Date
 - c. Name and address of Consultant
 - d. Name and address of Contractor
 - e. Name and address of subcontractor

- f. Name and address of supplier
 - g. Name of manufacturer
 - h. Number and title of appropriate Specification Section
 - i. Drawing number and detail references, as appropriate
- C. Submittal Transmittal: Package each submittal appropriately for transmittal and handling. Transmit each submittal from Contractor to Consultant using a transmittal form. Submittals received from sources other than the Contractor will be returned without action.
 - 1. On the transmittal, record relevant information and requests for data. On the form, or separate sheet, record deviations from Contract Document requirements, including minor variations and limitations. Include Contractor's certification that information complies with Contract Document requirements.
 - 2. Transmittal Form: Use AIA Document G 810.

1.04 CONTRACTOR'S CONSTRUCTION SCHEDULE

- A. Phasing: Provide notations on the schedule to show how the sequence of the Work is affected by requirements for phased completion to permit Work by separate Contractors and partial occupancy by the Owner prior to Substantial Completion.
- B. Work Stages: Indicate important stages of construction for each major portion of the Work, including testing and installation.
- C. Distribution: Following response to the initial submittal, print and distribute copies to the Consultant, Owner, subcontractors, and other parties required to comply with scheduled dates. Post copies in the Project meeting room and temporary field office.
 - 1. When revisions are made, distribute to the same parties and post in the same locations. Delete parties from distribution when they have completed their assigned portion of the Work and are no longer involved in construction activities.
 - 2. Contractor shall include an updated schedule with each payment requisition.

1.05 SUBMITTAL SCHEDULE

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

1. Coordinate submittal schedule with the list of subcontracts, schedule of values and the list of products as well as the Contractor's construction schedule.
 2. Prepare the schedule in chronological order; include submittals required during the first 90 days of construction. Provide the following information:
 - a. Scheduled date for the first submittal
 - b. Related Section number
 - c. Submittal category
 - d. Name of subcontractor
 - e. Description of the part of the Work covered
 - f. Scheduled date for re-submittal
 - g. Scheduled date the Consultant's final release or approval
- B. Distribution: Following response to initial submittal, print and distribute copies to the Consultant's, Owner, subcontractors, and other parties required to comply with submittal dates indicated. Post copies in the Project meeting room and field office.
1. When revisions are made, distribute to the same parties and post in the same locations. Delete parties from distribution when they have completed their assigned portion of the Work and are no longer involved in construction activities.
- C. Schedule Updating: Revise the schedule after each meeting or activity, where revisions have been recognized or made. Issue the updated schedule concurrently with report of each meeting.

1.06 DAILY CONSTRUCTION REPORTS

- A. Prepare a daily construction report, recording the following information concerning events at the site; and submit duplicate copies to the Consultant at weekly intervals:
1. List of subcontractors at the site
 2. Approximate count of personnel at the site
 3. High and low temperatures, general weather conditions
 4. Accidents and unusual events
 5. Meetings and significant decisions
 6. Stoppages, delays, shortages, losses
 7. Meter readings and similar recordings
 8. Emergency procedures
 9. Orders and requests of governing authorities
 10. Change Orders received, implemented
 11. Services connected, disconnected
 12. Equipment or system tests and start-ups

13. Partial Completions, occupancies
14. Substantial Completions authorized

1.07 SHOP DRAWINGS

- A. Submit newly prepared information, drawn to accurate scale. Highlight, encircle, or otherwise indicate deviations from the Contract Documents. Do not reproduce Contract Documents or copy standard information as the basis of Shop Drawings. Standard information prepared without specific reference to the Project is not considered Shop Drawings.
- B. Shop Drawings include fabrication and installation drawings, setting diagrams, schedules, patterns, templates and similar drawings. Include the following information:
 1. Dimensions
 2. Identification of products and materials included
 3. Compliance with specified standards
 4. Notation of coordination requirements
 5. Notation of dimensions established by field measurement
 6. Sheet Size: Except for templates, patterns and similar full-size Drawings, submit Shop Drawings on sheets at least 8-1/2" x 11" but no larger than 36" x 48"
 7. Initial Submittal: Submit one correctable translucent reproducible print and one blue or black-line print for the Consultant's review; the reproducible print will be returned
 8. Initial Submittal: Submit 2 blue or black-line prints for the Consultant's review; one will be returned
 9. Final Submittal: Submit 5 blue or black-line prints; submit 7 prints where required for maintenance manuals. 1 print will be retained; the remainder will be returned
 10. Final Submittal: Submit 5 blue or black-line prints and 7 additional prints where required for maintenance manuals, plus the number of prints needed by the Consultant for distribution. 2 prints will be retained; the remainder returned
 - a. One of the prints returned shall be marked-up and maintained as a "Record Document."
 11. Do not use Shop Drawings without an appropriate final stamp indicating action taken in connection with construction.
 12. Submission in electronic format (PDF) may be acceptable as approved by Owner/Engineer.

- C. Coordination drawings are a special type of Shop Drawing that show the relationship and integration of different construction elements that require careful coordination during fabrication or installation to fit in the space provided or function as intended.
 - 1. Preparation of coordination Drawings is specified in section "Project Coordination" and may include components previously shown in detail on Shop Drawings or Product Data.
 - 2. Submit coordination Drawings for integration of different construction elements. Show sequences and relationships of separate components to avoid conflicts in use of space.

1.08 PRODUCT DATA

- A. Collect Product Data into a single submittal for each element of construction or system. Product Data includes printed information such as manufacturer's installation instructions, catalog cuts, standard color charts, roughing-in diagrams and templates, standard wiring diagrams and performance curves. Where Product Data must be specially prepared because standard printed data is not suitable for use, submit as "Shop Drawings."
 - 1. Mark each copy to show applicable choices and options. Where printed Product Data includes information on several products, some of which are not required, mark copies to indicate the applicable information. Include the following information:
 - a. Manufacturer's printed recommendations
 - b. Compliance with recognized trade association standards
 - c. Compliance with recognized testing agency standards
 - d. Application of testing agency labels and seals
 - e. Notation of dimensions verified by field measurement
 - f. Notation of coordination requirements
 - 2. Do not submit Product Data until compliance with requirements of the Contract Documents has been confirmed.
 - 3. Preliminary Submittal: Submit a preliminary single-copy of Product Data where selection of options is required.
 - 4. Submittals: Submit 5 copies of each required submittal; submit 7 copies where required for maintenance manuals. The Consultant will retain one, and will return the others marked with action taken and corrections or modifications required.

- a. Unless noncompliance with Contract Document provisions is observed, the submittal may serve as the final submittal.
- 5. Submission in electronic format (PDF) may be acceptable as approved by Owner/Engineer.
- 6. Distribution: Furnish copies of final submittal to installers, subcontractors, suppliers, manufacturers, fabricators, and others required for performance of construction activities. Show distribution on transmittal forms.
 - a. Do not proceed with installation until an applicable copy of Product Data applicable is in the installer's possession.
 - b. Do not permit use of unmarked copies of Product Data in connection with construction.

1.09 SAMPLES

- A. Submit full-size, fully fabricated Samples cured and finished as specified and physically identical with the material or product proposed. Samples include partial sections of manufactured or fabricated components, cuts or containers of materials, color range sets, and swatches showing color, texture and pattern.
 - 1. Mount, display, or package Samples in the manner specified to facilitate review of qualities indicated. Prepare Samples to match the Consultant's Sample. Include the following:
 - a. Generic description of the Sample
 - b. Sample source
 - c. Product name or name of manufacturer
 - d. Compliance with recognized standards
 - e. Availability and delivery time
 - 2. Submit Samples for review of kind, color, pattern, and texture, for a final check of these characteristics with other elements, and for a comparison of these characteristics between the final submittal and the actual component as delivered and installed.
 - a. Where variation in color, pattern, texture or other characteristics are inherent in the material or product represented, submit multiple units (not less than 3), that show approximate limits of the variations.

- b. Refer to other Specification Sections for requirements for Samples that illustrate workmanship, fabrication techniques, details of assembly, connections, operation and similar construction characteristics.
 - c. Refer to other Sections for Samples to be returned to the Contractor for incorporation in the Work. Such Samples must be undamaged at time of use. On the transmittal, indicate special requests regarding disposition of Sample submittals.
 - 3. Preliminary submittals: Where Samples are for selection of color, pattern, texture or similar characteristics from a range of standard choices, submit a full set of choices for the material or product.
 - a. Preliminary submittals will be reviewed and returned with the Consultant's mark indicating selection and other action.
 - 4. Submittals: Except for Samples illustrating assembly details, workmanship, fabrication techniques, connections, operation and similar characteristics, submit 4 sets; three will be returned marked with the action taken.
 - 5. Maintain sets of Samples, as returned, at the Project site, for quality comparisons throughout the course of construction.
 - a. Unless noncompliance with Contract Document provisions is observed, the submittal may serve as the final submittal.
 - b. Sample sets may be used to obtain final acceptance of the construction associated with each set.
- B. Distribution of Samples: Prepare and distribute additional sets to subcontractors, manufacturers, fabricators, suppliers, installers, and others as required for performance of the Work. Show distribution on transmittal forms.
 - 1. Field Samples specified in individual Sections are special types of Samples. Field Samples are full-size examples erected on site to illustrate finishes, coatings, or finish materials and to establish the standard by which the Work will be judged.
 - a. Comply with submittal requirements to the fullest extent possible. Process transmittal forms to provide a record of activity.

1.10 ARCHITECT'S ACTION

- A. Except for submittals for record, information or similar purposes, where action and return is required or requested, the Consultant will review each submittal, mark to indicate action taken, and return promptly.
 - 1. Compliance with specified characteristics is the Contractor's responsibility.
- B. Action Stamp: The Consultant will stamp each submittal with a uniform, self-explanatory action stamp. The stamp will be appropriately marked, as follows, to indicate the action taken:
 - 1. Final Unrestricted Release: Where submittals are marked "Accepted," that part of the Work covered by the submittal may proceed provided it complies with requirements of the Contract Documents; final acceptance will depend upon that compliance.
 - 2. Final-But-Restricted Release: When submittals are marked "Accepted as Noted," that part of the Work covered by the submittal may proceed provided it complies with notations or corrections on the submittal and requirements of the Contract Documents; final acceptance will depend on that compliance.
 - 3. Returned for Re-submittal: When submittal is marked "Not Accepted, Revise and Resubmit," do not proceed with that part of the Work covered by the submittal, including purchasing, fabrication, delivery, or other activity. Revise or prepare a new submittal in accordance with the notations; resubmit without delay. Repeat if necessary to obtain a different action mark.
 - a. Do not permit submittals marked "Not Accepted, Revise and Resubmit" to be used at the Project site, or elsewhere where Work is in progress.
 - 4. Other Action: Where a submittal is primarily for information or record purposes, special processing or other activity, the submittal will be returned, marked "Action Not Required."

PART 2 - PRODUCTS (Not Applicable).

PART 3 - EXECUTION (Not Applicable).

END OF SECTION 01 30 00

SECTION 01 31 00

PROSECUTION AND PROGRESS

PART 1 - GENERAL

1.01 Related Documents

Drawings and general provisions of contract, including General and Supplementary Conditions and other Division-1 Specification Sections, apply to this Section.

1.02 Date For Completion

- A. The Contractor shall complete the Work on or before the date or within the time specified in the Contract, unless that date or time is duly extended according to the Contract.

1.03 Progress Schedule

- A. The Contractor shall submit to the Engineer for approval by the Owner, within ten (10) calendar days following the award of contract, a progress schedule, showing the order in which the Contractor proposes to carry out the Work, the dates on which he will start controlling items, and the contemplated dates for completing. The Contractor's submission may be a critical path flow chart, bar graph, or other appropriate device of the Contractor's choice, and shall clearly indicate the various types of work to be in progress and show progress of the completed work at any point through the term of the Contract. The Progress Schedule shall show that each of the Stages of the Contract will be substantially completed within the times provided in the Contract Documents.
- B. If the Contractor's progress is materially affected by changes in the Plans or in the amount of the Work, or, in the event, in the sole judgment of the Engineer or its representative such changes become necessary in the best interests of the project due to unforeseen circumstances, or the Contractor has failed to comply with its approved Progress Schedule, Contractor shall submit a revised Progress Schedule if requested by the Engineer, that shall show how he proposes to prosecute the balance of the Work. The Contractor shall make every effort to comply with the Progress Schedule submitted by him consistent with all Contract requirements, including the order of performance of specified portions of the Work. Payment may be withheld to the Contractor while he is delinquent in the submission of any Progress Schedule.

1.04 Temporary Suspension of Work

- A. The Owner shall have the authority to suspend, delay or interrupt all or any part of the work as he may deem necessary, due to conditions that in his opinion warrant such action; or for such time as is necessary by reason of failure on the part of the Contractor to carry out orders given, or to perform in accordance with any or all provisions of the Contract. The Engineer will notify the Contractor in writing of all such suspensions, delays or interruptions.
- B. The Owner reserves the right to recover any incurred damages by deducting the amount thereof out of any monies due or that may become due the Contractor, notwithstanding any liens, notices or liens or actions of subcontractors, and if said monies be insufficient to cover said damages, then the Contractor or the Surety shall promptly pay the amounts due.

1.05 Default on Contract

- A. If the Contractor fails to begin the Work under the Contract within ten (10) days after the date of the Notice to Proceed, or fails to perform the Work with sufficient workmen, equipment or materials to insure completion of the Work within the specified time or times, or shall perform the Work unsuitably, as determined by the Engineer, or shall neglect or refuse to remove materials or perform anew such work as shall be rejected as defective and unsuitable, or shall discontinue the prosecution of the Work, or if the Contractor shall become insolvent to be declared bankrupt, or shall commit any act of bankruptcy or insolvency, or shall make an assignment for the benefit of creditors, or for any other cause whatsoever shall not carry on the Work in a manner approved by the Engineer, the Engineer shall give notice in writing to the Contractor and his surety of such actions or delinquency, said notice to advise of the corrective measures or action required. If the Contractor, within a period of seven (7) days after said notice, shall not proceed in accordance therewith, the Owner shall, upon written certificate from the Engineer of the fact of such delinquency or improper actions and the Contractor's failure to comply with said notice, have full power and authority to forfeit the rights of the Contractor and at its option to call upon the surety to complete the Work in accordance with the terms of the Contract, or it may take over the Work, including any or all materials and equipment within the work area as may be suitable and acceptable, and may complete the Work by entering into a new Agreement, with or without competitive bidding, for the completion of said Contract according to the terms and provisions thereof, or use such other methods as, in its opinion, shall be required for the completion of said Contract according to the terms and provisions thereof in an acceptable manner.

All costs and charges incurred by the Owner, together with the cost of completing the Work under Contract, may be deducted from any monies due or which may become due on such Contract.

1.06 Subletting of Contract

- A. Approval in writing of a subcontractor shall be construed as approval for the Contractor's subletting of that portion of the Work to be done by the subcontractor. Subcontractors must be approved by the Engineer before commencing any work. Subcontractors shall be recognized only in the capacity of employees or workmen of the Contractor and shall be subject to the same requirements as to character and competence as the Contractor. Requests for approval of subcontractors shall show the nature and percentages of the Work to be done by each subcontractor, such percentages to be computed cost of the Work to be subcontracted, based on proposed quantities of Contract work items and unit prices, in relation to the total Contract. The Contractor shall not, under any circumstances, be relieved of his full and complete liability and obligations for the entire work under the contract and the Engineer shall not be required to deal directly with subcontractors.

1.07 Limitations of Operations

- A. The contractor shall contact and coordinate with the Owner for specific requirements of commercial space tenants and scheduling purposes.
- B. The Contractor shall at all times conduct his work so as to minimize the interference with or inconvenience to the normal operations of the spaces not being repaired or worked within. At any time when, in the judgment of the Engineer, the Contractor has obstructed or closed an area of the Site or is carrying on operations causing greater interference or inconvenience than necessary for the proper prosecution of the Work, the Engineer may require the Contractor to finish the section of the Work which is in progress before work is started on any additional section or require the Contractor to take such further actions so as to minimize inconvenience to vehicular or pedestrian traffic or as otherwise necessary.
- C. The Contractor shall arrange his work and his material so as not to interfere with the operations of other contractors engaged upon adjacent work, and to join his work to that of other in a proper manner, and in accordance with Plans and Specifications, and to coordinate the sequence of his work in relation to that of other contractors, and as may be directed by the Engineer from time to time as the Work progresses.

- D. Each Contractor shall be responsible for any damage done by him or his agents to the Work performed by another Contractor.
- E. The Contractor shall coordinate the available staging/storage area, superintendent's office (field office) space, etc. in the Site and the dumpster area with the Owner. The Contractor may be required to establish the space for this purpose outside the Garage. If so, he shall comply with all requirements by the Owner, City of New Haven and State of Connecticut.
- F. The Contractor shall pay special attention to the noise level generated by the selective demolition operation. The use of jackhammers equipment shall only be allowed as indicated in the contract Special Conditions or as otherwise approved in writing by the owner. Scarifying, debris removal, shot blasting and sandblasting shall be performed only as approved by the Owner or its representative so as to not interfere with facility operations, or cause disruptive noise to nearby residential or business uses.
- G. The Contractor may use the electricity (power) at existing fixtures and outlets for the completion of the work. Contractor shall provide additional power as needed for its operation if the existing is insufficient.
- H. The Contractor shall furnish all temporary service connections, wiring, meters, transformers, fixtures, extensions, cords, lamps, etc., and shall remove them upon completion. All temporary light and power shall be in accordance with the local code requirements.
- I. Water shall be furnished by the Owner at existing fixtures and outlets and such water availability is limited. If additional quantity is required than can be obtained from existing fixtures the Contractor shall be responsible.
- J. The Contractor shall furnish all temporary service connections, pumps, hoses, metering equipment, etc., and shall pay all fees associated with temporary service connections to fire hydrants and such, if required.
- K. The Contractor shall verify the adequacy (capacity) of existing drainage within the facility to remove excess water during construction and shall ensure the operation of existing drainage facilities both before construction commences and after the construction work has been completed.

1.08 Workmen, Methods and Equipment

- A. The Contractor shall at all times employ sufficient labor and equipment for prosecuting the several classes of work to full completion in the manner and time required by these Specifications and the Contract.
- B. All workmen shall have sufficient skill and experience to properly perform the work assigned to them. Workmen engaged in special work or skilled work shall have sufficient specialized experience in such work and in the operation of the required equipment to perform all work on time in a proper and safe manner.
- C. Any person employed by the Contractor or by any subcontractor who, in the opinion of the Engineer, does not perform his work in a proper and skillful manner or is intemperate or disorderly shall, at the written request of the Engineer, be removed forthwith by the Contractor or subcontractor employing such person, and shall not be employed again in any portion of the Work without the approval of the Engineer.
- D. Should the Contractor fail to remove such person or persons as required above, or fail to furnish suitable skilled and sufficient personnel for the proper prosecution of the Work, the Engineer may suspend the Work by written notice until the Contractor employs proper and sufficient personnel for the Work. All equipment that is proposed to be used on the Work shall be of sufficient size and in such mechanical condition as to meet requirement of the Contract and to produce work that meets to exceed the quality of work required by the Contract. Equipment used on any portion of the project shall be such that no damage to adjacent work areas or property will result from its use.
- E. The Contractor shall prosecute the Work for the number of days per week and the number of hours per day as are necessary to complete the Work by the date or dates provided in the Contract. If in the opinion of the Engineer the actual progress on the Work falls behind the estimate progress as outlined in the approved Progress Schedule submitted by the Contractor, or if it becomes apparent that the construction progress is such that the Work will not be completed within the specified time or times, the Contractor shall implement, at the direction and with the approval of the Engineer, any or all of the following at no additional cost to the Owner.
 - 1. Provide additional equipment of the Work
 - 2. Add necessary additional manpower

3. Increase working hours including Saturdays, Sundays, and holidays subject to any restrictions that may be set forth in the Special Conditions. When the methods and equipment to be used by the Contractor in performing the Work are not prescribed in the Contract, the Contractor is free to use any reasonable methods of equipment to perform the Work, as long as he demonstrates to the satisfaction of the Engineer that such methods or equipment will accomplish the Work in conformity with the requirements of the Contract.
- F. When the Contract specifies that the construction be performed by the use of certain methods and equipment, such methods and equipment shall be used unless others are authorized by the Engineer. If the Contractor desires to use a method or type of equipment other than specified in the Contract, he may request authorization from the Engineer to do so. The request shall be in writing and shall include a full description of the methods and equipment proposed to be used and explanation of the reasons for desiring to make the change.
- G. If approval is given, it will be under the condition that the Contractor will be fully responsible for producing construction work in conformity with Contract requirements. If, after use of the substituted methods or equipment, the Engineer determines that the work produced does not meet Contract requirements, the Contractor shall discontinue the use of the substitute method or equipment and shall complete the remaining construction with the specified methods and equipment. The Contractor shall remove any deficient work and replace it with work of specified quality, or take such other corrective action as the Engineer may direct. No change will be made in basis of payment for the construction items involved nor in Contract time as a result of authorizing any change in methods or equipment under these provisions.

1.09 Termination of Contract Prior to Completion

- A. The performance of the Work under the Contract may be terminated in whole or, in part from time to time, whenever the Engineer shall determine that such termination is in the best interest of the Owner. In the event of termination pursuant to this Section, the Contractor shall be entitled to no damages or compensation except as hereinafter provided.
- B. Termination of performance of the Work under the Contract, in whole or in part, shall be subject to the conditions herein, and it is the intent of these provisions that a settlement equitable to both the Contractor and the Owner be made in connection with a termination according to this Sub-section.

- C. For all Work completed by the Contractor prior to the effective date or dates of termination, payment will be made to the Contractor for the actual number of units or items completed at the Contract unit or percentage of completion for lump sum prices. It is agreed and understood, however, that the Contractor shall, in no event, be entitled to compensation for the loss of anticipated profits, whether for completed, uncompleted work, nor shall any claims therefore by the Contractor be considered.
- D. For all materials obtained by the Contractor for the Work prior to notice of termination, that have been inspected, tested and accepted by the Engineer, and that have not been incorporated in the Work and cannot be returned to the supplier, payment will be made to the Contractor for the actual costs for all such material including freight charges, as shown by original validated bills. The materials, when so paid for by the Owner, shall become the property of the Owner.
- E. Termination of the performance of the Work under the Contract by the Owner, as hereinbefore specified, shall not relieve the Contractor or his surety of the responsibility for the Work performed as required by the Contract.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION (Not Applicable)

END OF SECTION 01 31 00

SECTION 01 32 00

MEASUREMENT AND PAYMENT

PART 1 - GENERAL

1.01 Related Documents

Drawings and general provisions of contract, including General and Supplementary Conditions and other Division-1 Specification Sections, apply to this Section.

1.02 General Requirements

- A. Actual quantities of work completed under the Contract must be reviewed by the Engineer prior to payment. Measurement will be in accordance with United States standards and in compliance with recognized engineering practices. All packaged materials shall be marked plainly, showing the amount and nature of contents and shall be delivered intact.

1.03 Scope of Payment

- A. The Contractor agrees to and shall receive and accept the compensation as herein provided, as payment in full for the Work, including but not limited to, furnishing all materials, transportation, labor, tools, and equipment; for performing all work contemplated and embraced under the Contract; for all loss or damage arising out of the nature of the Work or from the action of the elements; for any unforeseen difficulties, obstructions or interferences that may arise or be encountered during the prosecution of the Work until its final acceptance by the Owner as determined by the specifications.
- B. In cases where the "Payment" clause in the Specifications related to any unit price cover and be considered compensation for certain work or material essential to the item, the same work or material shall not also be measured or paid for under any other pay item that may appear elsewhere in the Specifications.
- C. The partial payment of any portion of the Work certified by the Engineer shall in no way constitute an acknowledgment of the acceptance of the Work, nor in any way prejudice or affect the obligation of the Contractor to repair, correct, renew, or replace at his expense any defects or imperfections in the construction or in the strength or quality of the materials used in or about the construction of the Work under Contract and its appurtenances, nor any damage due to attributable to such defects, which defects, imperfections or damage should have been covered before or after payment for and acceptance of the Work.

- D. **No payment shall be made for stored materials or equipment. Payment shall be made only for materials and equipment in-place and accepted by Owner, less applicable retainage.**

1.04 Payment for Extra Work: Reference General Conditions

1.05 Canceled Items

- A. It shall be in the sole judgment and sole discretion of the Owner or its representatives to cancel or alter any or all portions of the Contract. Should such actions result in elimination or non-completion of any portion of the Contract, payment shall be made commensurate with the work performed.
- B. For the canceled work completed by the Contractor, payment shall be made to the Contractor for the actual number of units or items completed at the Contract unit or percentage of completion for lump sum prices.
- C. For materials obtained by the Contractor for the unfinished (uncompleted) portions of the canceled work, that have been inspected, tested and accepted by the Engineer, and that have not been incorporated in the canceled work, payment shall be made to the Contractor for the actual costs for all such materials, including freight charges, as shown by the original paid invoices. The materials, when so paid for by the Owner, shall become the property of the Owner.

1.06 Acceptance and Final Payment

- A. When the repairs and preventive maintenance measures provided for by the Contract shall have been completely performed by the Contractor according to the Contract and all parts of the Work have been approved and accepted by the Engineer, the final pay request will be prepared by the Contractor and submitted to the Engineer for approval. Along with the final pay request the Contractor must also submit the following:
1. All guarantees and warranties from General Contractor, Sub-contractors and Manufacturers
 2. Final Waiver of Lien from Contractors and Sub-contractors
 3. Complete mark up set of drawings and project manual showing amount and location of all work performed

4. Approved maintenance and operation manuals for all components incorporated into the Work. Manuals shall include spare parts listing, model numbers, serial numbers, manufacturer's addresses and telephone numbers
 5. Contractor's Release and Hold Harmless Agreement
 6. Final reports and other information required in the General and Supplementary Conditions; final daily logs; consent of surety to final payment and release of retainage (also see Section 01700)
- B. The Engineer will review all submittals, perform necessary measurements and computations and give final recommendation to Owner.
- C. The amount of this final estimate, less any sums deductible or retained under the provisions of the Contract, will be paid to the Contractor as soon as practicable after the final acceptance, provided the Contractor has furnished to the Engineer satisfactory evidence that all sums of money due for any labor, materials, apparatus, fixtures or machinery furnished for the purpose of such improvements have been paid, or that the person or persons to whom the same may be due have consented to such final payment.
- D. The Engineer shall determine the amount or quantity of all kinds of work herein contracted to be done and decide every question that can or may arise regarding to the execution and performance of this Contract on the part of said Contractor.
- E. The acceptance by the Contractor of the final payment shall constitute a release and waiver of any and all rights and privileges under the terms of the Contract; further, the acceptance by the Contractor of final payment shall relieve the Owner from any and all claims or liabilities for anything done or furnished relative to the Work.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION (Not Applicable)

END OF SECTION 01 32 00

SECTION 01 40 00

QUALITY CONTROL SERVICES

PART 1 - GENERAL

1.01 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.

1.02 SUMMARY

- A. This Section specifies administrative and procedural requirements for quality control services.
- B. Quality control services include inspections and tests and related actions including reports, performed by independent agencies, governing authorities, and the Contractor. They do not include contract enforcement activities performed by the Consultant.
- C. Inspection and testing services are required to verify compliance with requirements specified or indicated. These services do not relieve the Contractor of responsibility for compliance with Contract Document requirements.
- D. Requirements of this Section relate to customized fabrication and installation procedures, not production of standard products.
 - 1. Specific quality control requirements for individual construction activities are specified in the Sections that specify those activities. Those requirements, including inspections and tests, cover production of standard products as well as customized fabrication and installation procedures.
 - 2. Inspections, test and related actions specified are not intended to limit the Contractor's quality control procedures that facilitate compliance with Contract Document requirements.
 - 3. Requirements for the Contractor to provide quality control services required by the Consultant, Owner, or authorities having jurisdiction are not limited by provisions of this Section.

1.03 RESPONSIBILITIES

- A. Contractor Responsibilities: The Contractor shall provide inspections, tests and similar quality control services, specified in individual Specification Sections and required by governing authorities, except where they are specifically indicated to be the Owner's responsibility, or are provided by another identified entity; these services include those specified to be performed by an independent agency and not by the Contractor. Costs for these services shall be included in the Contract Sum.
1. The Contractor shall employ and pay an independent agency, to perform specified quality control services.
 2. The Owner will engage and pay for the services of an independent agency to perform inspections and tests specified as the Owner's responsibilities.
 - a. Where the Owner has engaged a testing agency or other entity for testing and inspection of a part of the Work, and if the Contractor is also required to engage an entity for the same or related element, the Contractor shall not employ the entity engaged by the Owner, unless otherwise agreed in writing with the Owner.
 3. Retesting: The Contractor is responsible for retesting where results of required inspections, tests or similar services prove unsatisfactory and do not indicate compliance with Contract Document requirements, regardless of whether the original test was the Contractor's responsibility.
 - a. Cost of retesting construction revised or replaced by the Contractor is the Contractor's responsibility, where required tests were performed on original construction.
 4. Associated Services: The Contractor shall cooperate with agencies performing required inspections, tests and similar services and provide reasonable auxiliary services as requested. Notify the agency sufficiently in advance of operations to permit assignment of personnel. Auxiliary services required include but are not limited to:
 - a. Providing access to the Work and furnishing labor and facilities necessary to facilitate inspections and tests
 - b. Taking adequate quantities of representative samples of materials that require testing or assisting the agency in taking samples

- c. Providing facilities for storage and curing of test samples, and delivery of samples to testing laboratories
 - d. Providing the agency with a preliminary design mix proposed for use for materials mixes that require control by the testing agency
 - e. Security and protection of samples and test equipment at the Project site
- B. Owner Responsibilities: The Owner will provide inspections, tests and similar quality control services specified to be performed by independent agencies and not by the Contractor, except where they are specifically indicated as the Contractor's responsibility or are provided by another identified entity.
 - 1. The Owner will employ and pay for the services of an independent agency, testing laboratory or other qualified firm to perform services which are the Owner's responsibility from the allowance set aside for testing in the contract sum.
- C. Duties of the Testing Agency: The independent testing agency engaged to perform inspections, sampling and testing of materials and construction specified in individual Specification Sections shall cooperate with the Consultant and Contractor in performance of its duties, and shall provide qualified personnel to perform required inspections and tests.
 - 1. The agency shall notify the Consultant and Contractor promptly of irregularities or deficiencies observed in the Work during performance of its services.
 - 2. The agency is not authorized to release, revoke, alter or enlarge requirements of the Contract Documents, or approve or accept any portion of the Work.
 - 3. The agency shall not perform any duties of the Contractor.
- D. Coordination: The Contractor and each agency engaged to perform inspections, tests and similar services shall coordinate the sequence of activities to accommodate required services with a minimum of delay. In addition the Contractor and each agency shall coordinate activities to avoid the necessity of removing and replacing construction to accommodate inspections and tests.
 - 1. The Contractor is responsible for scheduling times for inspections, tests, taking samples and similar activities.

1.04 SUBMITTALS:

- A. The independent testing agency shall submit a certified written report of each inspection, test or similar service, to the Consultant, in duplicate, unless the Contractor is responsible for the service. If the Contractor is responsible for the service, submit a certified written report of each inspection, test or similar service through the Contractor, in duplicate.
 - 1. Submit additional copies of each written report directly to the governing authority, when the authority so directs
 - 2. Report Data: Written reports of each inspection/test or similar service shall include, but not be limited to:
 - a. Date of issue
 - b. Project title and number
 - c. Name, address and telephone number of testing agency
 - d. Dates and locations of samples and tests or inspections
 - e. Names of individuals making the inspection or test
 - f. Designation of the Work and test method
 - g. Identification of product and Specification Section
 - h. Complete inspection or test data
 - i. Test results and interpretations of test results
 - j. Ambient conditions at the time of sample taking and testing
 - k. Comments or professional opinion as to whether inspected or tested Work complies with Contract Document requirements
 - l. Name and signature of laboratory inspector
 - m. Recommendations on retesting

1.05 QUALITY ASSURANCE

- A. Qualification for Service Agencies: Engage inspection and testing service agencies, including independent testing laboratories that are pre-qualified as complying with "Recommended Requirements for Independent Laboratory Qualification" by the American Council of Independent Laboratories, and that specialize in the types of inspections and tests to be performed.
 - 1. Each independent inspection and testing agency engaged on the Project shall be authorized by authorities having jurisdiction to operate in the State in which the Project is located.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION

3.01 REPAIR AND PROTECTION

- A. General: Upon completion of inspection, testing, sample taking and similar services, repair damaged construction and restore substrates and finishes to eliminate deficiencies, including deficiencies in visual qualities of exposed finishes. Comply with Contract Document requirements for "Cutting and Patching."
- B. Protect construction exposed by or for quality control service activities, and protect repaired construction.
- C. Repair and protection is the Contractor's responsibility, regardless of the assignment of responsibility for inspection, testing or similar services.

END OF SECTION 01 40 00

SECTION 01 50 00

TEMPORARY FACILITIES

PART 1 - GENERAL

1.01 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.

1.02 SUMMARY

- A. This Section specifies requirements for temporary services and facilities, including utilities, construction and support facilities, security and protection.
- B. Temporary utilities required include but are not limited to:
 - 1. Water service and distribution
 - 2. Temporary electric power and light
 - 3. Telephone service
- C. Temporary construction and support facilities required include but are not limited to:
 - 1. Temporary heat
 - 2. Field offices and storage sheds
 - 3. Sanitary facilities, including drinking water
 - 4. Temporary enclosures
 - 5. Temporary Project identification signs and bulletin boards
 - 6. Waste disposal services
 - 7. Rodent and pest control
 - 8. Construction aids and miscellaneous services and facilities
- D. Security and protection facilities required include but are not limited to:
 - 1. Temporary fire protection
 - 2. Barricades, warning signs, lights
 - 3. Sidewalk bridge or enclosure fence for the site
 - 4. Environmental protection

1.03 SUBMITTALS

- A. Temporary Utilities: Submit reports of tests, inspections, meter readings and similar procedures performed on temporary utilities.

- B. Implementation and Termination Schedule: Submit a schedule indicating implementation and termination of each temporary utility within 15 days of the date established for commencement of the Work.

1.04 QUALITY ASSURANCE

- A. Regulations: Comply with industry standards and applicable laws and regulations of authorities having jurisdiction, including but not limited to:
1. Building Code requirements
 2. Health and safety regulations
 3. Utility company regulations
 4. Police, Fire Department and Rescue Squad rules
 5. Environmental protection regulations
- B. Standards: Comply with NFPA Code 241, "Building Construction and Demolition Operations", ANSI-A10 Series standards for "Safety Requirements for Construction and Demolition", and NECA Electrical Design Library "Temporary Electrical Facilities."
1. Refer to "Guidelines for Bid Conditions for Temporary Job Utilities and Services", prepared jointly by AGC and ASC, for industry recommendations.
 2. Electrical Service: Comply with NEMA, NECA and UL standards and regulations for temporary electric service. Install service in compliance with National Electric Code (NFPA 70).
- C. Inspections: Arrange for authorities having jurisdiction to inspect and test each temporary utility before use. Obtain required certifications and permits.

1.05 PROJECT CONDITIONS

- A. Temporary Utilities: Prepare a schedule indicating dates for implementation and termination of each temporary utility. At the earliest feasible time, when acceptable to the Owner, change over from use of temporary service to use of the permanent service.
- B. Conditions of Use: Keep temporary services and facilities clean and neat in appearance. Operate in a safe and efficient manner. Take necessary fire prevention measures. Do not overload facilities, or permit them to interfere with progress. Do not allow hazardous dangerous or unsanitary conditions, or public nuisances to develop or persist on the site.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. General: Provide new materials; if acceptable to the Architect, undamaged previously used materials in serviceable condition may be used. Provide materials suitable for the use intended.
- B. Lumber and Plywood:
 - 1. For job-built temporary offices, shops and sheds within the construction area, provide UL labeled, fire treated lumber and plywood for framing, sheathing and siding.
 - 2. For signs and directory boards, provide exterior type, Grade B-B High Density Concrete Form Overlay Plywood conforming to PS-1, of sizes and thickness indicated.
 - 3. For fences and vision barriers, provide exterior type, minimum 3/8" thick plywood.
 - 4. For safety barriers, sidewalk bridges and similar uses provide minimum 5/8" thick exterior plywood.
- C. Paint: Comply with requirements of Division-9 Section "Painting."
 - 1. For job-built temporary offices, shops, sheds, fences and other exposed lumber and plywood, provide exterior grade acrylic-latex emulsion over exterior primer.
 - 2. For sign panels and applying graphics, provide exterior grade alkyd gloss enamel over exterior primer.
 - 3. For interior walls of temporary offices, provide two coats interior latex flat wall paint.
- D. Tarpaulins: Provide waterproof, fire-resistant, UL labeled tarpaulins with flame-spread rating of 15 or less. For temporary enclosures provide translucent nylon reinforced laminated polyethylene or polyvinyl chloride fire retardant tarpaulins.
- E. Water: Provide potable water approved by local health authorities.
- F. Open-Mesh Fencing: Provide 11-gage, galvanized 2-inch, chain link fabric fencing 6-feet high with galvanized barbed wire top strand and galvanized steel pipe posts, 1-1/2" I.D. for line posts and 2-1/2" I.D. for corner posts.

2.02 EQUIPMENT

- A. General: Provide new equipment; if acceptable to the Consultant, undamaged, previously used equipment in serviceable condition may be used. Provide equipment suitable for use intended.
- B. Water Hoses: Provide 3/4" heavy-duty, abrasion-resistant, flexible rubber hoses 100 ft. long, with pressure rating greater than the maximum pressure of the water distribution system; provide adjustable shut-off nozzles at hose discharge.
- C. Electrical Outlets: Provide properly configured NEMA polarized outlets to prevent insertion of 110-120 volt plugs into higher voltage outlets. Provide receptacle outlets equipped with ground-fault circuit interrupters, reset button and pilot light, for connection of power tools and equipment.
- D. Electrical Power Cords: Provide grounded extension cords; use "hard-service" cords where exposed to abrasion and traffic. Provide waterproof connectors to connect separate lengths of electric cords, if single lengths will not reach areas where construction activities are in progress.
- E. Lamps and Light Fixtures: Provide general service incandescent lamps of wattage required for adequate illumination. Provide guard cages or tempered glass enclosures, where exposed to breakage. Provide exterior fixtures where exposed to moisture.
- F. Heating Units: Provide temporary heating units that have been tested and labeled by UL, FM or another recognized trade association related to the type of fuel being consumed.
- G. Temporary Offices: Provide prefabricated or mobile units or similar job-built construction with lockable entrances, operable windows and serviceable finishes. Provide heated and air-conditioned units on foundations adequate for normal loading.
- H. Temporary Toilet Units: Provide self-contained single-occupant toilet units of the chemical, aerated recirculation, or combustion type, properly vented and fully enclosed with a glass fiber reinforced polyester shell or similar nonabsorbent material.
- I. First Aid Supplies: Comply with governing regulations.

- J. Fire Extinguishers: Provide hand-carried, portable UL-rated, class "A" fire extinguishers for temporary offices and similar spaces. In other locations provide hand-carried, portable, UL-rated, class "ABC" dry chemical extinguishers, or a combination of extinguishers of NFPA recommended classes for the exposures.
 - 1. Comply with NFPA 10 and 241 for classification, extinguishing agent and size required by location and class of fire exposure.

PART 3 - EXECUTION

3.01 INSTALLATION

- A. Use qualified personnel for installation of temporary facilities. Locate facilities where they will serve the Project adequately and result in minimum interference with performance of the Work. Relocate and modify facilities as required.
- B. Provide each facility ready for use when needed to avoid delay. Maintain and modify as required. Do not remove until facilities are no longer needed, or are replaced by authorized use of completed permanent facilities.

3.02 TEMPORARY UTILITY INSTALLATION

- A. General: Engage the appropriate local utility company to install temporary service or connect to existing service. Where the company provides only part of the service, provide the remainder with matching, compatible materials and equipment; comply with the company's recommendations.
 - 1. Arrange with the company and existing users for a time when service can be interrupted, where necessary, to make connections for temporary services.
 - 2. Provide adequate capacity at each stage of construction. Prior to temporary utility availability, provide trucked-in services.
 - 3. Obtain easements to bring temporary utilities to the site, where the Owner's easements cannot be used for that purpose.
 - 4. Use Charges: Cost or use charges for temporary facilities are not chargeable to the Owner or Consultant, and will not be accepted as a basis of claims for a Change Order.
- B. Temporary Water Service: The contractor shall make arrangements with the Building Management for temporary water from existing sources at the facility. The Contractor shall be responsible for all hoses, connections, etc., required from the point of water source at the facility.

- C. Temporary Electric Power Service: The Contractor shall make all arrangements for and shall install and pay for the temporary electric service. The Contractor shall furnish, install and maintain all temporary and power facilities required by the work. Provide weatherproof, grounded electric power service and distribution system of sufficient size, capacity, and power characteristics during construction period. Include meters, transformers, overload protected disconnects, automatic ground-fault interrupters and main distribution switch gear.
1. Power Distribution System: Install wiring overhead, and rise vertically where least exposed to damage. Where permitted, wiring circuits not exceeding 125 Volts, AC 20 ampere rating, and lighting circuits may be non-metallic sheathed cable where overhead and exposed for surveillance.
- D. Temporary Lighting:
1. Install and operate temporary lighting that will fulfill security and protection requirements, without operating the entire system, and will provide adequate illumination for construction operations and traffic conditions.
- E. Temporary Telephones: Provide temporary telephone service for all personnel engaged in construction activities, throughout the construction period. Install telephone on a separate line for each temporary office and first aid station. Where an office has more than two occupants, install a telephone for each additional occupant or pair of occupants.
1. At each telephone, post a list of important telephone numbers.
- F. Sewers and Drainage: If sewers are available, provide temporary connections to remove effluent that can be discharged lawfully. If sewers are not available or cannot be used, provide drainage ditches, dry wells, stabilization ponds and similar facilities. If neither sewers nor drainage facilities can be lawfully used for discharge of effluent, provide containers to remove and dispose of effluent off the site in a lawful manner.
1. Filter out excessive amounts of soil, construction debris, chemicals, oils and similar contaminants that might clog sewers or pollute waterways before discharge.
 2. Connect temporary sewers to the municipal system as directed by the sewer department officials.
 3. Maintain temporary sewers and drainage facilities in a clean, sanitary condition. Following heavy use, restore normal conditions promptly.

- G. Provide earthen embankments and similar barriers in and around excavations and sub-grade construction, sufficient to prevent flooding by runoff of storm water from heavy rains.

3.03 TEMPORARY CONSTRUCTION AND SUPPORT FACILITIES INSTALLATION

- A. Locate field offices, storage sheds, sanitary facilities and other temporary construction and support facilities for easy access at locations approved by the Owner.
 - 1. Maintain temporary construction and support facilities until near Substantial Completion. Remove prior to Substantial Completion. Personnel remaining after Substantial Completion will be permitted to use permanent facilities, under conditions acceptable to the Owner.
- B. Provide incombustible construction for offices, shops and sheds located within the construction area, or within 30 feet of building lines. Comply with requirements of NFPA 241.
- C. Temporary Heat: Provide temporary heat required by construction activities, for curing or drying of completed installations or protection of installed construction from adverse effects of low temperatures or high humidity. Select safe equipment that will not have a harmful effect on completed installations or elements being installed. Coordinate ventilation requirements to produce the ambient condition required and minimize consumption of energy.
- D. Heating Facilities: Except where use of the permanent system is authorized, provide vented self-contained LP gas or fuel oil heaters with individual space thermostatic control.
 - 1. Use of gasoline-burning space heaters, open flame, or salamander type heating units is prohibited.
- E. Field Offices: Provide insulated, weather-tight temporary offices of sufficient size to accommodate required office personnel at the Project site. Keep the office clean and orderly for use for small progress meetings. Furnish and equip offices as follows:
 - 1. Furnish with a desk and chairs, a 4-drawer file cabinet, plan table and plan rack and a 6-shelf bookcase, as required by the Owner
- F. Storage and Fabrication Sheds: Install storage and fabrication sheds, sized, furnished and equipped to accommodate materials and equipment involved, including temporary utility service. Sheds may be open shelters or fully enclosed spaces within the building or elsewhere on the site as approved by the Owner.

- G. Sanitary facilities include temporary toilets, wash facilities and drinking water fixtures. Comply with regulations and health codes for the type, number, location, operation and maintenance of fixtures and facilities. Install where facilities will best serve the Project's needs.
1. Provide toilet tissue, paper towels, paper cups and similar disposable materials for each facility. Provide covered waste containers for used material.
- H. Toilets: Install self-contained toilet units. Shield toilets to ensure privacy. Use of pit-type privies will not be permitted.
- I. Drinking Water Facilities: Within temporary office, provide containerized tap-dispenser bottled-water type drinking water units, including paper supply.
- J. Temporary Enclosures: Provide temporary enclosure for protection of construction in progress and completed, from exposure, foul weather, other construction operations and similar activities.
1. Where heat is needed and the permanent building enclosure is not complete, provide temporary enclosures where there is no other provision for containment of heat. Coordinate enclosure with ventilating and material drying or curing requirements to avoid dangerous conditions and effects.
 2. Install tarpaulins securely, with incombustible wood framing and other materials. Close openings of 25 square feet or less with plywood or similar materials.
 3. Where temporary wood or plywood enclosure exceeds 100 square feet in area, use UL-labeled fire-retardant treated material for framing and main sheathing.
 4. All temporary partitions shall be designed to attenuate noise on all sides of the garage and to prevent unauthorized access into the work area. The contractor shall pay special attention to the noise levels generated by the concrete removal operations and shotblasting/blast tracking of the deck prior to applicable work; obey all applicable noise laws. The contractor shall also use noise dampening/sound absorbing insulation in perimeter partitions to abate noise in the immediate vicinity and to nearby residential apartments, businesses, schools, medical buildings, theaters, and hotels. The partitions shall protect other areas within the facility from water, dust and flying debris. The contractor shall provide a dust collection/filter system to prevent dust and debris from escaping in the work area ventilation exhaust. All drainage systems shall be protected from damage and shall be maintained in functioning order.

- K. Collection and Disposal of Waste: Collect waste from construction areas and elsewhere daily. Comply with requirements of NFPA 241 for removal of combustible waste material and debris. Enforce requirements strictly. Do not hold materials more than 7 days during normal weather or 3 days when the temperature is expected to rise above 80 deg F (27 deg C). Handle hazardous, dangerous, or unsanitary waste materials separately from other waste by containerizing properly. Dispose of material in a lawful manner.

3.04 PROTECTION FACILITIES INSTALLATION

A. Temporary Fire Protection:

1. Locate fire extinguishers where convenient and effective for their intended purpose, but not less than one extinguisher on each floor at or near each usable stairwell
2. Store combustible materials in containers in fire-safe locations
3. Maintain unobstructed access to fire extinguishers, fire hydrants, temporary fire protection facilities, stairways and other access routes for fighting fires. Prohibit smoking in hazardous fire exposure areas
4. Provide supervision of welding operations, combustion type temporary heating units, and similar sources of fire ignition

- B. Barricades, Warning Signs and Lights: Comply with standards and code requirements for erection of structurally adequate barricades. Paint with appropriate colors, graphics and warning signs to inform personnel and the public of the hazard being protected against. Where appropriate and needed provide lighting, including flashing red or amber lights.

C. Security Enclosure and Lockup:

1. Storage: Where materials and equipment must be stored, and are of value or attractive for theft, provide a secure lockup. Enforce discipline in connection with the installation and release of material to minimize the opportunity for theft and vandalism.

- D. Environmental Protection: Provide protection, operate temporary facilities and conduct construction in ways and by methods that comply with environmental regulations, and minimize the possibility that air, waterways and subsoil might be contaminated or polluted, or that other undesirable effects might result. Avoid use of tools and equipment that produce harmful noise. Restrict use of noise making tools and equipment to hours that will minimize complaints from persons or firms near the site.

3.05 OPERATION, TERMINATION AND REMOVAL

- A. Supervision: Enforce strict discipline in use of temporary facilities. Limit availability of temporary facilities to essential and intended uses to minimize waste and abuse.
- B. Maintenance: Maintain facilities in good operating condition until removal. Protect from damage by freezing temperatures and similar elements.
 - 1. Maintain operation of temporary enclosures, heating, cooling, humidity control, ventilation and similar facilities on a 24-hour day basis where required to achieve indicated results and to avoid possibility of damage.
 - 2. Protection: Prevent water filled piping from freezing.
- C. Termination and Removal: Unless the Owner requests that it be maintained longer, remove each temporary facility when the need has ended, or when replaced by authorized use of a permanent facility, or no later than Substantial Completion. Complete or, if necessary, restore permanent construction that may have been delayed because of interference with the temporary facility. Repair damaged Work, clean exposed surfaces and replace construction that cannot be satisfactorily repaired.
 - 1. Materials and facilities that constitute temporary facilities are property of the Contractor.
 - 2. Where the area is intended for landscape development remove soil and aggregate fill that does not comply with requirements for fill or subsoil in the area. Remove materials contaminated with substances that might impair growth of plant materials or lawns. Repair or replace street paving, curbs and sidewalks at the temporary entrances, as required by the governing authority.
 - 3. At Substantial Completion, clean and renovate permanent facilities that have been used during the construction period, including but not limited to:
 - a. Replace air filters and clean inside of ductwork and housings
 - b. Replace significantly worn parts and parts that have been subject to unusual operating conditions

END OF SECTION 01 50 00

SECTION 01 60 00

MATERIALS AND EQUIPMENT

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. All Contract Documents shall apply to work of this Section.

1.02 SUMMARY

- A. This Section specifies administrative and procedural requirements governing the Contractor's selection of products for use in the Project.
- B. The Contractor's Construction Schedule and the Schedule of Submittals are included under Section "Submittals."
- C. Standards: Refer to Section "Reference Standards and Definitions" 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."

1.03 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 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 manufacturer's published product literature, that is current as of the date of the Contract Documents.

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.

1.04 SUBMITTALS

- A. Product List Schedule: Prepare a schedule showing products specified in a tabular form acceptable to the Consulting 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. Manufacturer's 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 seven days after date of commencement of the Work, submit three copies of an initial product list schedule. Provide a written explanation for omissions of data, and for known variations from Contract requirements.
 - a. 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.
 4. Completed Schedule: Within 15 days after date of commencement of the Work, submit three copies of the completed product list schedule. Provide a written explanation for omissions of data, and for known variations from Contract Documents.

5. Engineer's Action: The Engineer will respond in writing to the Contractor within one (1) week of receipt of the completed product list schedule. No response within this time period constitutes there is no objection to listed manufacturers or products, but does not constitute a waiver of the requirement that products comply with Contract Documents. The Engineer's response will include the following:
 - a. A list of unacceptable product selections, containing a brief explanation of reasons for this action

1.05 QUALITY ASSURANCE

- A. Source Limitations: To the fullest extent possible, provide products of the same kind, from a single source.
 1. 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.

1.06 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 weather-tight enclosure, with ventilation adequate to prevent condensation. Maintain temperature and humidity within range required by manufacturer's instructions.
8. Progress payments will be made for work complete and in place only. No payment will be made for stored materials.

PART 2 - PRODUCTS

2.01 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, finishes, 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 or Approved Equal.
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.
 - a. Where products or manufacturers are specified by name, accompanied by the term "or equal," or "or approved equal" 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.
 - a. 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 codes, standards, and 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.

- a. 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 Consulting Engineer will select the color, pattern and texture from the product line selected.
- 9. Allowances: Refer to individual Specification Sections and "Allowance" provisions in Division-1 for allowances that control product selection, and for procedures required for processing such selections.

PART 3 - EXECUTION

3.01 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.
- 1. Clean exposed surfaces and protect as necessary to ensure freedom from damage and deterioration at time of Substantial Completion.

3.02 SYSTEMS DEMONSTRATION

- A. Prior to final inspection, the Contractor shall demonstrate the operation of each system to Architect/Engineer or Owner.
- B. The Contractor shall instruct the Owner's personnel in operation, adjustment, and maintenance of equipment and systems, using the operation and maintenance data as the basis of instruction.

END OF SECTION 01 60 00

SECTION 01 63 10

PRODUCT SUBSTITUTIONS

PART 1 - GENERAL

1.01 Related Documents

- A. All Contract Documents shall apply to work of this section.

1.02 Summary

- A. This Section specifies administrative and procedural requirements for handling requests for substitutions made after award to the Contract.
- B. The Contractor's Construction Schedule and the Schedule of Submittals are included under Section "Submittals".
- C. Standards: Refer to Section "Reference Standards and Definitions" applicability of industry standards to products specified.
- D. Procedural requirements governing the Contractor's selection of products and product options are included under section "Materials and Equipment".

1.03 Definitions

- A. Definitions used in this Article are not intended to change or modify the meaning of other terms used in the Contract Documents.
- B. Substitutions: Requests for changes in products, materials, equipment, and methods of construction required by Contract Documents proposed by the Contractor after award of the Contract are considered requests for "substitutions". The following are not considered substitutions:
 - 1. Substitutions requested by Bidders during the bidding period, and accepted prior to award of Contract, are considered as included in the Contract Documents and are not subject to requirements specified in this Section for substitutions
 - 2. Revisions to Contract Documents requested by the Owner or Architect
 - 3. Specified options of products and construction methods included in Contract Documents

4. The Contractor's determination of and compliance with governing regulations and orders issued by governing authorities

1.04 Submittals

- A. Substitution Request Submittal: Requests for substitution will be considered if they are received within 60 days after the commencement of work. Requests received more than 60 days after commencement of the Work may be considered or rejected at the discretion of the Engineer/Architect.
 1. Submit a minimum of 4 copies of each request for substitution for consideration. Submit requests in the form and in accordance with procedures required for Change Order proposals.
 2. Identify the product, or the fabrication or installation method to be replaced in each request. Include related Specification Section and Drawing numbers. Provide complete documentation showing compliance with the requirements for substitutions, and the following information, as appropriate:
 - a. Project data, including drawings and descriptions of products, fabrication and installation procedures
 - b. Samples, where applicable or requested
 - c. A detailed comparison of significant qualities of the proposed substitution with those of the Work specified. Significant qualities may include elements such as size, weight, durability, performance and visual effect.
 - d. Coordination information, including a list of changes or modifications needed to other parts of the Work and to construction performed by the Owner and separate Contractors that will become necessary to accommodate the proposed substitution.
 - e. A statement indicating the substitution and its effect on the Contractor's Construction Schedule compared to the schedule without approval of the substitution. Indicate the effect of the proposed substitution on overall Contract Time.
 - f. Cost information, including a proposal of the net change, if any in the Contract Sum.

- g. Certification by the Contractor that the substitution proposed is equal-to or better in every significant respect to that required by the Contract Documents, and that it will perform adequately in the application indicated. Include the Contractor's waiver of rights to additional payment or time that may subsequently become necessary because of the failure of the substitution to perform adequately.
- 3. Engineer's Action: Within one week of receipt of the request for substitution, the Engineer will request additional information or documentation necessary for evaluation of the request. Within 2 weeks of receipt of the request, or one week of receipt of the additional information or documentation, whichever ever is later, the Engineer will notify the Contractor of acceptance or rejection of the proposed substitution. If a decision on use of a proposed substitute cannot be made or obtained within the time allocated, use the product specified by name. Acceptance will be in the form of a written response or Change Order if there is an impact on project cost.

PART 2 - PRODUCTS

2.01 Substitutions

- A. Conditions: The Contractor's substitution request will be received and considered by the Engineer when one or more of the following conditions are satisfied, as determined by the Engineer; otherwise requests will be returned without action except to record noncompliance with these requirements.
 - 1. Extensive revisions to Contract Documents are not required.
 - 2. Proposed changes are in keeping with the general intent of Contract Documents.
 - 3. The request is timely, fully documented and properly submitted.
 - 4. The request is directly related to an "or equal" clause or similar language in the Contract Documents.
 - 5. The specified product or method of construction cannot be provided within the Contract Time. The request will not be considered if the product or method cannot be provided as a result of failure to pursue the Work promptly or coordinate activities properly.

6. The specified product or method of construction cannot receive necessary approval by a governing authority, and the requested substitution can be approved.
 7. A substantial advantage is offered the Owner, in terms of cost, time, energy conservation or other considerations of merit, after deducting offsetting responsibilities the Owner may be required to bear. Additional responsibilities for the Owner may include additional compensation to the Engineer for redesign and evaluation services, increased cost of other construction by the Owner or separate Contractors, and similar considerations.
 8. The specified product or method of construction cannot be provided in a manner that is compatible with other materials, and where the Contractor certifies that the substitution will overcome the incompatibility.
 9. The specified product or method of construction cannot be coordinated with other materials, and where the Contractor certifies that the proposed substitution can be coordinated.
 10. The specified product or method of construction cannot provide a warranty required by the Contract Documents and where the Contractor certifies that the proposed substitution provide the required warranty.
- B. The Contractor's submittal and Engineer's acceptance of Shop Drawings, Product Data or Samples that relate to construction activities not complying with the Contract Documents does not constitute an acceptable or valid request for substitution, nor does it constitute approval.

PART 3 - EXECUTION (Not Applicable)

END OF SECTION 01 63 10

SECTION 01 70 00

PROJECT CLOSEOUT

PART 1 - GENERAL

1.01 **RELATED DOCUMENTS:**

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

1.02 **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 Divisions 2 through 9.

1.03 **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.
 - a. 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 changeover 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 changeover of permanent locks and transmit keys to the Owner. Advise the Owner's personnel of changeover 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 Consultant will either proceed with inspection or advise the Contractor of unfilled requirements. The Consultant 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 Consultant 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.

1.04 **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 Consultant'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 Consultant.
 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 Consultant 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 Consultant.
1. Upon completion of re-inspection, the Consultant will prepare a certificate of final acceptance, or inform 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.

1.05 **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 Consultant'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.
1. Upon completion of the Work, submit record Specifications to the Consultant 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 that cannot otherwise be readily discerned later by direct observation. Note related Change Orders and mark-up of record drawings and Specifications.
1. Upon completion of mark-up, submit complete set of record Product Data to the Consultant 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 Consultant 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 Consultant for the Owner's records.
- G. Maintenance Manuals: Organize operating and maintenance data into suitable sets of manageable size. Bind properly indexed data into 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
 8. Fixture lamping schedule

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION

3.01 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. Lubricants
6. Fuels
7. Identification systems
8. Control sequences
9. Hazards
10. Cleaning
11. Warranties and bonds
12. Maintenance agreements and similar continuing commitments

B. As part of instruction for operating equipment, demonstrate the following procedures:

1. Start-up
2. Shutdown
3. Emergency operations
4. Noise and vibration adjustments
5. Safety procedures
6. Economy and efficiency adjustments
7. Effective energy utilization

3.02 **FINAL CLEANING:**

- A. General: General cleaning during construction is required by the General Conditions and included in Section "Temporary Facilities".
- 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.
1. Complete the following cleaning operations before requesting inspection for Certification of Substantial Completion.
 - a. Remove labels that are not permanent labels.
 - b. Clean transparent materials, including mirrors and glass in doors and windows. Remove glazing compound and other substances that are noticeable vision-obscuring materials. Replace chipped or broken glass and other damaged transparent materials.

- c. 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.
 - d. Wipe surfaces of mechanical and electrical equipment. Remove excess lubrication and other substances. Clean plumbing fixtures to a sanitary condition. Clean light fixtures and lamps.
 - e. 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. Removal of Protection: Remove temporary protection and facilities installed for protection of the Work during construction.
- D. 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.
1. 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 01 70 00

SECTION 01 74 00

WARRANTIES AND BONDS

PART 1 - GENERAL

1.01 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.

1.02 SUMMARY:

- A. This Section specifies general administrative and procedural requirements for warranties and bonds required by the Contract Documents, including manufacturer's standard warranties on products and special warranties.
 - 1. Refer to the General Conditions for terms of the Contractor's special warranty of workmanship and materials.
 - 2. General closeout requirements are included in Section "Project Closeout."
 - 3. Specific requirements for warranties for the Work and products and installations that are specified to be warranted, are included in the individual Sections of Divisions 2 through 16.
 - 4. Certifications and other commitments and agreements for continuing services to Owner are specified elsewhere in the Contract Documents.
- B. Disclaimers and Limitations: Manufacturer's disclaimers and limitations on product warranties do not relieve the Contractor of the warranty on the Work that incorporates the products, nor does it relieve suppliers, manufacturers, and subcontractors required to countersign special warranties with the Contractor.

1.03 DEFINITIONS

- A. Standard Product Warranties are preprinted written warranties published by individual manufacturers for particular products and are specifically endorsed by the manufacturer to the Owner.
- B. Special Warranties are written warranties required by or incorporated in the Contract Documents, either to extend time limits provided by standard warranties or to provide greater rights for the Owner.

1.04 WARRANTY REQUIREMENTS

- A. Related Damages and Losses: When correcting warranted Work that has failed, remove and replace other Work that has been damaged as a result of such failure or that must be removed and replaced to provide access for correction of warranted Work.
- B. Reinstatement of Warranty: When Work covered by a warranty has failed and been corrected by replacement or re-building; reinstate the warranty by written endorsement. The reinstated warranty shall be equal to the original warranty with an equitable adjustment for depreciation.
- C. Replacement Cost: Upon determination that Work covered by a warranty has failed, replace or rebuild the Work to an acceptable condition complying with requirements of Contract Documents. The Contractor is responsible for the cost of replacing or rebuilding defective Work regardless of whether the Owner has benefited from use of the Work through a portion of its anticipated useful service life.
- D. Owner's Recourse: Written warranties made to the Owner are in addition to implied warranties, and shall not limit the duties, obligations, rights and remedies otherwise available under the law, nor shall warranty periods be interpreted as limitations on time in which the Owner can enforce such other duties, obligations, rights, or remedies.
 - 1. Rejection of Warranties: The Owner reserves the right to reject warranties and to limit selections to products with warranties not in conflict with requirements of the Contract Documents.
- E. The Owner reserves the right to refuse to accept Work for the Project where a special warranty, certification, or similar commitment is required on such Work or part of the Work, until evidence is presented that entities required to countersign such commitments are willing to do so.

1.05 SUBMITTALS

- A. Submit written warranties to the Consultant prior to the date certified for Substantial Completion. If the Consultant's Certificate of Substantial Completion designates a commencement date for warranties other than the date of Substantial Completion for the Work, or a designated portion of the Work, submit written warranties upon request of the Consultant.

1. When a designated portion of the Work is completed and occupied or used by the Owner, by separate agreement with the Contractor during the construction period, submit properly executed warranties to the Consultant within fifteen days of completion of that designated portion of the Work.
- B. When a special warranty is required to be executed by the Contractor, or the Contractor and a subcontractor, supplier or manufacturer, prepare a written document that contains appropriate terms and identification, ready for execution by the required parties. Submit a draft to the Owner through the Consultant for approval prior to final execution.
- C. Forms for special warranties are included at the end of this Section. Prepare a written document utilizing the appropriate form, ready for execution by the Contractor, or the Contractor and subcontractor, supplier or manufacturer. Submit a draft to the Owner through the Consultant for approval prior to final execution.
 1. Refer to individual Sections of Divisions 2 through 9 for specific content requirements, and particular requirements for submittal of special warranties.
- D. Form of Submittal: At Final Completion compile two copies of each required warranty and bond properly executed by the Contractor, or by the subcontractor, supplier, or manufacturer. Organize the warranty documents into an orderly sequence based on the table of contents of the Project Manual.
- E. Bind warranties and bonds in heavy-duty, commercial quality, durable 3-ring vinyl covered loose-leaf binders, thickness as necessary to accommodate contents, and sized to receive 8-1/2" by 11" paper.
 1. Provide heavy paper dividers with celluloid covered tabs for each separate warranty. Mark the tab to identify the product or installation. Provide a typed description of the product or installation, including the name of the product, and the name, address and telephone number of the installer.
 2. Identify each binder on the front and the spine with the typed or printed title "WARRANTIES AND BONDS," the Project title or name, and the name of the Contractor.
 3. When operating and maintenance manuals are required for warranted construction, provide additional copies of each required warranty, as necessary, for inclusion in each required manual.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION

3.01 SCHEDULE OF WARRANTIES

A. Schedule: Provide warranties on products and installations as specified, but not limited to, below:

1. The Contractor (and applicable sub-contractors) shall provide a 1-year warranty (minimum) for all work performed to conform to the specifications in addition to specific warranties for individual products

2. Concrete (Division 3)

- Section 033400 - Concrete Repair with Trowel Applied Materials. The Contractor (and applicable sub-contractors) shall provide a 1-year warranty for quality workmanship and materials to conform to the specifications

3. Metals (Division 5)

The Contractor (and applicable sub-contractors) shall reference applicable specifications for appropriate warranties for these products.

4. Thermal and Moisture Protection (Division 7)

- Section 079200 - Sealants and Caulking. The Contractor (and applicable sub-contractors) shall reference applicable specifications for appropriate warranties for these products. The Contractor (and applicable sub-contractors) shall provide a single source performance guarantee that the joint system repaired, including related work in the slab installed by the Contractor, will not leak water or de-bond from adjacent concrete for a 1 year period starting from the date of substantial completion. Any repairs required during the guarantee period starting from the date of substantial completion shall be performed by the Contractor at no additional cost to the Owner.

5. Finishes (Division 9)

The Contractor (and applicable sub-contractors) shall reference applicable specifications for appropriate warranties for individual products.

6. Conveyance Systems (Division 14)

- Section 142100 – Hydraulic Elevators. The Contractor (and applicable sub-contractors) shall submit copies of written warranty, signed by the Elevator Manufacturer agreeing to repair or replace defective materials and workmanship of the elevator work during a one (1) year guarantee period, which starts on the date the elevator is completed, placed in operation and accepted by the Authority. Defective materials and workmanship is hereby defined to include operational failures, performance below required minimums, excessive deterioration or aging, evidence that the system will not be reasonably maintainable for the life of the building, abnormal wear considering intensity of use, unsafe conditions, excessive noise or vibration, and similar unusual, unexpected and unsatisfactory conditions; but does not include defects caused by alterations, abusive use, vandalism, failure of the supporting structure or power supply, improper maintenance and similar causes beyond the control of the Elevator Manufacturer. Elevator Installer shall note that warranty shall include call-back service on a basis of 24-hour availability.
- Section 142110 – Traction Elevators. The One-Year Warranty and Guarantee Period of Service shall commence and run concurrent after final inspection, completion of performance test, and upon acceptance of each elevator. During warranty period if a device is not functioning properly in accordance with specification requirements, more maintenance than the contract requires keeping device operational, device shall be removed and a new device meeting all requirements shall be installed as part of work until satisfactory operation of installation is obtained. Period of warranty shall start anew for such parts from date of completion of each new installation performed, in accordance with foregoing requirements.

7. Heating, Ventilating and Air Conditioning (Division 23)

The Contractor (and applicable sub-contractors) shall reference applicable specifications for appropriate warranties for these products.

8. Electrical (Division 26)

The Contractor (and applicable sub-contractors) shall reference applicable specifications for appropriate warranties for these products.

END OF SECTION 01 74 00

DIVISION 2

EXISTING CONDITIONS

SECTION 02 07 00

SELECTIVE DEMOLITION

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SUMMARY

A. Description

1. Furnish labor, materials, equipment and transportation necessary to do all concrete demolition, as shown on drawings and as specified herein, including but not necessarily limited to the following:
 - a. Removal of existing concrete, masonry, and other materials as noted on plans or directed by the Engineer
 - b. Dust and water control
 - c. Removal and disposal of all debris
 - d. Disconnecting and relocating/reinstalling any existing utility lines on the site which interfere with the repairs
 - e. Protection of all existing electrical systems, mechanical equipment, light fixtures, overhead piping, fire protection system etc. scheduled to remain
2. Contractor shall provide barricades with warning lights, enclose the construction area and take all precautions necessary to ensure public and employee safety.
3. All work shall be done in accordance with the requirements of all local and state agencies.

1.03 QUALITY ASSURANCE

- A. Demolition Contractor's Qualifications: Minimum of 5 years experience on comparable projects.

- B. Comply with all pertinent codes and regulations that apply to this type of work and with requirements of insurance carriers providing coverage for this work. Dispose of debris in a legal manner off site daily. Do not allow to accumulate on site.

1.04 SUBMITTALS

- A. General: Submit the following in accordance with Conditions of Contract and Division 1 Specification Sections.
- B. Schedule indicating proposed sequence of operations for selective demolition work to Owner's Representative for review prior to start of work. Include coordination for shutoff, capping, and continuation of utility services as required, together with details for dust and noise control protection.
 - 1. Provide detailed sequence of demolition and removal work to ensure uninterrupted progress of Owner's on-site operations.
 - 2. Coordinate with MGI's on-site staff, schedule and logistics plans and/or with Owner's partial occupancy of completed work.
- C. Photographs of existing conditions of structure's surfaces, equipment, and adjacent improvements that might be misconstrued as damage related to removal operations. File with Owner's Representative prior to start of work.

1.05 JOB CONDITIONS

- A. Occupancy: Conduct selective demolition work in manner that will minimize need for disruption of other construction activities. Provide minimum of 72 hours advance notice to MGI of demolition activities that will affect other construction activities and/or Owner's operations.
- B. Condition of Structures: Owner assumes no responsibility for actual condition of items or structures to be demolished.
 - 1. Conditions existing at time of inspection for bidding purposes will be maintained by Owner insofar as practicable. However, minor variations within structure may occur prior to start of selective demolition work.
- C. Partial Demolition and Removal: Items indicated to be removed but of salvageable value to Contractor may be removed from structure as work progresses. Transport salvaged items from site as they are removed.

1. Storage or sale of removed items on site will not be permitted.
- D. Protections: Provide temporary barricades and other forms of protection to protect Owner's personnel and general public from injury due to selective demolition work.
1. Provide protective measures as required to provide free and safe passage of Owner's personnel and general public to occupied portions of the project.
 2. Erect temporary covered passageways as required by authorities having jurisdiction.
 3. Provide interior and exterior shoring, bracing, or support to prevent movement, settlement, or collapse of structure or element to be demolished and adjacent facilities or work to remain.
 4. Protect from damage existing finish work that is to remain in place and becomes exposed during demolition operations.
 5. Use all means necessary to protect existing facilities, utilities, and appurtenances within the project areas.
 6. Protect floors with suitable coverings when necessary.
 7. Dust and Water Control: Contractor shall contain particular debris generated by his work activities from polluting the atmosphere or waterways.
 8. Construct temporary insulated dust resistant partitions where required separating areas where noisy or extensive dirt or dust operations are performed. Equip partitions with dust resistant doors and security locks.
 9. Provide temporary weather protection during interval between demolition and removal of existing construction on exterior surfaces and installation of new construction to ensure that no water leakage or damage occurs to structure or interior areas of existing building.
 10. On-site burning shall not be permitted.
 11. Remove protections at completion of work.
- E. Damages: Promptly repair damages caused to adjacent facilities by demolition work.

- F. Traffic: Conduct selective demolition operations and debris removal to ensure minimum interference with roads, streets, walks, and other adjacent occupied or used facilities.
 - 1. Do not close, block, or otherwise obstruct streets, walks, or other occupied or used facilities without written permission from authorities having jurisdiction. Provide alternate routes around closed or obstructed traffic ways if required by governing regulations.
- G. Flame Cutting: Do not use cutting torches for removal until work area is cleared of flammable materials. At concealed spaces, such as interior of ducts and pipe spaces, verify condition of hidden space before starting flame-cutting operations. Maintain portable fire suppression devices during flame-cutting operations.
- H. Utility Services: Maintain existing utilities in service and protect them against damage during demolition operations.
 - 1. Do not interrupt utilities serving occupied or used facilities, except when authorized in writing by authorities having jurisdiction. Provide temporary services during interruptions to existing utilities, as acceptable to governing authorities.
 - 2. Maintain fire protection services during selective demolition operations.
- I. Environmental Controls: Use water sprinkling, temporary enclosures, and other methods to limit dust and dirt migration. Comply with governing regulations pertaining to environmental protection.
 - 1. Do not use water when it may create hazardous or objectionable conditions such as ice, flooding, and pollution.

PART 2 - PRODUCTS

2.01 MATERIALS AND EQUIPMENT

- A. Use appropriate materials and proper equipment to complete the work of this Section. Provide all necessary barricades, warning devices, enclosures, etc. as required to comply with governing safety regulations.

PART 3 - EXECUTION

3.01 PREPARATION

- A. General: Provide interior and exterior shoring, bracing, or support to prevent movement, settlement, or collapse of areas to be demolished and adjacent facilities to remain.
1. Cease operations and notify Owner's Representative immediately if safety of structure appears to be endangered. Take precautions to support structure until determination is made for continuing operations.
 2. Cover and protect equipment and fixtures from soilage or damage when demolition work is performed in areas where such items have not been removed.
 3. Erect and maintain dust resistant partitions and closures as required preventing spread of dust or fumes to occupied portions of the building.
 - a. Where selective demolition occurs immediately adjacent to occupied portions of the building, construct dust resistant partitions of minimum 4-inch studs and ½-inch fire-retardant plywood on demolition side.
 - b. Provide weatherproof closures for exterior openings resulting from demolition work.
 4. Locate, identify, stub off, and disconnect utility services that are not indicated to remain.
 - a. Provide bypass connections as necessary to maintain continuity of service to occupied areas of building. Provide minimum of 72 hours advance notice to MGI and Owner if shutdown of service is necessary during changeover.

3.02 DEMOLITION

- A. General: Perform selective demolition work in a systematic manner. Use such methods as required to complete work indicated on Drawings in accordance with demolition schedule and governing regulations.

1. Demolish concrete in small sections. Cut concrete and masonry at junctures with construction to remain using power-driven masonry saw or hand tools; do not use power-driven impact tools except as indicated in the construction drawings.
 2. Locate demolition equipment throughout structure and promptly remove debris to avoid imposing excessive loads on supporting walls, floors, or framing.
 3. Provide services for effective air and water pollution controls as required by local authorities having jurisdiction.
- B. If unanticipated mechanical, electrical, or structural elements that conflict with intended function or design are encountered, investigate and measure both nature and extent of the conflict. Submit report to Consultant, written with accurate detail describing the unanticipated conflict. Pending receipt of directive from Owner's Representative, rearrange selective demolition schedule as necessary to continue overall job progress without undue delay.

3.03 DISPOSAL OF DEMOLISHED MATERIALS

- A. Remove from building site debris, rubbish, and other materials resulting from demolition operations. Transport and legally dispose off site.
1. If hazardous materials are encountered during demolition operations, comply with applicable regulations, laws, and ordinances concerning removal, handling, and protection against exposure or environmental pollution.
 2. Burning of removed materials is not permitted on project site.

3.04 CLEANUP AND REPAIR

- A. General: Upon completion of demolition work, remove tools, equipment, and demolished materials from site. Remove protections and leave interior areas broom clean.
1. Repair demolition performed in excess of that required. Return elements of construction and surfaces to remain to condition existing prior to start operations. Repair adjacent construction or surfaces soiled or damaged by selective demolition work.

END OF SECTION 02 07 00

DIVISION 3

CONCRETE

SECTION 03 20 00

CONCRETE REINFORCEMENT

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

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

1.02 DESCRIPTION

- A. Furnish, fabricate and install reinforcement and associated items required or indicated on the drawings for cast-in-place concrete, including, but not necessarily limited to, reinforcing steel bars, welded wire fabric, ties, and supports.
- B. Contractor shall note that new steel shall be uncoated ("black steel"). All steel, including welded wire fabric, shall be field-coated with primer to total surface coverage, inclusive of, but not limited to, top side, bottom side, ends, and all other exposed surfaces, in accordance with the material manufacturer's recommendations. Coverage shall be reviewed in the field by the Engineer prior to concrete placement; concrete placement may be delayed until primer coverage is determined to be acceptable by Engineer. Reference Section 2.01.

1.03 WORK SPECIFIED ELSEWHERE

- A. Furnishing and placement of inserts, anchorages, and other embedded items as specified in other sections.

1.04 QUALITY ASSURANCE

- A. Unless otherwise shown or specified, fabrication and placement of all concrete reinforcement and related items shall conform to the following codes and standards:
 - 1. American Concrete Institute, ACI 318, "Building Code Requirement for Reinforced Concrete."
 - 2. American Concrete Institute, ACI 315, "Manual of Standard Practice for Detailing Reinforced Concrete Structures."
 - 3. Concrete Reinforcing Steel Institute, "Manual of Standard Practice."

1.05 SUBMITTALS

- A. **Shop Drawings:** Submit shop drawings with mill certificates for fabrication, bending, and placement of concrete reinforcement all as may be required. Comply with the ACI 315 "Manual of Standard Practice for Detailing Reinforced Concrete Structures." Show bar schedule, stirrup spacing, diagrams of bent bars, arrangements and assemblies, for the fabrication and placement of concrete reinforcement.

1.06 PRODUCT DELIVERY, STORAGE AND HANDLING

- A. **Delivery:** Deliver reinforcement to the Project Site bundled, tagged, and marked. Use metal tags indicating bar size, lengths, and other information corresponding to markings shown on placement diagrams.

Protection: Use all means necessary to protect concrete reinforcement before, during, and after installation and to protect the materials and installed work of all trades. Take all necessary precautions to maintain identification of fabricated bars after bundles are broken.

Storage: Store concrete reinforcement materials at the site to prevent damage and accumulation of dirt or excessive rust.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. **Reinforcing Bars:** ASTM A615, Grade 60, deformed.
- B. **Welded Wire Fabric:** ASTM A82 and ASTM A185.
- C. **Zinc-Rich Primer:** All steel, including welded wire fabric, shall be field-coated with primer to total surface coverage, inclusive of, but not limited to, top side, bottom side, ends, and all other exposed surfaces, in accordance with the material manufacturer's recommendations. Coverage shall be reviewed in the field by the Engineer prior to concrete placement; concrete placement may be delayed until primer coverage is determined to be acceptable by Engineer. Acceptable primer shall be MasterProtect P8100 AP, as manufactured by BASF Construction Chemicals, LLC, or approved equal. Reinforcing bars to be coated shall conform to Section 2.01-A.

- D. Bar Supports: Bar supports and spacing of same shall be per recommendations set forth by Chapter 3 of the "CRSI Manual of Standard Practice." Reinforcing bars supported from formwork shall rest on wire bar supports, or on bar supports made of dielectric material or other acceptable materials. Wire bar supports shall be coated with dielectric material, compatible with concrete, for a minimum distance of 2 inches from the point of contact with reinforcing bars.
- E. Tie Wire: Wire shall be 16 gauge or heavier, black-annealed. Reinforcing bars shall be tied with tie wire or other acceptable materials.
- F. For epoxy grouting reinforcing steel use the Hilti "HIT RE 500 System" supplied by Hilti Fastening Systems, "Dowel Fast" System by Powers Fasteners, or approved equal. Follow manufacturer's directions for installation and required surface preparation.

2.02 FABRICATION

- A. General Requirements: Fabricate reinforcing bars to conform to required shapes and dimensions, with fabrication to tolerances complying with CRSI Manual of Standard Practice. In case of fabricating errors, do not re-bend or straighten reinforcement in a manner that will injure or weaken the material.
- B. Unacceptable Workmanship: Reinforcement with any of the following defects will not be permitted in the work:
 - 1. Bar lengths, depths and bends exceeding specified fabrication tolerances.
 - 2. Bends or kinks not indicated on drawings or final shop drawings.
 - 3. Bars with reduced cross-section due to excessive rusting or other cause.

PART 3 - EXECUTION

3.01 PLACING REINFORCEMENT

- A. General Requirements:
 - 1. All reinforcing bars shall be placed in accordance with CRSI "Recommended Practice for Placing Reinforcing Bars."
 - 2. Bars shall be placed to the tolerance specified in ACI 318-99.
 - 3. Place all reinforcement according to the approved placement drawings. Use sufficient bar supports, tie anchors, additional reinforcing bars, if required, and other accessories to hold all bars securely in place.

- B. Concrete Coverage: Place reinforcement to obtain the minimum coverage specified on the drawings for concrete protection. Arrange, space, and securely tie bars and bar supports together with 16 gauge wire to hold reinforcement accurately in position during concrete placement operation. Set wire ties so that twisted ends are directed away from exposed concrete surfaces.
- C. Cleaning Reinforcement: Steel reinforcement, at the time concrete is placed around it, shall be free from loose rust and mill scale, oil, grease, paint, earth, ice and all coatings, which would reduce or destroy bond between steel and concrete. Clean reinforcement as necessary prior to, during, or after placement to achieve this result.

When bars project from construction joints, all cement mortar clinging to the bars from previous concreting shall be removed before the ensuing enveloping concrete is placed.

- D. All steel, including welded wire fabric, shall be field-coated with primer to total surface coverage, inclusive of, but not limited to, top side, bottom side, ends, and all other exposed surfaces, in accordance with the material manufacturer's recommendations. **Coverage shall be reviewed in the field by the Engineer prior to concrete placement; concrete placement may be delayed until primer coverage is determined to be acceptable by Engineer.**

3.02 REINFORCING BAR LAP SPLICES

- A. New slab reinforcing bars may be spliced to existing bars by lapped splices if adequate lengths of exposed existing bars are available. Provide reinforcement lap splices by placing bars in contact and tying with wire tightly. Comply with the requirements of Engineering Data Report Number 45, 'Tension Development and Lap Splice Lengths of Reinforcing Bars Under ACI 318-99' for minimum required length of bar for lap splices. Alternatively, the contractor can follow the values provided below for lap splice lengths based on the following guidelines:

LAP SPLICE LENGTHS FOR BARS IN TENSION (IN INCHES)

<u>Bar Size</u>	<u>Uncoated Reinforcement</u>
3	16
4	16
5	22
6	31
7	50
8	62

- Note 1. Based on Class B splice = $1.3 l_d$ (l_d = tensile development length)
Normal weight concrete
 f'_c = 4,000 psi min.
Grade 60 reinforcement
Concrete cover = 1.00 in. or greater
Bars have less than 12 in. concrete cast below them.
- Note 2. Lap splice lengths for steel based on concrete cover equal to or greater than 3 bar diameters and clear spacing between bars equal to or greater than 6 bar diameters.
- Note 3. For lightweight aggregate concrete, multiply the tabulated values by 1.3.

- B. Do not make splices at points of maximum stress if possible.
- C. Stagger top splices, and in horizontal wall reinforcement separate at least five feet longitudinally in alternate bars of opposite tiers.
- D. Stubs and dowels required to receive and engage subsequent work shall extend a sufficient length to develop the strength of the bar. Place dowel and stub bars in the forms and secure against displacement during the placing of concrete. Where stub steel and dowels extend through construction joints in walls, they shall be thoroughly cleaned of adhering particles of concrete, before continuing the placing of any subsequent concrete.
- E. Where splicing length is insufficient either additional concrete removal or mechanical bar splicing shall be implemented at the direction of the Engineer.

3.03 REINFORCING BAR MECHANICAL SPLICES

- A. Bars to be spliced by the mechanical splicing process shall be free of paint, oil, rust, scale or other foreign material. The splice shall be done in accordance with the manufacturer's recommendations which shall be submitted to the Engineer for approval.

The mechanical splice shall meet full tension requirement of 100% of the yield strength (f_y). The mechanical splices shall be performed using the Quick Wedge system manufactured by Erico Products, Inc. (800)248-2677, MBT Bar Lock System (800) 755-4888, or approved equal.

Test assemblies shall include the same bars, couplers and anchors. The same equipment shall be used to make these assemblies as to be used on the project.

- B. Unskilled operators must be trained and indoctrinated by an authorized representative of the system manufacturer. Upon satisfactory completion of the training, a certificate will be issued by the system manufacturer to show the splicer's name, badge, number/Social Security Number and date certified.
- C. Test splices should be made on the size, type and grade of rebar to be used in production. If a change of size, type of grade or rebar occurs, new test results should be obtained.

Minimum rebar deformation heights and spacing within the splice must conform to the requirements of ASTM A625, or ASTM A706 as appropriate. If minimum deformation heights and spacing requirements cannot be satisfied, the system's manufacturer may at its option offer and get an approval for alternate splicing procedure to meet the specified splicing strength requirements.

- D. The frequency of test splices shall be as follows:

First Fifty (50) - One Test

Next Fifty (50) - One Test

Thereafter, every one hundred (100) - One Test

The test splice shall be a SISTER SPLICE (removable splice made in-place and in sequence adjacent to production splices by the same operator and under same conditions.)

Separate test frequencies are not necessary to horizontal, vertical and diagonal splices.

- E. If any splice used for testing fails to meet the design code strength requirements, two splices in-place shall be cut from the previous lot and tested. If these sister splices fail, the contractor shall at his own expense, test as many splices as directed by the Engineer and re-splice all test and failed splices.

END OF SECTION 03 20 00

SECTION 03 34 00

CONCRETE REPAIR USING TROWEL APPLIED MATERIALS

PART 1 - GENERAL

1.01 RELATED DOCUMENTS:

- A. Drawings and general provisions of the contract, including General and Supplementary Conditions and Division-1 Specification Sections, apply to this Section.
- B. Section 033000 – Concrete Work.

1.02 SCOPE OF WORK:

- A. This work shall consist of the removal of existing unsound concrete to required depth and the installation of a trowel applied, fast-setting cement mortar at locations indicated on drawings and/or at other locations designated by the Engineer.

PART 2 - PRODUCTS

2.01 MATERIALS:

- A. The fast-setting polymer repair mortar shall achieve a compressive strength of 5,000 psi in 28 days. The products approved under this section are as follows.
 - 1. Horizontal Repair Mortar:
 - a. “MasterEmaco T 310 CI” as manufactured by BASF Construction Chemicals, LLC (800) 433-9517.
 - b. “MasterEmaco S 440 CI” as manufactured by BASF Construction Chemicals, LLC (800) 433-9517.
 - c. “SikaTop 122 Plus” as manufactured by Sika Corporation (800) 933-7452.
 - d. “Concrete-Top Supreme” as manufactured by Euclid Chemical Company (800) 321-7628.
 - e. "MasterEmaco T 1060 Rapid Mortar" as manufactured by BASF Construction Chemicals, LLC (800) 433-9517.
 - f. or approved equal.

2. Vertical and Overhead Repair Mortar:
 - a. "MasterEmaco S 488 CI" as manufactured by BASF Construction Chemicals, LLC (800) 433-9517.
 - b. "SikaRepair SHB" as manufactured by Sika Corporation (800) 933-7452.
 - d. "Verticoat Supreme" as manufactured by Euclid Chemical Company (800) 321-7628.
 - e. "MasterEmaco N 425" as manufactured by BASF Construction Chemicals, LLC (800) 433-9517.
 - f. or approved equal.

PART 3 - EXECUTION

3.01 SURFACE PREPARATIONS:

- A. All loose and unsound concrete shall be removed with small chipping hammers. Remove concrete a minimum of 3/4" beyond the reinforcing steel.
- B. The surface shall be blown clean with compressed air to assure that all loose and hollow concrete is removed. The reinforcing steel shall be sandblasted to remove all rust.

3.02 PLACING, FINISHING AND CURING:

- A. Apply patching material as follows and in accordance with manufacturer's recommendations.
- B. Saturate the surface dry with water so that it maintains a dark gray color one half hour before placing.
- C. Scratch a base coat firmly into the dampened surface and apply the balance of the patch. Consolidate the mortar for density. For deep patches, add recommended filler and apply the material in lifts, allowing it to stiffen enough between lifts to support its own weight. For repairs over 4 inches deep, steel ties shall be provided to aid in weight support. Maximum filler addition to be 1 part filler to 2 parts mortar material by volume. The surface shall be troweled and brushed to match surrounding concrete.
- D. The finished patch shall be cured for at least 48 hours. Keep damp with water or coat with a water-based curing and sealing compound conforming to ASTM C1315 as recommended by the polymer repair mortar manufacturer.
- E. In hot weather, the surface shall be kept cool by shading. Use cold liquid for mixing. Work material rapidly since heat accelerates set. Cure immediately. In cold weather,

do not make repair if temperature is expected to fall below freezing within 48 hours of placing. The patches must be kept at a minimum of 60 degrees F. for 72 hours for proper curing.

3.03 TESTING:

- A. The patched areas shall be sounded with a chain drag and/or hammer after 7 days after concrete placement; any hollowness detected shall be corrected by the Contractor by removing and replacing the patch at no extra cost to the Owner.

END OF SECTION 03 34 00

DIVISION 5

METAL

SECTION 05 50 00

METAL FABRICATIONS

PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. Shop fabricated steel and aluminum items.

1.02 RELATED REQUIREMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division-1 Specification Sections, apply to this Section.
- B. Section 099113 - Exterior Painting: Paint finish.

1.03 REFERENCE STANDARDS

- A. AAMA 2604 - Voluntary Specification, Performance Requirements and Test Procedures for High Performance Organic Coatings on Aluminum Extrusions and Panels (with Coil Coating Appendix); 2017a.
- B. AAMA 2605 - Voluntary Specification, Performance Requirements and Test Procedures for Superior Performing Organic Coatings on Aluminum Extrusions and Panels (with Coil Coating Appendix); 2017a.
- C. ASTM B209 - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate; 2014.
- D. ASTM B209M - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate (Metric); 2014.
- E. AWS A2.4 - Standard Symbols for Welding, Brazing, and Nondestructive Examination; 2012.
- F. AWS B2.1/B2.1M - Specification for Welding Procedure and Performance Qualification; 2014 (Amended 2015).
- G. AWS D1.1/D1.1M - Structural Welding Code - Steel; 2020.
- H. AWS D1.2/D1.2M - Structural Welding Code - Aluminum; 2014, with Errata.
- I. IAS AC172 - Accreditation Criteria for Fabricator Inspection Programs for Structural Steel; 2018.

1.04 SUBMITTALS

- A. See Section Division 1 specs as applicable.
- B. Shop Drawings: Indicate profiles, sizes, connection attachments, reinforcing, anchorage, size and type of fasteners, and accessories. Include erection drawings, elevations, and details where applicable.
- C. Welders' Qualification Statement: Welders' certificates in accordance with AWS B2.1/B2.1M and dated no more than 12 months before start of scheduled welding work.
- D. Designer's Qualification Statement.
- E. Fabricator's Qualification Statement: Provide documentation showing steel fabricator is accredited under IAS AC172.

1.05 QUALITY ASSURANCE

- A. Design of light fixture plate under direct supervision of a Professional Structural Engineer experienced in design of this work and licensed in the State in which the Project is located.
- B. Welder Qualifications: Welding processes and welding operators qualified in accordance with AWS D1.1/D1.1M and AWS D1.2/D1.2M and dated no more than 12 months before start of scheduled welding work.
- C. Fabricator Qualifications: A qualified steel fabricator that is accredited by IAS AC172.

PART 2 - PRODUCTS

2.01 MATERIALS - ALUMINUM

- A. Sheet Aluminum: ASTM B209 (ASTM B209M), 5052 alloy, H32 or H22 temper.
- B. Bolts, Nuts, and Washers: Stainless steel.
- C. Welding Materials: AWS D1.2/D1.2M; type required for materials being welded.

2.02 FABRICATION

- A. Fit and shop assemble items in largest practical sections, for delivery to site.
- B. Fabricate items with joints tightly fitted and secured.

- C. Continuously seal joined members by intermittent welds and plastic filler.
- D. Grind exposed joints flush and smooth with adjacent finish surface. Make exposed joints butt tight, flush, and hairline. Ease exposed edges to small uniform radius.
- E. Exposed Mechanical Fastenings: Flush countersunk screws or bolts; unobtrusively located; consistent with design of component, except where specifically noted otherwise.
- F. Supply components required for anchorage of fabrications. Fabricate anchors and related components of same material and finish as fabrication, except where specifically noted otherwise.

2.03 FABRICATED ITEMS

- A. Ledge Angles, Shelf Angles, Channels, and Plates Not Attached to Structural Framing: For support of metal decking; prime paint finish.

2.04 FINISHES - ALUMINUM

- A. Exterior Aluminum Surfaces: high performance organic coating.
- B. High Performance Organic Coating System: AAMA 2604 multiple coat, thermally cured fluoropolymer system; color as indicated.
 - 1. Manufacturers:
 - a. Sherwin-Williams Company; Emerald Exterior Acrylic Latex Paint: oem.sherwin-williams.com/#sle.
 - b. Substitutions: See Section 016000 - Product Requirements.

2.05 FABRICATION TOLERANCES

- A. Squareness: 1/8 inch (3 mm) maximum difference in diagonal measurements.
- B. Maximum Offset Between Faces: 1/16 inch (1.5 mm).
- C. Maximum Misalignment of Adjacent Members: 1/16 inch (1.5 mm).
- D. Maximum Bow: 1/8 inch (3 mm) in 48 inches (1.2 m).
- E. Maximum Deviation From Plane: 1/16 inch (1.5 mm) in 48 inches (1.2 m).

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Verify that field conditions are acceptable and are ready to receive work.

3.02 INSTALLATION

- A. Install items plumb and level, accurately fitted, free from distortion or defects.
- B. Provide for erection loads, and for sufficient temporary bracing to maintain true alignment until completion of erection and installation of permanent attachments.
- C. Field weld components as indicated on drawings.
- D. Perform field welding in accordance with AWS D1.1/D1.1M.
- E. Obtain approval prior to site cutting or making adjustments not scheduled.
- F. After erection, prime welds, abrasions, and surfaces not shop primed, except surfaces to be in contact with concrete.

END OF SECTION 05 50 00

DIVISION 7
THERMAL AND
MOISTURE PROTECTION

SECTION 07 92 00

SEALANTS AND CAULKING

PART 1 - GENERAL

1.01 RELATED DOCUMENTS:

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

1.02 SCOPE OF WORK:

- A. Furnish labor, materials and equipment for sealing and caulking of cracks, construction or control joints and cove in the reinforced concrete structural slabs as shown on drawings or designated by the Consultant.

1.03 JOB CONDITIONS:

- A. The sealant shall be installed in floor cracks, construction and/or control joints in the areas shown on drawings or designated by the Consultant. In the case of repair of existing cracks that are sealed or filled with other materials, the existing sealant material shall be raked out and the exposed concrete cleaned by sandblasting or grinding at those locations designated for repair.

1.04 FULL RESPONSIBILITY:

- A. System manufacturer will have the full responsibility for: (1) Instructing the Contractor on the required configuration of joints and (2) Reviewing and approving tooled joints constructed as a part of surface preparation prior to installing the sealant.

1.05 GUARANTEE:

- A. The Contractor shall provide a single source performance guarantee that the joint system repaired, including related work in the slab installed by the Contractor, will not leak water or de-bond from adjacent concrete for a 5 year period starting from the date of substantial completion. Any repairs required during the guarantee period starting from the date of substantial completion shall be performed by the Contractor at no additional cost to the Owner.

1.06 APPLICATOR QUALIFICATIONS:

- A. The Contractor shall have a minimum of three years of experience in performing work similar to that shown in the drawings and specifications.
- B. The Contractor shall submit a list of five projects in which similar work to that specified hereinbefore was successfully completed. The list shall contain the following for each of the five projects:
 - 1. Project Name
 - 2. Owner of Project
 - 3. Owner's Representative, Address and Telephone Number
 - 4. Brief Description of Work
 - 5. Cost of Portion of Work Similar to that Specified in this Section
 - 6. Total Restoration Cost of Project
 - 7. Date of Completion of Work

The sum of the costs of the five projects provided shall be a minimum of \$50,000.

- C. A full time on-site supervisor shall be provided by the contractor for the duration of the sealant and caulking work. This supervisor shall have had a minimum of 2 years documented supervisory experience with the products to be used.

PART 2 - PRODUCTS

2.01 MATERIALS:

- A. The sealant to be used shall be non-sag two component polyurethane sealants of the chemically curing type containing no asphalt, coal tar, or plasticizers. The cove joint sealant shall comply with Federal Specification TT-S-00227E, Type II, Class A, Corporation of Consultants CRD-C-506-72; ASTM C-920-79, Type M, Grade NS, Class 25.

Approved Cove Sealants are as follows:

- 1. "SikaFlex-2C-NS TG," as manufactured by Sika Corporation (www.sikausa.com)
 - 2. "Iso-Flex 881 NS Sealant" as manufactured by LymTal International, Inc. (www.lymtal.com)
 - 3. "THC-901" as manufactured by Tremco (www.tremcosealants.com)
 - 4. "MasterSeal NP 150" as manufactured by BASF Building Systems (www.buildingsystems.basf.com)
 - 5. or approved equal.
- B. The manufacturer of the sealant system used in this project shall share responsibility for all sealant work and joint preparation work in slab.

PART 3 - EXECUTION

3.01 TYPICAL SURFACE PREPARATION:

The Contractor shall either grind the surface of all cracks and construction joints designated for repair with sealant to the shape of 1/2" x 1/2" v-groove, or saw-cut a square 1/2" x 1/2" groove, grind sharp corner of groove and apply bond breaker to bottom horizontal surface. Edges of cracks or joints to be sealed shall be of sound concrete. Prior to installing sealant, surfaces shall be cleaned of foreign materials and debris, V-groove ground and primed.

3.02 RECORD OF SEALED CRACK AND JOINT LOCATIONS AND TYPES:

- A. After determining the cracks and joints to be sealed and the detail types required, the Contractor shall prepare scale shop drawings showing the sealed crack and/or joint locations and submit them to the Consultant for his approval. The Shop Drawings submitted shall be reviewed by the Consultant for the condition of the existing cracks/joints, the size/shape of the routed crack, and the type of detail selected.
- B. The Shop Drawings submitted shall be used as a record of the detail types used and the measured number of linear feet of each sealed crack. Quantities of work done on a unit price basis shall be recorded on the document and submitted to the Consultant with Request for Payment.

END OF SECTION 07 92 00

DIVISION 9

FINISHES

SECTION 09 67 23

RESINOUS FLOORING

PART 1 – GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SUMMARY

- A. This section includes the following: Resinous flooring system as shown on the drawings and in schedules.

1.03 SYSTEM DESCRIPTION

- A. The work shall consist of preparation of the substrate, the furnishing and application of a cementitious urethane based self-leveling seamless flooring system with decorative chip broadcast and Epoxy broadcast and topcoats.
- B. The system shall have the color and texture as specified by the Owner with a nominal thickness of 3/16 inch. It shall be applied to the prepared area(s) as defined in the plans strictly in accordance with the Manufacturer's recommendations.
- C. Cove base (if required) to be applied where noted on plans and per manufacturers standard details unless otherwise noted

1.04 SUBMITTALS

- A. See Section Division 1 specs as applicable.
- B. Product Data: Latest edition of Manufacturer's literature including performance data and installation procedures.
- C. Manufacturer's Safety Data Sheet (SDS) for each product being used.
- D. Samples: A 3 x 3 inch square sample of the proposed system. Color, texture, and thickness shall be representative of overall appearance of finished system subject to normal tolerances.

1.05 QUALITY ASSURANCE

- A. The Manufacturer shall have a minimum of 10 years experience in the production, sales, and technical support of epoxy and urethane industrial flooring and related materials.
 - 1. The Applicator shall have experience in installation of the flooring system as confirmed by the manufacturer in all phases of surface preparation and application of the product specified.
- B. No requests for substitutions shall be considered that would change the generic type of the specified System.
- C. System shall be in compliance with requirements of United States Department of Agriculture (USDA),
 - 1. Food, Drug Administration (FDA), and local Health Department.
- D. System shall be in compliance with the Indoor Air Quality requirements of California section 01350 as verified by a qualified independent testing laboratory.
 - 1. A pre-installation conference shall be held between Applicator, General Contractor and the Owner to review and clarification of this specification, application procedure, quality control, inspection and acceptance criteria and production schedule.

1.06 PRODUCT DELIVERY, STORAGE, AND HANDLING

- A. Packing and Shipping
 - 1. All components of the system shall be delivered to the site in the Manufacturer's packaging, clearly identified with the product type and batch number.
- B. Storage and Protection
 - 1. The Applicator shall be provided with a dry storage area for all components. The area shall be between 60 F and 85 F, dry, out of direct sunlight and in accordance with the Manufacturer's recommendations and relevant health and safety regulations.
 - 2. Copies of Safety Data Sheets (SDS) for all components shall be kept on site for review by the Engineer or other personnel.

C. Waste Disposal

1. The Applicator shall be provided with adequate disposal facilities for non-hazardous waste generated during installation of the system.

1.07 PROJECT CONDITIONS

A. Site Requirements

1. Application may proceed while air, material and substrate temperatures are between 60 F and 85 F providing the substrate temperature is above the dew point. Outside of this range, the Manufacturer shall be consulted.
2. The relative humidity in the specific location of the application shall be less than 85 % and the surface temperature shall be at least 5 F above the dew point.
 - a. The Applicator shall ensure that adequate ventilation is available for the work area. This shall include the use of manufacturer's approved fans, smooth bore tubing and closure of the work area.

B. The Applicator shall be supplied with adequate lighting equal to the final lighting level during the preparation and installation of the system.

C. Conditions of new concrete to be coated with cementitious urethane material.

1. Concrete shall be moisture cured for a minimum of 3 days and have fully cured a minimum of 5 days
2. in accordance with ACI-308 prior to the application of the coating system pending moisture tests.
3. Concrete shall have a flat rubbed finish, float or light steel trowel finish (a hard steel trowel finish is neither necessary nor desirable).
4. Sealers and curing agents should not to be used.
5. Concrete shall have minimum design strength of 3,500 psi. and a maximum water/cement ratio of 0.45
6. Concrete surfaces on grade shall have been constructed with a vapor barrier to protect against the effects of vapor transmission and possible delamination of the system.

1.08 SAFETY REQUIREMENTS

1. All open flames and spark-producing equipment shall be removed from the work area prior to commencement of application.
 - a. "No Smoking" signs shall be posted at the entrances to the work area.
2. The Owner shall be responsible for the removal of foodstuffs from the work area.
3. Non-related personnel in the work area shall be kept to a minimum.

1.09 WARRANTY

- A. The manufacturer warrants that material shipped to buyers at the time of shipment substantially free from material defects and will perform substantially to the manufacturer's published literature as used in accordance with the latest prescribed procedures and prior to the expiration date.

PART 2 – PRODUCTS

2.01 MANUFACTURER

- A. Dur-A-Flex, Inc., 95 Goodwin Street, East Hartford, CT 06108, Phone: (860) 528-9838
- B. Manufacturer of Approved System shall be single source and made in the USA.
- C. Basis-of-Design: Hybri-Flex EC (self-leveling chip broadcast), Epoxy/Aliphatic Urethane Topcoat Seamless Flooring System.
1. Topping: Dur-A-Flex, Inc, Poly-Crete SL resin, hardener and SL aggregate.
 2. The broadcast aggregate shall be Dur-A-Flex, Inc. Macro chip
 3. Broadcast: Dur-A-Flex, Inc. Dur-A-Glaze #4, epoxy based two-component resin.
 4. Grout coat: Dur-A-Flex, Inc Dur-A-Glaze #4, epoxy-based, two-component resin.
 5. Top coat: Dur-A-Flex, Inc. Armor Top aliphatic urethane 2 component resin with dur-a-grip.
 - a. Patch Materials
 - b. Shallow Fill and Patching: Use Dur-A-Flex, Inc. Poly-Crete MD (up to ¼ inch).
 - c. Deep Fill and Sloping Material (over ¼ inch): Use Dur-A-Flex, Inc. Poly-Crete WR.

2.02 PRODUCT REQUIREMENTS

- A. Topping: Poly-Crete SL

1. Percent Reactive	100 %
2. VOC	0 g/L
3. Bond Strength to Concrete ASTM D 4541 substrates fails	400 psi,
4. Compressive Strength, ASTM C 579	9,000 psi
5. Tensile Strength, ASTM D 638	2,175 psi
6. Flexural Strength, ASTM D 790	5,076 psi
7. Impact Resistance @ 125 mils, MIL D-3134,	160 inch lbs
a. No visible damage or deterioration	

B. Broadcast Coat: Dur-A-Glaze #4 Regular

1. Percent Reactive,	100 %
2. VOC	<4 g/L
3. Water Absorption, ASTM D 570	0.04%
4. Tensile Strength, ASTM D 638	4000psi
5. Coefficient of thermal expansion	
a. ASTM D 696,	2 x 10 ⁻⁵ in/in/F
6. Flammability ASTM D-635	Self-Extinguishing
7. Flame Spread/ NFPA 101 ASTM E-84	Class A
a. Grout Coat	Dur-A-Glaze 4 Water clear
8. Percent Reactive,	100 %
9. VOC	
<4 g/L	
10. Water Absorption, ASTM D 570	0.04%
11. Tensile Strength, ASTM D 638	4000psi
12. Coefficient of thermal expansion	
a. ASTM D 696,	2 x 10 ⁻⁵ in/in/F
13. Flammability ASTM D-635	Self-Extinguishing
14. Flame Spread/ NFPA 101 ASTM E-84	Class A

C. Topcoat:

1. VOC	Armor Top
2. 60 Degree Gloss ASTM D523	0 g/L
3. Mixed Viscosity, (Brookfield 25oC)	75+/-5
4. Tensile strength, ASTM D 638	500 cps
5. Abrasion Resistance, ASTM D4060	7,000 psi
	Gloss Satin
a. CS 17 wheel (1,000 g load) 1,000 cycles	4 8 mg loss with grit
1) 12 mg loss without grit	
6. Pot life @ 70o F 50% RH	2 hours
7. Dry properties, 70oF, 50% R.H. free, 12 hours Dry	8 hours tack

a. 60oF, 30% RH	12 hours tack free, 18 hours Dry
b. 80oF, 70%RH	4 hours tack free, 6 hours Dry
8. Flash Point PMCC	186oF
9. Full Chemical resistance	7 days

PART 3 – EXECUTION

3.01 EXAMINATION

- A. Examine substrates, areas and conditions, with Applicator present, for compliance with requirements for maximum moisture content, installation tolerances and other conditions affecting flooring performance.
- B. Verify that substrates and conditions are satisfactory for flooring installation and comply with requirements specified.

3.02 PREPARATION

- A. General
 - 1. New and existing concrete surfaces shall be free of oil, grease, curing compounds, loose particles, moss,
 - a. algae growth, laitance, friable matter, dirt, and bituminous products.
 - 2. Moisture Testing: Perform tests recommended by manufacturer and as follows.
- B. Perform anhydrous calcium chloride test ASTM F 1869-98. Application will proceed only when the vapor/moisture emission rates from the slab is less than and not higher than 20 LBS/1,000 SF/24 HRS.
- C. Perform relative humidity test using is situ probes, ASTM F 2170. Proceed with installation only after substrates have a maximum 99% relative humidity level measurement.
 - 1. If the vapor drive exceeds 99% relative humidity or 20 lbs/1,000 sf/24 hrs then the Owner and/or Engineer shall be notified and advised of additional cost for the possible installation of a vapor mitigation system that has been approved by the manufacturer or other means to lower the value to the acceptable limit.
 - 2. Mechanical surface preparation
 - a. Shot blast all surfaces to receive flooring system with a mobile steel shot, dust recycling machine (Blastrac or equal). All surface and embedded accumulations of paint, toppings hardened concrete layers, laitance, power trowel finishes and other similar surface characteristics shall be completely removed leaving a bare concrete surface having a minimum profile of CSP 3-4 as described by the International Concrete Repair Institute.

- b. Floor areas inaccessible to the mobile blast machines shall be mechanically abraded to the same degree of cleanliness, soundness and profile using diamond grinders, needle guns, bush hammers, or other suitable equipment.
- c. Where the perimeter of the substrate to be coated is not adjacent to a wall or curb, a minimum 1/4 inch
 - 1) key cut shall be made to properly seat the system, providing a smooth transition between areas. The
 - 2) detail cut shall also apply to drain perimeters and expansion joint edges.
- d. Cracks and joints (non-moving) greater than 1/8 inch wide are to be chiseled or chipped-out and repaired per manufacturer's recommendations.
- e. At spalled or worn areas, mechanically remove loose or delaminated concrete to a sound concrete and
- f. patch per manufactures recommendations.

3.04 APPLICATION

A. General

- 1. The system shall be applied in five distinct steps as listed below:
 - a. Substrate preparation
 - 1) Topping/overlay application with chip broadcast.
 - 2) Resin application with chip broadcast.
 - 3) Grout Coat application
 - 4) Topcoat application.
- 2. Immediately prior to the application of any component of the system, the surface shall be dry and any remaining dust or loose particles shall be removed using a vacuum or clean, dry, oil-free compressed air.
- 3. The handling, mixing and addition of components shall be performed in a safe manner to achieve the desired results in accordance with the Manufacturer's recommendations.
- 4. The system shall follow the contour of the substrate unless pitching or other leveling work has been specified by the Architect.
- 5. A neat finish with well-defined boundaries and straight edges shall be provided by the Applicator.

B. Topping

1. The topping shall be applied as a self-leveling system as specified by the Architect. The topping shall be applied in one lift with a nominal thickness of 1/8 inch.
2. The topping shall be comprised of three components, a resin, hardener and filler as supplied by the Manufacturer.
3. The hardener shall be added to the resin and thoroughly dispersed by suitably approved mechanical means. SL Aggregate shall then be added to the catalyzed mixture and mixed in a manner to achieve a homogenous blend.
 - a. The topping shall be applied over horizontal surfaces using ½ inch “v” notched squeegee, trowels or other systems approved by the Manufacturer.
 - b. Immediately upon placing, the topping shall be degassed with a loop roller.
 - c. Chip aggregate shall be broadcast to excess into the wet resin, Macro chip at the rate of 0.1 lbs/sf
 - d. Allow material to fully cure. Vacuum, sweep and/or blow to remove all loose chips.

C. Broadcast

1. The broadcast coat resin shall be applied at the rate of 100 sf/gal.
2. The broadcast coat shall be comprised of liquid components, combined at a ratio of 2 parts resin to 1 part hardener by volume and shall be thoroughly blended by mechanical means such as a high speed paddle mixer.
3. Chip aggregate shall be broadcast into the wet resin, Macro chips at the rate of 0.1 lbs/sf,
4. Allow material to fully cure. Vacuum, sweep and/or blow to remove all loose chips.

D. Grout Coat

1. The grout coat t shall be squeegee applied with a coverage rate of 100 sf/gal.
2. The topcoat shall be comprised of liquid components, combined at a ratio of 2 parts resin to 1 part hardener by volume and shall be thoroughly blended by mechanical means such as a high speed paddle mixer.
3. The grout coat will be back rolled and cross rolled to provide a uniform texture and finish

E. TOP COAT

1. The topcoat with dur-a-grip shall be roller applicator with a coverage rate of 500 sf/gal.

2. The finish floor will have a nominal thickness of 3/16 inch.

3.05 FIELD QUALITY CONTROL

A. Tests, Inspection

1. The following tests shall be conducted by the Applicator:
 - a. Temperature
 - 1) Air, substrate temperatures and, if applicable, dew point.
 - b. Coverage Rates
 - 1) Rates for all layers shall be monitored by checking quantity of material used against the area covered.

3.06 CLEANING AND PROTECTION

- A. Cure flooring material in compliance with manufacturer's directions, taking care to prevent their contamination during stages of application and prior to completion of the curing process.
- B. Remove masking. Perform detail cleaning at floor termination, to leave cleanable surface for subsequent work of other sections.

END OF SECTION 09 67 23

SECTION 09 91 13

EXTERIOR PAINTING

PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. Surface preparation.
- B. Field application of paints.
- C. Scope: Finish designated exterior surfaces exposed to view, unless fully factory-finished and unless otherwise indicated.

1.02 RELATED REQUIREMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division-1 Specification Sections, apply to this Section.
- B. Section 055000 - Metal Fabrications: Shop-primed items.
- C. Section 099600 - High-Performance Coatings.

1.03 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. MPI (APSM) - Master Painters Institute Architectural Painting Specification Manual; Current Edition.
- E. SCAQMD 1113 - Architectural Coatings; 1977 (Amended 2016).
- F. SSPC V1 (PM1) - Good Painting Practice: Painting Manual, Volume 1; 2016.
- G. SSPC-SP 2 - Hand Tool Cleaning; 2018.
- H. SSPC-SP 3 - Power Tool Cleaning; 2018.
- I. SSPC-SP 13 - Surface Preparation of Concrete; 1997 (Reaffirmed 2003).

1.04 SUBMITTALS

- A. See Section Division 1 specs as applicable.
- B. 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.
 - 4. Manufacturer's installation instructions.
 - 5. If proposal of substitutions is allowed under submittal procedures, explanation of substitutions proposed.
- C. Samples: Submit two painted samples, illustrating selected colors and textures for each color and system selected with specified coats cascaded. Submit on hard board.
- D. Manufacturer's Instructions: Indicate special surface preparation procedures.
- E. 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.
- F. 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.

1.05 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing the products specified, with minimum three years documented experience.
- B. Applicator Qualifications: Company specializing in performing the type of work specified with minimum 5 years experience and approved by manufacturer.

1.06 MOCK-UP

- A. See Section 014000 - Quality Requirements, for general requirements for mock-up.
- B. Provide panel, 1' foot long by 1' foot wide, illustrating paint color, texture, and finish.
- C. Mock-up may remain as part of the work.

1.07 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.

1.08 FIELD CONDITIONS

- A. Do not apply materials when surface and ambient temperatures are outside the paint product manufacturer's temperature ranges.
- 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 exterior paint and finishes during rain or snow, or when relative humidity is outside the humidity ranges required by the paint product manufacturer.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

- A. Provide paints and finishes from the same manufacturer to the greatest extent possible.
- B. Paints:
 - 1. Sherwin-Williams Company; www.sherwin-williams.com/#sle.
 - 2. Benjamin Moore & Co; <https://www.benjaminmoore.com/en-us>.
- C. Primer Sealers: Same manufacturer as top coats.
- D. Substitutions: See Section 016000 - Product Requirements.

2.02 PAINTS AND FINISHES - GENERAL

- A. Paints and Finishes: Ready-mixed, unless required 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 described explicitly in manufacturer's product instructions.
- B. Sheens: Provide the sheens specified; where sheen is not specified, sheen will be selected later by Architect from the manufacturer's full line.
- C. Colors: As indicated in Color Schedule.

2.03 PAINT SYSTEMS - EXTERIOR

- A. Paint E-OP - Exterior Surfaces to be Painted, Unless Otherwise Indicated: Including concrete, concrete masonry units, brick, fiber cement siding, primed wood, and primed metal.
 - 1. Two top coats and one coat primer.
 - 2. Top Coat(s): Exterior Latex; MPI #10, 11, 15, 119, or 214.
 - a. Products:
 - 1) Sherwin-Williams Loxon XP Exterior. (MPI #10)
 - 2) Substitutions: Section 01 6000 - Product Requirements.
 - 3. Top Coat Sheen:
 - a. Flat: MPI gloss level 1; use this sheen for overhead surfaces.

2.04 ACCESSORY MATERIALS

- A. Accessory Materials: Provide primers, sealers, cleaning agents, cleaning cloths, sanding materials, and clean-up materials as required for final completion of painted surfaces.

- B. Patching Material: Latex filler.
- C. Fastener Head Cover Material: Latex filler.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Verify that surfaces are ready to receive work as instructed by the product manufacturer.
- B. Examine surfaces scheduled to be finished prior to commencement of work. Report any condition that may potentially effect proper application.

3.02 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 mask surface appurtenances, including electrical plates, hardware, light fixture trim, escutcheons, and fittings, prior to preparing surfaces for finishing.
- D. Remove mildew from impervious surfaces by scrubbing with solution of tetra-sodium phosphate and bleach. Rinse with clean water and allow surface to dry.
- E. Concrete:
 - 1. Clean concrete according to ASTM D4258. Allow to dry.
 - 2. Prepare surface as recommended by top coat manufacturer and according to SSPC-SP 13.

3.03 APPLICATION

- A. Apply products in accordance with manufacturer's written instructions and recommendations in "MPI Architectural Painting Specification Manual".
- B. Do not apply finishes to surfaces that are not dry. Allow applied coats to dry before next coat is applied.
- C. Apply each coat to uniform appearance.
- D. Vacuum clean surfaces of loose particles. Use tack cloth to remove dust and particles just prior to applying next coat.

- E. Reinstall electrical cover plates, hardware, light fixture trim, escutcheons, and fittings removed prior to finishing.

3.04 FIELD QUALITY CONTROL

- A. See Section 014000 - Quality Requirements, for general requirements for field inspection.

3.05 CLEANING

- A. Collect waste material that could constitute a fire hazard, place in closed metal containers, and remove daily from site.

3.06 PROTECTION

- A. Protect finishes until completion of project.

END OF SECTION 09 01 13

SECTION 09 96 00

HIGH-PERFORMANCE COATINGS

PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. High performance coatings.
- B. Surface preparation.

1.02 RELATED REQUIREMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division-1 Specification Sections, apply to this Section.
- B. Section 099113 - Exterior Painting.

1.03 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 D4258 - Standard Practice for Surface Cleaning Concrete for Coating; 2005 (Reapproved 2017).
- C. FS TT-P-28 - Paint, Aluminum, Heat Resisting (1200 Degrees F.); 2007h.
- D. MPI (APL) - Master Painters Institute Approved Products List; Master Painters and Decorators Association; Current Edition.
- 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-PA 1 - Shop, Field, and Maintenance Painting of Steel; 2016.
- I. SSPC-SP 1 - Solvent Cleaning; 2015, with Editorial Revision (2016).
- J. SSPC-SP 2 - Hand Tool Cleaning; 2018.
- K. SSPC-SP 3 - Power Tool Cleaning; 2018.
- L. SSPC-SP 6 - Commercial Blast Cleaning; 2007.

1.04 SUBMITTALS

- A. See Section 013000 - Administrative Requirements for submittal procedures.
- B. Product Data: Provide complete list of all 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 coating system(s) product is to be used in; include description of each system.
 - 4. Manufacturer's installation instructions.
 - 5. If proposal of substitutions is allowed under submittal procedures, explanation of all substitutions proposed.
- C. Samples: Submit two samples 8 by 8 inch (203 by 203 mm) in size illustrating colors available for selection.
- D. Manufacturer's Certificate: Certify that high-performance coatings comply with VOC limits specified.
- E. Manufacturer's Installation Instructions: Indicate special procedures and perimeter conditions requiring special attention.
- F. Maintenance Data: Include cleaning procedures and repair and patching techniques.

1.05 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing the Products specified in this section with minimum three years documented experience.
- B. Applicator Qualifications: Company specializing in performing the work of this section with minimum 5 years documented experience.

1.06 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 coating, brand name, lot number, brand code, coverage, surface preparation, drying time, cleanup requirements, color designation, and instructions for mixing and reducing.

- C. Coating 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.

1.07 FIELD CONDITIONS

- A. Follow manufacturer's recommended procedures for producing best results, including testing of substrates, moisture in substrates, and humidity and temperature limitations.
- B. Do not install materials when temperature is below 55 degrees F (13 degrees C) or above 90 degrees F (32 degrees C).
- C. Maintain this temperature range, 24 hours before, during, and 72 hours after installation of coating.
- D. Restrict traffic from area where coating is being applied or is curing.

1.08 WARRANTY

- A. Correct defective Work within a 1 year period after Date of Substantial Completion.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

- A. High-Performance Coatings:
 - 1. Sherwin-Williams Company; Resilience Exterior Acrylic Latex:
www.protective.sherwin-williams.com/industries/#sle.
 - 2. Substitutions: Section 016000 - Product Requirements.

2.02 TOP COAT MATERIALS

- A. Coatings - General: Provide complete multi-coat systems formulated and recommended by manufacturer for the applications indicated, in the thicknesses indicated; number of coats specified does not include primer or filler coat.
- B. Urethane Coating aluminum signage:
 - 1. Top Coat(s): Polyurethane, Water Based Anti-Graffiti; MPI #105.
 - a. Sheen: Satin.
 - b. Products:

- 1) Sherwin-Williams; 2K Waterbased Urethane Anti Graffiti Coating, B65-195/B65V195 Satin: www.protective.sherwin-williams.com/#sle. (MPI #105)
- 2) Substitutions: Section 016000 - Product Requirements.

2. Primer: As recommended by coating manufacturer for specific substrate.

D. Shellac: Pure, white type.

2.03 PRIMERS

A. Primers: Provide the following unless other primer is required or recommended by coating manufacturer.

1. Rust-Inhibitive, Water Based; MPI #107.

a. Products:

- 1) Sherwin-Williams; Pro Industrial Pro-Cryl Universal Primer: www.protective.sherwin-williams.com/#sle. (MPI #107)
- 2) Substitutions: Section 01 6000 - Product Requirements.

2.04 ACCESSORY MATERIALS

A. Accessory Materials: Provide all primers, sealers, cleaning agents, cleaning cloths, sanding materials, and clean-up materials as required for final completion of coated surfaces.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Verify existing conditions before starting work.
- B. Do not begin application of coatings until substrates have been properly prepared.
- C. Verify that substrate surfaces are ready to receive work as instructed by the coating manufacturer. Obtain and follow manufacturer's instructions for examination and testing of substrates.
- D. Examine surfaces scheduled to be finished prior to commencement of work. Report any condition that may potentially affect proper application.
- E. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

- F. Proceed with coating application only after unacceptable conditions have been corrected.

3.02 PREPARATION

- A. Clean surfaces of loose foreign matter.
- B. Remove substances that would bleed through finished coatings. If unremovable, seal surface with shellac.
- C. Remove finish hardware, fixture covers, and accessories and store.
- D. Existing Painted and Sealed Surfaces:
 - 1. Remove loose, flaking, and peeling paint. Feather edge and sand smooth edges of chipped paint.
 - 2. Clean with mixture of trisodium phosphate and water to remove surface grease and foreign matter.
- E. Aluminum: Remove surface contamination and oils and wash with solvent according to SSPC-SP 1.
- F. Galvanized Surfaces:
 - 1. Remove surface contamination and oils and wash with solvent according to SSPC-SP 1.
 - 2. Prepare surface according to SSPC-SP 2.
- G. Ferrous Metal:
 - 1. Solvent clean according to SSPC-SP 1.
 - 2. 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", and protect from corrosion until coated.
- H. Protect adjacent surfaces and materials not receiving coating from spatter and overspray; mask if necessary to provide adequate protection. Repair damage.

3.03 PRIMING

- A. Apply primer to all surfaces, unless specifically not required by coating manufacturer. Apply in accordance with coating manufacturer's instructions.

3.04 COATING APPLICATION

- A. Apply coatings in accordance with manufacturer's written instructions, to thicknesses specified and recommendations in "MPI Architectural Painting and Specification Manual".
- B. Apply in uniform thickness coats, without runs, drips, pinholes, brush marks, or variations in color, texture, or finish. Finish edges, crevices, corners, and other changes in dimension with full coating thickness.

3.05 FIELD QUALITY CONTROL

- A. See Section 01 4000 - Quality Requirements, for general requirements for field inspection.

3.06 CLEANING

- A. Collect waste material that could constitute a fire hazard, place in closed metal containers, and remove daily from site.
- B. Clean surfaces immediately of overspray, splatter, and excess material.
- C. After coating has cured, clean and replace finish hardware, fixtures, and fittings previously removed.

3.07 PROTECTION

- A. Protect finished work from damage.

3.08 SCHEDULE

- A. Colors: As indicated on Finish Schedule.

END OF SECTION 09 06 00

DIVISION 10

SPECIALTIES

SECTION 10 42 60

TEMPORARY CONSTRUCTION/TRAFFIC CONTROL SIGNAGE

PART 1 - GENERAL

1.01 SUMMARY

- A. Work Included: The Work of this Section shall include but not be limited to the following:
1. The fabrication, installation, and maintenance of all temporary construction/traffic control signage throughout construction. The size, wording, placement and configuration of the temporary signage shall be based upon the Contractors traffic control plan as approved by the Engineer and Owner. Final positioning of signage shall be coordinated in the field with the Engineer and Owner as necessary to assure proper vehicular and pedestrian flow in proximity or around active construction areas. As work progresses throughout the facility temporary signage shall be reused or reconfigured by the Contractor as appropriate as long as signage is in suitable condition for reuse. Additional signage shall be fabricated as required when needed.
 2. Work shall include verifying exact mounting locations, inclusive of height and maximizing visibility as approved by Engineer and Owner.
 3. Contractor shall coordinate the fabrication and installation of suitable temporary signage with all trades to direct vehicular and pedestrian traffic around active construction areas so that any unnecessary conflicts between construction and patrons of the garage are avoided.
 4. All temporary signage shall become the property of the New Haven Parking Authority upon completion of construction work unless the Contractor is specifically directed to legally dispose certain items. Cost of removal and disposal of said items shall be the Contractor's responsibility.
- B. Related Work Specified Elsewhere:
1. Drawings and general provisions of the contract, including General Conditions, Special Conditions and other Division 1 specification sections apply to this section.
 2. Section 01500 - Temporary Facilities

1.02 SUBMITTALS

A. Shop Drawings

1. Shop drawings: The Contractor shall submit shop drawings of all sign types including all message schedules and typical sections and mounting details to be approved prior to fabrication.
2. Complete alphabets, numbers, punctuation and symbols of the following typestyles shall be submitted to the Engineer for approval prior to fabrication.
3. Samples of each lettering type and word spacing are required for approval of color, and graphics. Compliance with all other requirements is the exclusive responsibility of the Contractor.
4. Scaled drawings of all temporary signage of each sign type shall be submitted for approval by the Engineer and Owner.

1.03 QUALITY ASSURANCE

- A. Comply with provisions of Division 1, and all other applicable Contract Documents.
- B. All materials shall be of first quality, and shall be carefully fabricated and approved by the Owner and Engineer.
- C. Minor deviations from the specifications may be acceptable in order to utilize a manufacturer's standard product only when such changes have been reviewed and approved by the Engineer and Owner based upon a review of submitted shop drawings.
- D. The Contractor shall be responsible for the quality of all materials and workmanship required for the execution of this contract, including the materials and workmanship of any firms or individuals who act as his subcontractors. The Contractor shall be responsible for providing subcontractors with complete and up-to-date drawings, specifications, graphic schedule and other information issued by the Engineer.
- E. Written dimensions on the drawings shall have precedence over scaled dimensions. Contractor shall field check, verify and be responsible for all dimensions shown by these drawings.

- F. The drawings in this bid package are for design intent only. The internal structure, dimensions and specifications for all items shall be indicated in the Contractor's shop drawings. Sign Contractor to engineer signs to proper level to withstand abuses of their environment.
- G. No fabrication, installation materials or procedures shall be used that will change the visual quality or in any manner have an adverse effect on existing materials and surfaces. The Contractor is responsible for the structural stability of all signs and mounting thereof. All damaged surfaces and materials shall be restored to their original condition and appearance by the Contractor upon removal of any and all temporary signage.
- H. Use adequate numbers of skilled workmen who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and the methods needed for proper performance of the Work of this Section.
- I. Comply with all provisions of the Americans with Disabilities Act of 1990, and as amended, and all other applicable codes with regard to signage, as well as any and all subsequent appendices, addenda or revisions.

1.04 DELIVERY, STORAGE AND HANDLING REQUIREMENTS

- A. Deliver products to site under pertinent provisions of Division 1.
- B. Store and protect products under pertinent provisions of Division 1.
- C. Package signs, and properly label each, as to specific message or use.
- D. Store adhesive tape at ambient room temperatures

1.05 WARRANTY

- A. Not Applicable

PART 2 - PRODUCTS

2.01 MANUFACTURERS

- A. Subject to compliance with requirements, manufacturers offering products which may be incorporated in the work include, but are not limited to, the following:

1. Sign-Lite, Inc., 6 Corporate Drive, North Haven, CT 06473,
tel: (203) 239-6799
2. Approved Equal

2.02 GRAPHIC REQUIREMENTS

- A. The typeface shall conform to the Type Specifications in this sign package. Type for signs shall match Adobe Type Library fonts (Adobe Systems Inc.) or approved equal.
- B. International symbols that are used are to be from the U.S. Department of Transportation current standards publication where applicable.
- C. All letters, regardless of material process, shall be executed in such a manner that all edges and corners of finished letterforms are true, clean and sharp photomechanical reproductions from professional typeset originals. Letterforms with rounded positive and negative corners, edge build-up or bleeding will not be accepted. Hand construction and hand letterforms will not be accepted.
- D. All letterforms shall be aligned to maintain a baseline parallel to the sign format.
- E. Letter size shall be determined by the height of the uppercase 'E' of the letterform.

2.03 MATERIALS

- A. Temporary signage shall consist of 10mm thick Corroplast corrugated exterior signboard. All text shall be 3M engineer grade Scotchlite reflective vinyl.
- B. Adhesives:
 1. Contractor shall use adhesives specifically designed for compatibility with the base materials and the desired adhesive strength in accordance with recommendations made by the manufacturer of the materials specified to be laminated or adhered. No adhesives shall fade, discolor or delaminate as a result of proximity to ultraviolet light source or heat shall be used. No adhesives shall change the color or deteriorate the materials to which they are applied. All adhesives shall be of a non-staining, non-yellowing quality and all visible joints shall be free from air bubbles and other defects. All adhesives shall be tested on site. All adhesives shall be indicated in the shop drawings.
 2. Surfaces on which signing is to be installed using adhesive shall be free of grease, oil, or any other residue.

3. Foam tape shall be 1/8" thick, high-density open cell double coated polyurethane foam VHB tape, manufactured by 3M Co., or approved equivalent.

2.04 FABRICATION

- A. All fabrication and installation shall be in accordance with the highest standards of the trade. All signs and components shall be complete and free from visual, structural and mechanical defects.
- B. Mechanically fastened signs or those fastened to preexisting substrates shall incorporate provisions for easy removal. All necessary mounting hardware or mounting adhesive shall be provided for proper temporary installation.
- C. All edges of signs to be ground smooth.

PART 3 - EXECUTION

3.01 PREPARATION

- A. Clean and prepare surfaces to receive signage, according to manufacturer's written instructions for each particular substrate condition and as specified, as approved by Engineer.

3.02 PRE-INSTALLATION

- A. The location of signs shall be coordinated with the Engineer and Owner to determine final location of signs in the field. Location and placement of signage shall agree in general with locations depicted within the Contractor's traffic control plans as approved by the Engineer and Owner.
- B. The Contractor shall examine the areas and conditions under which work of this section will be performed and correct conditions detrimental to timely and proper completion of the work.

3.03 INSTALLATION

- A. Installation to be in compliance with manufacturer's instructions, unless otherwise specified.
- B. Sign units shall be installed level, plumb and at a height specified on drawings, unless otherwise indicated, with sign surfaces free from distortion or other defects in appearance.

- C. Any and all missing or damaged temporary construction/traffic control signage shall be repaired or replaced by the Contractor immediately upon request of the Engineer or Owner, particularly if missing or damaged signage presents or create unnecessary hazard to either vehicular or pedestrian traffic in proximity to active construction areas. All replacement signage required shall be a direct Contractor cost.
- D. Contractor to be responsible for the removal and legal disposal of all temporary construction/traffic control signage from the project site upon completion.

END OF SECTION 10 42 60

DIVISION 14

CONVEYING EQUIPMENT

SECTION 14 21 00.01**HYDRAULIC ELEVATORS (TSPG)****PART 1 - GENERAL****1.01 DESCRIPTION OF WORK – TEMPLE STREET PARKING GARAGE**

- A. The extent of hydraulic elevator work is hereby defined to include, the removal of existing elevator and the installation of one (1) new hole-less roped-hydraulic Passenger Elevator in a simplex operating configuration, designated as Elevator C (093-1589) and shown as Elevator 5 on the State of Connecticut Inspection Certificate in the Temple Street Parking Garage located at One Temple Street, New Haven, CT 06510. Work shall consist of, but shall not be limited to, the following:

ELEVATOR SCHEDULE	
Elevator Number	C (5 on Inspection Certificate)
Elevator Layout	Simplex Configuration
Cab Dimensions	52" D x 80" W x 89" H
Rated Load – lbs.	2,500 lbs.
Contract Speed - fpm	150 fpm
Floors Served	Five (5) Front Openings: S, 2, 4, 6, 8
Equipment	<i>Schindler</i> Hole-Less Hydraulic (2001)
Controller	<i>Schindler</i> Microprocessor Simplex (2001)
Door Type & Size	Front 42" W x 84" H Single-Slide

1. Review of existing equipment. Existing equipment, associated with the thresholds, sills and jambs, shall be allowed to remain as long as acceptance is documented by the manufacturer and approved by the Consultant. Should replacement be required, replacement shall match other scheduled elevator improvements.
2. Replacement of all associated equipment, switches, disconnects, interlocks, piping, cabling and lighting required by code. Existing control system shall be replaced with a Simplex CPU control system that can integrate with ANSI 17.1 smoke detection elevator recall.

Work shall also include removal and relocation of all items located within hoistways unrelated to elevator operation (i.e. items non-compliant with existing codes), together with all incidental work necessary to successfully replace the existing roped-hydraulic inside the existing hoistway in accordance with local, state and federal regulations.

3. Removal and replacement of the cab with finishes with vandal resistant construction, inclusive of textured stainless steel wall panels, along with installation of poured epoxy resin flooring. Cab interior shall include provisions for vandal resistant ceiling and recessed lighting, new car operating panel, handrails, emergency call system, ADA compliant annunciators, call buttons and graphics, together with all incidental work necessary to successfully replace the existing hydraulic elevator in the existing hoistway in accordance with local, state and federal regulations.
4. Power Supply: Refer to Division 26 Sections and Electrical Drawings for characteristics of power supplied for elevator machinery and for lighting and service outlets, including fused disconnect switches or circuit breakers for power supply line disconnect.
5. Removal and proper disposal of all equipment controls, spoils, finishes and accessories removed in replacing the existing equipment.
6. Replace existing power unit that controls the flow of oil to and from individual hydraulic cylinders. Replacement shall include, but not be limited to motors, pumps, control valves, gaskets, o-rings, piping, oil and electrical relays/line starters and wiring in accordance with local, state and federal regulations.
8. The elevator contractor shall provide conduit or duct wiring and fittings necessary for proper integration and operation of equipment. Conduit or duct wiring and fittings shall be furnished and installed in accordance with the manufacturer's standard methods and shall be in compliance with the national electric code. Travel cabling shall be of the best grade for the service. It shall be hung so that proper size loop may be obtained. It shall have a fire resistant outer braid that shall meet the underwriter's standard tests. All wiring installed shall be stranded copper and conform to UL standards. Proper shielding shall be provided where applicable. All wiring shall be neatly routed in metal conduit and secured. Entire wiring system shall be tested for insulation to ground.
9. Elevator Manufacturer shall be required to coordinate with the applicable divisions to provide the following services:
 - a. Provision of 75-degree bevel guards on all projections, recesses or setbacks within hoistway over 2 inches, except for the loading and unloading side of hoistway.
 - b. Provision of fire damper for hoistway venting (as required).
 - c. Provision of blockouts/cutouts through wall and the grouting/patching of masonry as required to perform all installation

work (i.e. new thresholds, sills, jambs, hall call stations, annunciators and signal fixtures) and maintaining of fire wall rating while maintaining existing aesthetic appearances.

- d. Provision of GFIC convenience outlet, light fixture and light switch within the elevator pit. Light switches shall be easily accessible from lowest hoistway doors.
- 10. Contractor shall be responsible for providing all necessary permits for welding, gas burning and cutting associated with the performance of all work.
- 11. Contractor shall be responsible for providing and/or coordinating the de-activation and activation of all fire, smoke and/or combustion sensors associated with the performance of their work.

B. Related Work Specified Elsewhere:

- 1. General provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.
- 2. Division 26 – Electrical

1.02 QUALITY ASSURANCE

- A. Elevator Code: Except for more stringent requirements as indicated or imposed by governing regulations, comply with applicable requirements of the "American Standard Safety Code for Elevators, Dumbwaiters, Escalators and Moving Walks" (ANSI A17.1) published by the American Society of Mechanical Engineers, hereinafter referred to as the "Code".
- B. Electrical Code: For electrical work included in the elevator work, comply with the "National Electrical Code" (latest edition), by NFPA.
- C. Fire Resistance: Comply with NFPA Standard No. 80 for construction and installation of hoistway entrances. Provide each door unit bearing UL label of approval ("B" label, except as otherwise indicated) as a "Fire Door".
- D. Testing: Comply with Code requirements for testing of elevator components and materials.
- E. Elevator Manufacturers: Elevator shall be the products of one firm or corporation engaged in the business of manufacturing, installing and servicing high grade elevators, for a minimum of 10 years, possessing sufficient shop equipment, technical organization, and maintenance facilities and having demonstrated ability to design, construct and maintain elevators of the types covered by the contract. Minnesota Elevator, Inc. (MEI) shall be the design basis manufacturer.
 - 1. Elevator hydraulic unit, controller, and associated equipment shall be in accordance with specification requirements and of highest quality and grade of new materials.
 - 2. Elevator components in hoistway including signal equipment shall be suitable for operating in a structure without any climate controls. Materials and equipment must be adequately protected against corrosion due to possible high humidity in the hoistway.

3. Elevator equipment shall be installed, adjusted, tested and placed into operation by competent personnel under the supervision and in the direct employ of the installing contractor.
4. Maintenance service shall be performed solely by the elevator contractor and shall not be assigned or transferred to any agent or other subcontractor.
5. Basic elevator equipment for the elevator shall be products of the elevator manufacturer. Motors, accessories and appurtenances which are products of another manufacturer of established reputation shall be constructed at direction of, or based upon specifications of the elevator manufacturer.

1.03 SUBMITTALS

- A. Manufacturer's Data: Submit the manufacturer's specifications and installation instructions for the complete elevator system, and for each component or product used in the system. Include a complete listing and description of performance and operating characteristics.
- B. Shop Drawings: Submit shop drawings for the elevator system and its components, including typical details of assembly, erection and anchorage drawn at large scale. Show maximum dynamic and static loads imposed on the building structure at points of support for the elevator work. Submit smaller scale drawings of the overall plans, elevations and sections to show the floors served, travel distances and similar considerations of the work. Include wiring diagrams for the entire system of power distribution, lighting, control, signals, communication, etc. Assemble shop drawings into one coordinated submittal.
- C. Samples: Submit samples of each required finish, not including those intended for painting after installation.
- D. Certificates and Test Reports: Submit written, certified reports for required tests, recording the dates performed, test method (description), test results, interpretation of the results, and recommended action. Where required, submit additional copies directly to governing authorities.
- E. Maintenance Manuals: Submit bound maintenance manual for the elevator. Include full maintenance and operating instructions, parts lists, recommended spare parts and emergency parts inventory, sources of purchase and similar information. Include legible schematic wiring diagrams of installed electrical equipment, and changes made in the Work. List symbols corresponding to markings on machine room and hoistway apparatus. Provide one copy of master schematic and one copy of lubrication chart, each framed with clear plastic; mount on machine room walls.

1.03 JOB CONDITIONS

- A. Temporary Elevator Use: Do not use or permit anyone to use permanent elevator for any purpose, other than necessary installation and testing procedures, prior to acceptance of the system and occupancy of the building.
- B. Existing Conditions:

1. It shall be a mandatory requirement that existing elevator under the work of the Contract be individually inspected by the Proposer prior to submission of a Proposal.
2. The contractor shall accept all existing conditions "As is" and install new work as specified, shown on the Drawings, and/or compliance with applicable codes and ADA requirements.
3. The description of work to be performed as specified herein is provided for general information as required to conform to state requirements. Modify existing conditions as necessary to install new items of work.
4. Any existing conditions that may prevent the proper and expeditious completion of the work of replacing the existing elevator shall be immediately brought to the attention of the Project Manager.

1.05 WARRANTY

- A. Submit copies of written warranty, signed by the Elevator Manufacturer agreeing to repair or replace defective materials and workmanship of the elevator work during a one (1) year guarantee period, which starts on the date the elevator is completed, placed in operation and accepted by the Authority. Defective materials and workmanship is hereby defined to include operational failures, performance below required minimums, excessive deterioration or aging, evidence that the system will not be reasonably maintainable for the life of the building, abnormal wear considering intensity of use, unsafe conditions, excessive noise or vibration, and similar unusual, unexpected and unsatisfactory conditions; but does not include defects caused by alterations, abusive use, vandalism, failure of the supporting structure or power supply, improper maintenance and similar causes beyond the control of the Elevator Manufacturer.
- B. Elevator Installer shall note that warranty shall include call-back service on a basis of 24-hour availability.

1.06 MAINTENANCE

- A. Maintenance Period: Starting at the time of acceptance of elevator work, provide complete systematic inspection and maintenance of the elevator for a period of 12 months. Furnish equipment and trained experts to check, adjust, lubricate and otherwise maintain the elevator in operation without defects or deterioration. Replace or repair materials and parts which become defective or deteriorate for any reason except through abuse or misuse by the Authority or occupants of the building.
- B. Monthly examinations for the elevator unit and its component parts shall be documented in writing to Authority, with additional copies of each written report placed in a three ring binder to be stored within individual elevator machine rooms for future reference. Written report shall describe items checked, problems identified, maintenance performed and parts replaced.

- C. Include systematic examination, adjustment, and lubrication of elevator equipment. Repair or replace parts whenever required. Use parts produced by the manufacturer of the original equipment.
- D. Perform maintenance work without removing car during peak traffic periods.
- E. Emergency call-back service for minor repairs and adjustments to return an elevator to service shall be available on demand, 24 hours per day, seven days per week.
- F. Maintain locally, near the Building, an adequate stock of parts for replacement or emergency purposes. Have personnel available to ensure the fulfillment of this maintenance service, without unreasonable loss of time.
- G. Perform maintenance work using competent and qualified personnel, under the supervision and in the direct employ of the elevator manufacturer or original installer.

PART 2 - PRODUCTS

2.01 SCHEDULE OF PASSENGER ELEVATOR REQUIREMENTS

Elevators shall be modernized with non-proprietary equipment serviceable and maintainable by others.

2.02 ELEVATOR OPERATIONS

- A. General: Elevator operations are hereby defined to mean the manner in which, and the methods by which the elevator functions in response to calls for service, and in response to programmed traffic control systems. The terms used herein to describe type of operation are the recognized industry standards. Provide the systems of elevator operations as scheduled.
- B. Automatic Operation: The starting and stopping of the car at the landing occurs in response to the momentary pressing of signal buttons, and in response to programmed operating devices, or safety devices. Power operated doors operate automatically in response to calls and car movements. Car movement is possible only when hoistway door interlocks and car door switch circuits are complete.
- C. Auxiliary Operations: Provide the following additional operations for the elevator or, except as otherwise indicated.
 - 1. Manual Door Controls: Car station buttons for "door open" (for power operated doors).
 - 2. Inspection Operation: Top-of-car station, comply with Code.
 - 3. Provide a fireman's key-switch located at the grade level 1, and an in-car key-switch for emergency operation of the elevator, in compliance with the Code.
 - 4. Automatic recall of elevator cars upon signal from smoke detectors. Provide contacts on the elevator controller to receive signals from heat and smoke sensing devices furnished by others.

2.03 WORK BY GENERAL CONTRACTOR (as contracted by Elevator Manufacturer)

- A. Perform all necessary cutting and patching to restore existing finishes.
- B. Protect all existing adjoining surfaces that are to remain.
- C. Provide venting of the hoist-way per ANSI A17.1, rule 100.4.
- D. Provide adequate supports adjacent to side and rear walls for rail brackets, including divider beams, with pockets in metallic decking and patching after brackets are in.
- E. Provide block-outs/cutouts through wall and the grouting/patching required to maintain firewall rating as required to accommodate hall boxes for corridor and signal fixtures.
- F. Provide all barricades either outside of elevator hoist-way as required by OSHA and local codes.
- G. Provide a convenience outlet, light fixture in pit and light switch, easily accessible from the lowest landing door.
- H. Provide a pit ladder in the pit, extending to not less than 3'-6" above the bottom landing.
- I. Removal of existing doors, retain frames and retain sills where applicable.
- J. Provide support for sills the full width of hoist-way with two and one-half inches minimum floor recess. Provide grouting full length and width after sills are cleaned.
- K. Provide lighting, ventilation, heating, cooling of machine room and machinery space. Machine room temperature will be maintained between 55° F and 90° F
- L. Provide a fused disconnect switch or circuit breaker for the elevator located per the National Electric Code, and a light switch adjacent to the lock jamb-side of the machine room door.
- M. Provide feeder and branch wiring circuits to the controller of copper wire, including a main line switch and convenience outlets.
- N. Provide all conduit and wire runs as required.
- O. Provide a dedicated telephone and telephone line in the machine room for system access of diagnostics and remote access.

2.04 MACHINES AND COMPONENTS

- A. Design Basis: Minnesota Elevator, Inc. (MEI)
- B. Rails: Steel elevator guide rails shall be furnished to guide the car, erected plumb and securely fastened to the building structure.
- C. Wiring: All wiring and electrical connections shall comply with the governing codes. Insulated wiring shall have flame retardant and moisture-proof outer covering, and shall be run in conduit tubing or electrical wireways. Traveling cables shall be flexible and suspended to relieve strain on individual conductors.
- D. Leveling Device: The elevator shall be provided with an automatic leveling device which will bring the car to a stop within 3/8" of the landing level regardless of load or direction of travel. Landing level will be maintained within

- the leveling zone irrespective of the hoistway doors being open or closed.
- E. Pit Switch: An emergency stop switch shall be located in the pit.
 - F. Controller: Microprocessor based, non-proprietary controller.
 - G. Rope and Sheave Assembly: Sheave shall comply with ASME A17.1. Rotating sheave to be mounted to fixed shaft through ball or roller bearings. Sheave support base to be attached to top of plunger with single 1-1/4" UNC bolt. Adjustable rope retainers shall be provided over the full 180 degree arc of contact. Sheave to be supported by crossbar guided by the car rails. Ropes to be 8x19 of sufficient quantity. Shackles to be of the wedge rope socket type.
A manually reset switch shall remove power from the driving motor and control valve should any rope become slack.
 - H. Cylinder Mounting Assembly: Base of cylinder to be elevated above pit floor by a pedestal weldment. Pedestal weldment includes dead-end hitch plate for pit shackles, and mounting for slack rope switch. Pedestal and cylinder to be secured to wall, and adjustable for widthwise, depth-wise, and vertical adjustment.
 - I. Cylinder: The cylinder shall be constructed of steel pipe of sufficient thickness and suitable for the operating pressure per current ASME 17.1 Code. The top of the cylinder shall be equipped with a cylinder head with drip ring and self-adjusting packing. The plunger shall be constructed of selected steel tubing or pipe of proper diameter machined true and smooth with a fine polished finish. The plunger shall be provided with a stop ring electrically welded to it to prevent the plunger from leaving the cylinder. The plunger and cylinder shall be installed plumb and must operate freely with minimum friction.
 - J. Safety and Governor: Properly sized safeties and governor for ascending car protection to meet code requirements will be supplied.
 - K. Oil Line: Schedule 40 ASTM A-53 Grade B pipe shall be installed between the pumping unit and the cylinder.
 - L. Oil Line Fittings: Fittings shall be of the grooved type. Shut-off valves shall be provided in the machine room and in the elevator pit for maintenance and adjusting purposes.
 - M. Oil Line Support Stands: Oil line shall be supported with an adequate number of support stands. Stands shall be anchored to the floor or wall and adjustable in height. Isolation clamps shall secure the oil line to the stand around the full 360 degree circumference.
 - N. Pumping Unit Tank: The storage tank shall be constructed of steel and shall be provided with a removable cover containing a removable oil dip stick. The pump and submersible motor shall be mounted on a special reinforced isolation mount in the bottom of the tank. The control valve shall be mounted in the discharge line above the oil level and easily accessible from the top of the tank. An air-bladder silencer shall be provided at the control valve discharge.
 - O. Pumping Unit Motor: The motor shall be of the submersible alternating current, squirrel cage induction type and shall be of a design adapted to electro-hydraulic requirements.

- P. Pumping Unit Pump: The pump shall be a positive displacement screw type to give smooth operation and shall be designed and manufactured for elevator service.
- Q. Pumping Unit Control Valve: The control valve shall be manifold with up, down and check valve sections. A control section including solenoid valves will direct the main valve and control up and down starting, transition from full speed to leveling speed, up and down stops, pressure relief and manual lowering. Down speed and up and down leveling shall be controlled at the main valve sections. All of these functions shall be fully adjustable for maximum smoothness and to meet contract conditions. The manual lowering feature will permit lowering the elevator at slow speed in the event of power failure or for adjusting purposes.
- R. Oil Cooler
 - 1. Oil cooler with heat rejection of 18,000 BTU/hr, based on ambient temperature 40 deg F cooler than oil out. Cooler may be mounted adjacent on pumping unit storage tank or remote up to 110 ft. horizontally and 55 ft. vertically.
 - 2. To include:
 - a. Single fan radiator
 - b. Adjustable thermostat control
 - c. Isolated radiator mounts
 - d. 10 micron easily changeable filter
 - e. Restriction sight glass with bypass in case of plugged filter
 - f. Single plug for 115 VAC 20 amp separate circuit
 - g. Fittings, hardware, and instructions
- S. Platform: The car platform shall be of steel construction with a fire rated plywood subflooring. Toe guard of 16 ga galvanized steel. Diagonal braces from toe guard bottom to platform stringers.
- T. Car Frame: A suitable car frame fabricated from formed or structural steel members shall be provided with adequate bracing to support the platform and car enclosure. Spring or oil buffers as specified by code to stop car. Guides shall be mounted on top and bottom of the car frame to engage the guide rails.
- U. Car Stall Protective Circuit: A protective circuit shall be provided which will stop the motor and return the car to its lowest landing in the event that the car does not reach its designated landing within a predetermined time interval. This circuit shall permit a normal exit from the car, but prevent further operation of the elevator until the trouble has been corrected.

2.05 MATERIALS AND COMPONENTS IN HOISTWAY

- A. General: Provide manufacturer's standard components and accessories complying with the Code. Protect steel components with paint system or galvanizing to prevent corrosion.
- B. Car Frame and Platform: Undercoat platform with sound-deadening material.
- C. Guide Rollers: Roller guides will be furnished, securely bolted to the car at top and bottom. Each roller guide will consist of sound reducing wheels in

precision type ball bearings and held in contact with the rail surfaces by means of adjustable devices. Roller guides will run on dry un-lubricated guide rails.

- D. Buffers: Spring buffers, in the pit for the car and counterweight, shall be mounted on continuous channels fastened to the guide rails. Provide pipe struts for buffers.
- E. Pit Switch: Provide a stop switch in the elevator pit which, when activated, will prevent operation of the elevator.

2.06 DEVICES AND MISCELLANEOUS EQUIPMENT

- A. Automatic Leveling Device: Provide manufacturer's standard adjustable automatic leveling device, which will position car level with each floor regardless of travel direction or size of load.
- B. Power Door Operator: Manufacturer's standard unit of not less than 2.5 ft. per sec. high speed and checking action at both limits of travel, arranged to operate car door and hoistway entrance simultaneously.
- C. Weather Resistant Infrared Detector Device: Pulsed-screen car door protective device projecting across entire entrance opening. Arrange controls to provide nudging operation and/or prevent elevator operation if device is not operative. If detector is obstructed for a predetermined, adjustable interval (10-30 seconds), sound buzzer and attempt to close "doors with a maximum of 2.5 foot pounds kinetic energy nudging action."
- D. Zoned Hoistway Access Keyswitch: Hoistway access shall be provided as per all applicable ANSI code.
- E. Interlocks: Hoistway entrance shall be equipped with an approved type interlock tested as required by Code. The interlock shall be designed to prevent operation of the car away from the landing until the doors are locked in the closed position as defined by Code and shall prevent opening the doors at any landing from the corridor side unless the car is at rest at that landing or is in the leveling zone and stopping at that landing. Interlocks shall bear Underwriter's Laboratories "B" label of approval.
- F. Emergency Moving Device: Include emergency manual valve, to release hydraulic pressure and permit car to move from its stalled position due to power failure or equipment failure.

2.07 LOBBY FIXTURES

- A. General: Except as otherwise indicated, provide manufacturer's standard elevator signal equipment which is consistent with operational complexity of the elevator, and will function properly in a building without climate control and subject to high humidity conditions.
 - 1. Metal Finish: Stainless steel with No. 4 polish and clear baked epoxy coating.
 - 2. Call Buttons: Vandal resistant, non-cancelable LED illuminated type (light extinguishes when call is answered).

3. Raised letter/numeral indications will be furnished on all operating panels to comply with handicapped requirements.
- B. Corridor Push-button Station: A corridor push-button station with an “UP” and “DOWN” station at intermediate floors, single push-button station at each terminal floor.
- C. Lobby Direction Lantern/Gong: A lobby direction lantern will be provided in each lobby to indicate the direction of the elevator. Gong will sound once in “UP” direction and twice in “DOWN” direction. Level 1 shall have an integrated position indicator.

2.08 PASSENGER ELEVATOR CAR

- A. Passenger Elevator Car: Hereby defined to include, but not necessarily by way of limitation, the finished walls, doors, ceilings, lighting, trim, hardware and accessories. Signal equipment and operating and safety devices shall be installed as specified. Elevator Manufacturer shall note that existing cabs shall be stripped to shell for installation of noted finishes and hardware. Basis of Design shall be Crown Street Garage cab interiors.
- B. Car Doors: Horizontal center-parting doors of the type scheduled fabricated from 16 gauge stainless steel, #4, satin, by Rigidized Metals Corp.; flush construction.
- C. Door Track and Sheaves: Cold-rolled steel track, sealed ball-bearing sheaves with non-metallic bearing surfaces, 2-point suspension with up-thrust sheave.
- D. Door Frame, Transom and Front Wall: Integrally-formed 16 gauge stainless steel, #4, satin, by Rigidized Metals Corp. Provide cut-outs, reinforcing and cabinets as shown and otherwise required for signal equipment.
- E. Side Walls: 16 gauge #4 satin stainless steel with .036 gauge raised textured stainless steel wall panels 1-CS 304, by Rigidized Metals Corp.
- F. Back Wall: 16 gauge #4 satin stainless steel with .036 gauge raised textured stainless steel wall panels 1-CS 304, by Rigidized Metals Corp.
- G. Provide stainless steel, satin, handrail on back walls, 1 ½” diameter, 32 inches above floor.
- H. Floor Covering: Poured epoxy resin from standard color chart with non-slip finish.
- I. Ceiling and Lighting: Manufacturer's standard ceiling, with concealed frame, 6 baked enamel ceiling panels, white, with 6 LED downlights with lens.
- J. Provide hinged emergency exit on top of car with mechanical stop contacts to prevent operation of car when exit door is opened.
- K. Emergency Lighting: Provide emergency lighting. Comply with Code.
- L. Mechanical Ventilation: Supply fan with outlet diffuser, 10 cfm per sq. ft. of floor area, NC rating of 25 or less. Provide emergency power.
- M. Maintenance Devices: Provide a 20 amp 110 VAC duplex outlet and lamp with wire guard on top and bottom of elevator car and one duplex outlet inside car in a position not visible to the public.

2.09 CAR FIXTURES AND ACCESSORIES

- A. Types: Vandal-resistant, non-cancelable illuminated type selected from the elevator manufacturer's standard designs; stainless steel finish.
- B. Car Station: Flush mounted panel, containing banks of illuminated push-buttons numbered and colored to correspond with the landings served, switch for the car light, alarm button which serves as an emergency signal, emergency stop switch, door open button, fan switch, and fireman's service switch.
 - 1. Emergency alarm to be located so that it is audible from the Manager's Office.
 - 2. Car station shall conform with ADA handicapped requirements.
- C. Car Position Indicator: Illuminated numerals located within cab above the control panel to indicate the floor location and direction of travel. In addition to illuminated numerals, an audible signal shall sound to indicate the car is stopping or passing a floor served by the elevator.
- D. Certificate Display Case: Tamper-proof metal frame with acrylic window, sized to match governing authorities' form.
- E. Warning Signs: Standard sign, warning against use of elevators in case of fire and "No Smoking" sign.
- F. Telephone: Provide vandal-resistant, speaker-type phone installed behind perforated grille and connected to auto-dialer located in the machine room. Device shall permit two-way conversation in accordance with the Code:
 - 1. Auto Dialer: Equipped with a solid state charger unit which will automatically provide emergency power within 10 seconds in the event of failure of the normal power supply.
 - 2. Push button: Located in car station at the prescribed handicapped height, identified as "EMERGENCY PHONE - PUSH TO ACTIVATE."
 - 3. Quality: Entire assembly Federal Communication Commission approved.
 - 4. Connections: Authority will arrange for their telephone company to provide incoming lines for connections in the elevator machine room.

2.10 PASSENGER HOISTWAY ENTRANCES

Contractor shall review existing conditions with representative of the elevator manufacturer prior to start of work. Existing equipment, associated with the hoistway entrances, shall be allowed to remain as long as acceptance is documented by the manufacturer and approved by the Engineer. Should replacement be required, the following requirements shall apply:

- A. Hoistway entrances are hereby defined to include doors, frames, sills, hardware, transom panels and accessories as shown and scheduled. Protect steel components with paint or galvanizing to prevent corrosion.
- B. Door Panels: Horizontal sliding of the type scheduled, fabricated from 16 gauge stainless steel, No. 4 finish.
- C. Entrance Frames: Retain existing entrance frames.

- D. Sills: Extruded aluminum, grooved for door guides, grooved surface filled with anti-slip strips.
- E. Fascia Plates: Fascia plates, fabricated from No. 14 gauge steel, shall be fastened to the header and the sill above.
- F. Toe Guard: A toe guard, fabricated from No. 14 gauge steel, shall be fastened at the lowest landing beveled to the wall.
- G. Dust Cover: A dust cover, fabricated from No. 14 gauge steel, shall be furnished at the highest landing.
- H. Headers: Headers of sufficient size and thickness to provide support for the frame and hangers shall be securely fastened to the strut angles and shall include integral hanger tracks.
- I. Struts: Strut angles shall be of sufficient size to support the entrance and shall be securely fastened to the building structure.
- J. Hangers: Hangers shall be of the sheave type, two sheaves per door rotating on a precision ball bearing. The roller shall be on an eccentric stud to provide adjustment. Hangers shall be integral and welded to the top of the doors.

2.11 ELECTRIC WIRING

- A. Furnish and install complete insulated wiring to connect all parts of the equipment.
- B. Insulated wiring shall have a flame retarding and moisture resisting outer cover and shall be run in metal conduit metallic tubing or wire ducts in conformance with Code requirements
- C. Traveling cable between car and hoistway shall have flame retarding and moisture resisting neoprene outer cover. Cable shall be flexible and shall be suitably suspended to relieve strain in the individual conductors. The traveling cable, or combination of traveling cables, shall contain not less than eight (8) pairs of shielded wire. Terminate traveling cable at terminal blocks in under car junction box and in halfway box in the hoistway or in the elevator machine room.
- D. Provide 10% spare wires between controller, selector, hatchway junction box and in cable; all spares shall be properly tagged or otherwise identified with clear and indelible markings.
- E. Car lighting, receptacles, and fan shall be on an individual circuit.
- F. Keep all wiring in troughs or raceways in such a manner that each run may be readily traced from stud blocks to point of entry into a circuit.
- G. Tag code all insulated wiring, control wiring and wiring in traveling cables at their terminals in the motor room, shaft box, elevator cab junction box and push-button stations within the cab. Test entire wiring system for insulation to ground.
- H. Car lighting and car fan shall remain operative for a predetermined adjustable time after the power conversion unit is disconnected. Fan shall have a plug connection for easy removal for maintenance purposes.

- I. All wiring related to Firemen's Operation, Emergency Power, Intercom, building communication system, Firemen's telephone jack and security operation, having interface, is to be terminated in a single junction box external to the elevator group controller.

2.12 PROVISIONS FOR HANDICAP

- A. Comply with State of Connecticut Building Code.
- B. Provide indicators near controls in conformance with FHAA, ADA, and ANSI A117.1.
- C. Landing Buttons: Illuminating type, one for originating "UP" and one for originating "DOWN" calls, one button only at terminating landings; marked with arrows, including indications required by ANSI A117.1.
- D. Locate highest button in elevator cab control panel not more than 54 inches above floor level.
- E. Sound audible voice signal in car when car is stopping at a floor or passing a floor.
- F. Include with illuminated landing indicators, audible tone signals; once for "UP" stops and twice for "DOWN" stops.
- G. Provide Arabic numerals 5/8 inch in height raised 0.03 inch Braille numerals immediately to left of floor buttons to identify each floor.
- H. At each floor landing provide 2 inch floor numerals raised 0.03 inch on door frame jamb.
- I. Provide vision panel in doors to achieve ADA compliance.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Verify that piston and frame anchors, hoist machine room and controls and machinery are in serviceable condition and capable of being reconditioned in accordance with this Section.
- B. Prior to commencing elevator repairs, examine existing conditions at the elevator, as constructed, verify all critical dimensions, and examine the structure and all other conditions under which elevator work is to be performed. Notify Consultant, in writing, of any discrepancies or other conditions detrimental to the proper installation or performance of elevator work. Do not proceed until unsatisfactory conditions have been corrected.

3.02 PREPARATION

- A. Arrange for temporary electrical power for installation work and testing of elevator components.
- B. Hoistway: Examine the hoistway and supporting structure, and the conditions under which the elevator work is to be performed. Do not proceed with the elevator modernization work until unsatisfactory conditions have been corrected.

3.03 INSTALLATION OF ELEVATOR SYSTEM

- A. General: Comply with Code, manufacturer's instructions and recommendations. Comply with National Electrical Code (ANSI C1 by NFPA) for electrical work required during installation.
- B. Welded Construction: Provide welded connections for installation of elevator work wherever bolted connections are not required for subsequent removal or for normal operation, adjustment, inspection, maintenance and replacement of work parts. Comply with AWS standards for workmanship and for qualification of welding operators.
- C. Coordination: Coordinate elevator work with the work of other trades for proper time and sequence to avoid construction delays. Provide sleeves and inserts to be installed in work by others. Use benchmarks, lines and levels designated by the Contractor to ensure dimensional coordination of the Work.
- D. Sound Isolation: Mount rotating and vibrating elevator equipment and components on vibration-absorption mounts, designed to effectively prevent the transmission of vibrations to the structure, and thereby eliminate the sources of structure-borne noise resulting from the elevator system.
- E. Lubricate operating parts of systems as recommended by manufacturers.
- F. Alignment: Confirm alignment of elevator guide rails for accurate clearances to minimum, safe, workable dimensions of cabs at each landing.
- G. Grout sills with non-staining, non-shrink grout. Set units accurately aligned with and slightly above finished floor at landings.

3.04 FIELD QUALITY CONTROL

- A. Acceptance Testing: Upon nominal completion of the elevator installation, and before permitting use of the elevator (either temporary or permanent), perform acceptance tests as required and recommended by Code, and also perform other tests, if any, as required by governing regulations.
 - 1. Secure from agencies having jurisdiction all approvals required to place the elevator in operation and furnish copies of the certificates for the Authority's records.

3.05 PROTECTION

- A. Provide all recommended protection facilities and procedures to prevent damage and deterioration of completed elevator work during the remainder of the construction period.

3.06 INSTRUCTION AND MAINTENANCE

- A. Instruct Authority's personnel in the proper use, operation and daily maintenance of the elevator. Review emergency provisions, including emergency access and procedures to be followed at time of failure in operation and other building emergencies.
- B. Train Authority's personnel in the normal procedures to be followed in checking for the source of an operational failure or malfunction. Confer with the Authority on the requirements for a complete elevator maintenance program.
- C. Make a final check of the elevator operation just prior to acceptance of the building. Determine that all operating devices are functioning properly.

END OF SECTION 14 21 00.01

SECTION 14 21 00.02**HYDRAULIC ELEVATORS (270 SSPG)****PART 1 - GENERAL****1.01 DESCRIPTION OF WORK – 270 STATE STREET PARKING GARAGE**

- A. The extent of hydraulic elevator work is hereby defined to include, the repair and renovation of the two (2) traditional in-ground hydraulic Passenger Elevators in simplex operating configuration, designated as Elevators 1 (093-1434) and 2 (093-1438) in the 270 State Street Parking Garage located at 270 State Street, New Haven, CT 06510. Work shall consist of, but shall not be limited to, the following:

ELEVATOR SCHEDULE	
Elevator Numbers	1, 2
Elevator Layout	Simplex Configurations
Cab Dimensions	51" D x 79" W x 89" H
Rated Load – lbs.	2,500 lbs.
Contract Speed - fpm	100 fpm
Floors Served	Three (3) Front Openings: 1, 2, 3
Equipment	<i>Otis</i> In-Ground Hydraulic (1993)
Controller	<i>Otis</i> Microprocessor Simplex (1993)
Door Type & Size	Front 42" W x 84" H Center-Parting

1. Review of existing equipment. Existing equipment, associated with the thresholds, sills and jambs, shall be allowed to remain as long as acceptance is documented by the manufacturer and approved by the Consultant. Should replacement be required, replacement shall match other scheduled elevator improvements.
2. Replacement of all associated equipment, switches, disconnects, interlocks, piping, cabling and lighting required by code. Existing control system shall be replaced with a Simplex CPU control system that can integrate with ANSI 17.1 smoke detection elevator recall.

Work shall also include removal and relocation of all items located within hoistways unrelated to elevator operation (i.e. items non-compliant with existing codes), together with all incidental work necessary to successfully modernize existing hydraulic elevators and hoistways in accordance with local, state and federal regulations.

3. Removal and replacement of interior cab finishes with vandal resistant construction, inclusive of textured stainless steel wall panels, along with installation of poured epoxy resin flooring. Cab renovations shall include provisions for vandal resistant ceiling and recessed lighting, new operating panels, handrails, emergency call system, ADA compliant annunciators, call buttons and graphics, together with all incidental work necessary to successfully modernize existing hydraulic elevators and hoistways in accordance with local, state and federal regulations.
4. Power Supply: Refer to Division 26 Sections and Electrical Drawings for characteristics of power supplied for elevator machinery and for lighting and service outlets, including fused disconnect switches or circuit breakers for power supply line disconnect.
5. Removal and proper disposal of all equipment controls, spoils, finishes and accessories removed in modernizing existing equipment.
6. Existing guide rails shall be retained and reused. Guide rails shall be cleaned, all brackets and rail bolts tightened, and joints adjusted and filed smooth. New adjustable roller guides and rollers shall be provided and both elevators adjusted for smooth, comfortable rides.
7. Replace existing power units that control the flow of oil to and from individual hydraulic cylinders. Replacement shall include, but not be limited to motors, pumps, control valves, gaskets, o-rings, piping, oil and electrical relays/line starters and wiring necessary to successfully modernize existing hydraulic elevators and hoistways in accordance with local, state and federal regulations.
8. The elevator contractor shall provide conduit or duct wiring and fittings necessary for proper integration and operation of equipment. Conduit or duct wiring and fittings shall be furnished and installed in accordance with the manufacturer's standard methods and shall be in compliance with the national electric code. Travel cabling shall be replaced as required, and shall be of the best grade for the service. They shall be hung so that proper size loop may be obtained. They shall have a fire resistant outer braid that shall meet the underwriter's standard tests. All wiring installed shall be stranded copper and conform to UL standards. Proper shielding shall be provided where applicable. All wiring shall be neatly routed in metal conduit and secured. Entire wiring system shall be tested for insulation to ground.

9. Elevator Manufacturer shall be required to coordinate with the applicable divisions to provide the following services:
 - a. Provision of 75-degree bevel guards on all projections, recesses or setbacks within hoistway over 2 inches, except for the loading and unloading side of hoistway.
 - b. Provision of fire damper for hoistway venting (as required).
 - c. Provision of blockouts/cutouts through wall and the grouting/patching of masonry as required to perform all installation work (i.e. new thresholds, sills, jams, hall call stations, annunciators and signal fixtures) and maintaining of fire wall rating while maintaining existing aesthetic appearances.
 - d. Provision of GFIC convenience outlet, light fixture and light switch within each elevator pit. Light switches shall be easily accessible from lowest hoistway doors.
10. Contractor shall be responsible for providing all necessary permits for welding, gas burning and cutting associated with the performance of all work.
11. Contractor shall be responsible for providing and/or coordinating the de-activation and activation of all fire, smoke and/or combustion sensors associated with the performance of their work.

B. Related Work Specified Elsewhere:

1. General provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.
2. Division 26 – Electrical

1.02 QUALITY ASSURANCE

- A. Elevator Code: Except for more stringent requirements as indicated or imposed by governing regulations, comply with applicable requirements of the "American Standard Safety Code for Elevators, Dumbwaiters, Escalators and Moving Walks" (ANSI A17.1) published by the American Society of Mechanical Engineers, hereinafter referred to as the "Code".
- B. Electrical Code: For electrical work included in the elevator work, comply with the "National Electrical Code" (latest edition), by NFPA.
- C. Fire Resistance: Comply with NFPA Standard No. 80 for construction and installation of hoistway entrances. Provide each door unit bearing UL label of approval ("B" label, except as otherwise indicated) as a "Fire Door".
- D. Testing: Comply with Code requirements for testing of elevator components and materials.
- E. Elevator Manufacturers: Elevators shall be the products of one firm or corporation engaged in the business of manufacturing, installing and servicing high grade elevators, for a minimum of 10 years, possessing sufficient shop equipment, technical organization, and maintenance facilities and having demonstrated ability to design, construct and maintain elevators of the types covered by the contract.

1. Elevator hydraulic units, controllers, and associated equipment shall be in accordance with specification requirements and of highest quality and grade of new materials.
2. Elevator components in hoistway including signal equipment shall be suitable for operating in a structure without any climate controls. Materials and equipment must be adequately protected against corrosion due to possible high humidity in the hoistway.
3. Elevator equipment shall be installed, adjusted, tested and placed into operation by competent personnel under the supervision and in the direct employ of the elevator system manufacturer.
4. Maintenance service shall be performed solely by the elevator contractor and shall not be assigned or transferred to any agent or other subcontractor.
5. Basic elevator equipment for each elevator shall be products of the elevator manufacturer. Motors, accessories and appurtenances which are products of another manufacturer of established reputation shall be constructed at direction of, or based upon specifications of the elevator manufacturer.

1.03 SUBMITTALS

- A. **Manufacturer's Data:** Submit the manufacturer's specifications and installation instructions for the complete elevator system, and for each component or product used in the system. Include a complete listing and description of performance and operating characteristics.
- B. **Shop Drawings:** Submit shop drawings for the elevator system and its components, including typical details of assembly, erection and anchorage drawn at large scale. Show maximum dynamic and static loads imposed on the building structure at points of support for the elevator work. Submit smaller scale drawings of the overall plans, elevations and sections to show the floors served, travel distances and similar considerations of the work. Include wiring diagrams for the entire system of power distribution, lighting, control, signals, communication, etc. Assemble shop drawings into one coordinated submittal.
- C. **Samples:** Submit samples of each required finish, not including those intended for painting after installation.
- D. **Certificates and Test Reports:** Submit written, certified reports for required tests, recording the dates performed, test method (description), test results, interpretation of the results, and recommended action. Where required, submit additional copies directly to governing authorities.
- E. **Maintenance Manuals:** Submit bound maintenance manual for each elevator. Include full maintenance and operating instructions, parts lists, recommended spare parts and emergency parts inventory, sources of purchase and similar information. Include legible schematic wiring diagrams of installed electrical equipment, and changes made in the Work. List symbols corresponding to markings on machine room and hoistway apparatus. Provide one copy of master schematic and one copy of lubrication chart, each framed with clear plastic; mount on machine room walls.

1.04 JOB CONDITIONS

- A. Temporary Elevator Use: Do not use or permit anyone to use permanent elevators for any purpose, other than necessary installation and testing procedures, prior to acceptance of the systems and occupancy of the building.
- B. Existing Conditions:
 - 1. It shall be a mandatory requirement that existing elevators under the work of the Contract be individually inspected by the Proposer prior to submission of a Proposal.
 - 2. The contractor shall accept all existing conditions "As is" and install new work as specified, shown on the Drawings, and/or compliance with applicable codes and ADA requirements.
 - 3. The description of work to be performed as specified herein is provided for general information as required to conform to state requirements. Modify existing conditions as necessary to install new items of work.
 - 4. Any existing conditions that may prevent the proper and expeditious completion of the work of repairing/refurbishing the existing elevators shall be immediately brought to the attention of the Engineer.

1.05 WARRANTY

- A. Submit copies of written warranty, signed by the Elevator Manufacturer agreeing to repair or replace defective materials and workmanship of the elevator work during a one (1) year guarantee period, which starts on the date the elevators are completed, placed in operation and accepted by the Authority. Defective materials and workmanship is hereby defined to include operational failures, performance below required minimums, excessive deterioration or aging, evidence that the system will not be reasonably maintainable for the life of the building, abnormal wear considering intensity of use, unsafe conditions, excessive noise or vibration, and similar unusual, unexpected and unsatisfactory conditions; but does not include defects caused by alterations, abusive use, vandalism, failure of the supporting structure or power supply, improper maintenance and similar causes beyond the control of the Elevator Manufacturer.
- B. Elevator Manufacturer shall note that warranty shall include call-back service on a basis of 24-hour availability.

1.06 MAINTENANCE

- A. Maintenance Period: Starting at the time of acceptance of elevator work, provide complete systematic inspection and maintenance of each elevator for a period of 12 months. Furnish equipment and trained experts to check, adjust, lubricate and otherwise maintain the elevators in operation without defects or deterioration. Replace or repair materials and parts which become defective or deteriorate for any reason except through abuse or misuse by the Authority or occupants of the building.

- B. Monthly examinations for each elevator unit and its component parts shall be documented in writing to Authority, with additional copies of each written report placed in a three ring binder to be stored within individual elevator machine rooms for future reference. Written report shall describe items checked, problems identified, maintenance performed and parts replaced.
- C. Include systematic examination, adjustment, and lubrication of elevator equipment. Repair or replace parts whenever required. Use parts produced by the manufacturer of the original equipment.
- D. Perform maintenance work without removing car during peak traffic periods.
- E. Emergency call-back service for minor repairs and adjustments to return an elevator to service shall be available on demand, 24 hours per day, seven days per week.
- F. Maintain locally, near the Building, an adequate stock of parts for replacement or emergency purposes. Have personnel available to ensure the fulfillment of this maintenance service, without unreasonable loss of time.
- G. Perform maintenance work using competent and qualified personnel, under the supervision and in the direct employ of the elevator manufacturer or original installer.

PART 2 - PRODUCTS

2.01 SCHEDULE OF PASSENGER ELEVATOR REQUIREMENTS

Elevators shall be modernized with non-proprietary equipment serviceable and maintainable by others.

2.02 ELEVATOR OPERATIONS

- A. General: Elevator operations are hereby defined to mean the manner in which, and the methods by which the group of elevators function in response to calls for service, and in response to programmed traffic control systems. The terms used herein to describe type of operation are the recognized industry standards. Provide the systems of elevator operations as scheduled.
- B. Automatic Operation: The starting and stopping of the car at the landing occurs in response to the momentary pressing of signal buttons, and in response to programmed operating devices, or safety devices. Power operated doors operate automatically in response to calls and car movements. Car movement is possible only when hoistway door interlocks and car door switch circuits are complete.
- C. Auxiliary Operations: Provide the following additional operations for each elevator or group of elevators, except as otherwise indicated.
 - 1. Manual Door Controls: Car station buttons for "door open" (for power operated doors).
 - 2. Inspection Operation: Top-of-car station, comply with Code.
 - 3. Provide a fireman's key-switch located at the grade level 1, and an in-car key-switch for emergency operation of the elevators, in compliance with the Code.

4. Automatic recall of elevator cars upon signal from smoke detectors. Provide contacts on the elevator controller to receive signals from heat and smoke sensing devices furnished by others.

2.03 WORK BY GENERAL CONTRACTOR (as contracted by Elevator Manufacturer)

- A. Perform all necessary cutting and patching to restore existing finishes.
- B. Protect all existing adjoining surfaces that are to remain.
- C. Provide venting of the hoist-way per ANSI A17.1, rule 100.4.
- D. Provide adequate supports adjacent to side and rear walls for rail brackets, including divider beams for multiple elevators in a common hoist-way at each floor, roof and/or immediate locations, with pockets in metallic decking and patching after brackets are in.
- E. Provide block-outs/cutouts through wall and the grouting/patching required to maintain firewall rating as required to accommodate hall boxes for corridor and signal fixtures.
- F. Provide all barricades either outside of elevator hoist-ways or between elevators inside of hoist-ways as required by OSHA and local codes.
- G. Provide a convenience outlet, light fixture in pit and light switch, easily accessible from the lowest landing door.
- H. Provide a pit ladder in each pit, extending to not less than 3'-6" above the bottom landing.
- I. Removal of existing doors, retain frames and retain sills.
- J. Provide support for sills the full width of hoist-way with two and one-half inches minimum floor recess. Provide grouting full length and width after sills are cleaned.
- K. Provide lighting, ventilation, heating, cooling of machine room and machinery space. Machine room temperature will be maintained between 55° F and 90° F
- L. Provide a fused disconnect switch or circuit breaker for each elevator located per the National Electric Code, and a light switch adjacent to the lock jamb-side of the machine room door.
- M. Provide feeder and branch wiring circuits to the controller of copper wire, including a main line switch and convenience outlets.
- N. Provide all conduit and wire runs as required.
- O. Provide a dedicated telephone and telephone line in the machine room for system access of diagnostics and remote access.

2.04 MACHINES AND COMPONENTS

- A. Jack Hole: The Elevator Contractor shall clean the hole for the jack assembly on a firm price basis anticipating water, rock or other unstable soil conditions. The hole shall be cased with a PVC liner and permanently sealed watertight at the bottom. The top of the casing shall extend at least 6" above the finished pit floor level and shall be capped with a steel plate to prevent foreign material from entering the casing. The 6" casing projection shall be burned off flush with the finished pit floor slab prior to setting of the jack assembly. After installation of the jack assembly the casing shall be made plumb and sealed off from the pit surface to eliminate water intrusion.

- B. Hydraulic Power Unit: Provide manufacturer's self-contained submersible or compact-type hydraulic elevator power unit, including electric motor, adjustable belt drive, non-pulsating constant-displacement type pump, piping, control valve assembly, self-cleaning strainers, oil gauge, overhead oil storage tank on steel support frame, oil drip pan and bed plate. Provide auxiliary devices and fittings required for performance as specified, including manual valve for return of car to lowest landing and manual shut off valves in machine room and in the elevator pit.
1. Motor: Provide high-starting-torque, single speed, A.C. motor, sized for continuous elevator operation at full rated capacity and speed. Provide motor with Wye-Delta starting for reduced voltage starts.
 2. Control Valves: Solenoid-operated, designed for slow opening and closing, as required for controlled acceleration and deceleration and for smooth stopping and starting of car, both for "UP" and "DOWN" travel (automatic two-way leveling).
 3. Mounting: Mount hydraulic power unit bedplate and steel frame assembly onto floor or foundation with efficient, fail-safe isolation mounts, designed to effectively eliminate the transfer of vibrations to the building structure.
 4. Provide viscosity control unit complete with electric heating element in reservoir.
 5. Oil: Provide full supply of hydraulic oil, of the type and grade recommended by the manufacturer.
- C. Electrical Controller Unit: Provide non-proprietary state of the art control equipment with solid-state components on printed circuit boards located in metal cabinets for either floor (free-standing) or wall mounting. Provide equipment designed to control starting and stopping, and soft-starter to protect the motor from damage due to overload or excess current, and to cut off power and bring the car to rest in the event of safety device operation or other possible events which might result in malfunction of elevators.
1. Equip controller unit with electrical and electronic devices needed to perform the specified operations of the elevator or group of elevators. Use flame-resistant wiring, neatly formed and tied to panels.
 - a. Provide "Low Oil Control Feature" which automatically returns cars to lowest level, opens doors and prevents operation of elevator until oil supply has been replenished.
 - b. Mount "power panel" equipment either with other control equipment or on the hydraulic power unit, at manufacturer's option.
- D. Piping: Size, type and weight recommended by the manufacturer and as required by Code. Protect underground piping by coating and wrapping same as specified for cylinder. Provide sound-isolating couplings for connections of piping to power unit. Support all horizontal piping with hangers spaced no more than 10 feet apart.

2.05 MATERIALS AND COMPONENTS IN HOISTWAY

- A. General: Provide manufacturer's standard components and accessories complying with the Code. Protect steel components with paint system or galvanizing to prevent corrosion.
- B. Car Frame and Platform: Undercoat platform with sound-deadening material.
- C. Guide Rollers: Roller guides will be furnished, securely bolted to the car at top and bottom. Each roller guide will consist of sound reducing wheels in precision type ball bearings and held in contact with the rail surfaces by means of adjustable devices. Roller guides will run on dry un-lubricated guide rails.
- D. Buffers: Spring buffers, in the pit for the car and counterweight, shall be mounted on continuous channels fastened to the guide rails. Provide pipe struts for buffers.
- E. Pit Switch: Provide a stop switch in the elevator pit which, when activated, will prevent operation of the elevator.

2.06 DEVICES AND MISCELLANEOUS EQUIPMENT

- A. Automatic Leveling Device: Provide on each car, manufacturer's standard adjustable automatic leveling device, which will position car level with each floor regardless of travel direction or size of load.
- B. Power Door Operators, Passenger: Manufacturer's standard unit of not less than 2.5 ft. per sec. high speed and checking action at both limits of travel, arranged to operate car door and hoistway entrance simultaneously.
- C. Weather Resistant Infrared Detector Device: Pulsed-screen car door protective device projecting across entire entrance opening. Arrange controls to provide nudging operation and/or prevent elevator operation if device is not operative. If detector is obstructed for a predetermined, adjustable interval (10-30 seconds), sound buzzer and attempt to close "doors with a maximum of 2.5 foot pounds kinetic energy nudging action."
- D. Zoned Hoistway Access Keyswitch: Hoistway access shall be provided as per all applicable ANSI code.
- E. Interlocks: Hoistway entrance shall be equipped with an approved type interlock tested as required by Code. The interlock shall be designed to prevent operation of the car away from the landing until the doors are locked in the closed position as defined by Code and shall prevent opening the doors at any landing from the corridor side unless the car is at rest at that landing or is in the leveling zone and stopping at that landing. Interlocks shall bear Underwriter's Laboratories "B" label of approval.
- F. Emergency Moving Device: Include emergency manual valve, to release hydraulic pressure and permit car to move from its stalled position due to power failure or equipment failure.

2.07 LOBBY FIXTURES

- A. General: Except as otherwise indicated, provide manufacturer's standard elevator signal equipment which is consistent with operational complexity of each elevator or group of elevators, and will function properly in a building without climate control and subject to high humidity conditions.
 - 1. Metal Finish: Stainless steel with No. 4 polish and clear baked epoxy coating.
 - 2. Call Buttons: Vandal resistant, non-cancelable LED illuminated type (light extinguishes when call is answered).
 - 3. Raised letter/numeral indications will be furnished on all operating panels to comply with handicapped requirements.
- B. Corridor Push-button Station: A corridor push-button station with an "UP" and "DOWN" station at intermediate floors, single push-button station at each terminal floor.
- C. Lobby Direction Lantern/Gong: A lobby direction lantern will be provided in each lobby to indicate the direction of the elevator. Gong will sound once in "UP" direction and twice in "DOWN" direction. Level 1 shall have an integrated position indicator.

2.08 PASSENGER ELEVATOR CARS

- A. Passenger Elevator Cars: Are hereby defined to include, but not necessarily by way of limitation, the finished walls, doors, ceilings, lighting, trim, hardware and accessories. Signal equipment and operating and safety devices shall be installed as specified. Elevator Manufacturer shall note that existing cabs shall be stripped to shell for installation of noted finishes and hardware. Basis of Design shall be Crown Street Garage cab interiors.
- B. Car Doors: Horizontal center-parting doors of the type scheduled fabricated from 16 gauge stainless steel, #4, satin, by Rigidized Metals Corp.; flush construction.
- C. Door Track and Sheaves: Cold-rolled steel track, sealed ball-bearing sheaves with non-metallic bearing surfaces, 2-point suspension with up-thrust sheave.
- D. Door Frame, Transom and Front Wall: Integrally-formed 16 gauge stainless steel, #4, satin, by Rigidized Metals Corp. Provide cut-outs, reinforcing and cabinets as shown and otherwise required for signal equipment.
- E. Side Walls: 16 gauge #4 satin stainless steel with .036 gauge raised textured stainless steel wall panels 1-CS 304, by Rigidized Metals Corp.
- F. Back Wall: 16 gauge #4 satin stainless steel with .036 gauge raised textured stainless steel wall panels 1-CS 304, by Rigidized Metals Corp.
- G. Provide stainless steel, satin, handrail on back walls, 1 ½" diameter, 32 inches above floor.
- H. Floor Covering: Poured epoxy resin from standard color chart with non-slip finish.
- I. Ceiling and Lighting: Manufacturer's standard ceiling, with concealed frame, 6 baked enamel ceiling panels, white, with 6 LED downlights with lens.
- J. Provide hinged emergency exit on top of car with mechanical stop contacts to

- prevent operation of car when exit door is opened.
- K. Emergency Lighting: Provide emergency lighting. Comply with Code.
- L. Mechanical Ventilation: Supply fan with outlet diffuser, 10 cfm per sq. ft. of floor area, NC rating of 25 or less. Provide emergency power.
- M. Maintenance Devices: Provide a 20 amp 110 VAC duplex outlet and lamp with wire guard on top and bottom of elevator car and one duplex outlet inside car in a position not visible to the public.

2.09 CAR FIXTURES AND ACCESSORIES

- A. Types: Vandal-resistant, non-cancelable illuminated type selected from the elevator manufacturer's standard designs; stainless steel finish.
- B. Car Station: Flush mounted panel, containing banks of illuminated push-buttons numbered and colored to correspond with the landings served, switch for the car light, alarm button which serves as an emergency signal, emergency stop switch, door open button, fan switch, and fireman's service switch.
 - 1. Emergency alarm to be located so that it is audible from the Manager's Office.
 - 2. Car station shall conform with ADA handicapped requirements.
- C. Car Position Indicator: Illuminated numerals located within cab above the control panel to indicate the floor location and direction of travel. In addition to illuminated numerals, an audible signal shall sound to indicate the car is stopping or passing a floor served by the elevator.
- D. Certificate Display Case: Tamper-proof metal frame with acrylic window, sized to match governing authorities' form.
- E. Warning Signs: Standard sign, warning against use of elevators in case of fire and "No Smoking" sign.
- F. Telephone: Provide vandal-resistant, speaker-type phone installed behind perforated grille and connected to auto-dialer located in the machine room. Device shall permit two-way conversation in accordance with the Code:
 - 1. Auto Dialer: Equipped with a solid state charger unit which will automatically provide emergency power within 10 seconds in the event of failure of the normal power supply.
 - 2. Push button: Located in car station at the prescribed handicapped height, identified as "EMERGENCY PHONE - PUSH TO ACTIVATE."
 - 3. Quality: Entire assembly Federal Communication Commission approved.
 - 4. Connections: Authority will arrange for their telephone company to provide incoming lines for connections in the elevator machine room.

2.10 PASSENGER HOISTWAY ENTRANCES

Contractor shall review existing conditions with representative of the elevator manufacturer prior to start of work. Existing equipment, associated with the hoistway entrances, shall be allowed to remain as long as acceptance is documented by the manufacturer and approved by the Engineer. Should replacement be required, the following requirements shall apply:

- A. Hoistway entrances are hereby defined to include doors, frames, sills, hardware, transom panels and accessories as shown and scheduled. Protect steel components with paint or galvanizing to prevent corrosion.
- B. Door Panels: Horizontal sliding of the type scheduled, fabricated from 16 gauge stainless steel, No. 4 finish.
- C. Entrance Frames: Retain existing entrance frames.
- D. Sills: Extruded aluminum, grooved for door guides, grooved surface filled with anti-slip strips.
- E. Fascia Plates: Fascia plates, fabricated from No. 14 gauge steel, shall be fastened to the header and the sill above.
- F. Toe Guard: A toe guard, fabricated from No. 14 gauge steel, shall be fastened at the lowest landing beveled to the wall.
- G. Dust Cover: A dust cover, fabricated from No. 14 gauge steel, shall be furnished at the highest landing.
- H. Headers: Headers of sufficient size and thickness to provide support for the frame and hangers shall be securely fastened to the strut angles and shall include integral hanger tracks.
- I. Struts: Strut angles shall be of sufficient size to support the entrance and shall be securely fastened to the building structure.
- J. Hangers: Hangers shall be of the sheave type, two sheaves per door rotating on a precision ball bearing. The roller shall be on an eccentric stud to provide adjustment. Hangers shall be integral and welded to the top of the doors.

2.11 ELECTRIC WIRING

- A. Furnish and install complete insulated wiring to connect all parts of the equipment.
- B. Insulated wiring shall have a flame retarding and moisture resisting outer cover and shall be run in metal conduit metallic tubing or wire ducts in conformance with Code requirements
- C. Traveling cables between cars and hoistways shall have flame retarding and moisture resisting neoprene outer cover. Cables shall be flexible and shall be suitably suspended to relieve strain in the individual conductors. Each traveling cable, or combination of traveling cables, shall contain not less than eight (8) pairs of shielded wire. Terminate traveling cables at terminal blocks in under car junction box and in halfway box in the hoistway or in the elevator machine room.
- D. Provide 10% spare wires between each controller, selector, hatchway junction box and in each trail cable; all spares shall be properly tagged or otherwise identified with clear and indelible markings.
- E. Car lighting, receptacles, and fan shall be on an individual circuit.
- F. Keep all wiring in troughs or raceways in such a manner that each run may be readily traced from stud blocks to point of entry into a circuit.
- G. Tag code all insulated wiring, control wiring and wiring in traveling cables at their terminals in the motor room, shaft box, elevator cab junction box and push-button stations within the cab. Test entire wiring system for insulation to ground.

- H. Car lighting and car fan shall remain operative for a predetermined adjustable time after the power conversion unit is disconnected. Fan shall have a plug connection for easy removal for maintenance purposes.
- I. All wiring related to Firemen's Operation, Emergency Power, Intercom, building communication system, Firemen's telephone jack and security operation, having interface, is to be terminated in a single junction box external to the elevator group controller.

2.12 PROVISIONS FOR HANDICAP

- A. Comply with State of Connecticut Building Code.
- C. Provide indicators near controls in conformance with FHAA, ADA, and ANSI A117.1.
- D. Landing Buttons: Illuminating type, one for originating "UP" and one for originating "DOWN" calls, one button only at terminating landings; marked with arrows, including indications required by ANSI A117.1.
- E. Locate highest button in elevator cab control panel not more than 54 inches above floor level.
- F. Sound audible voice signal in car when car is stopping at a floor or passing a floor.
- G. Include with illuminated landing indicators, audible tone signals; once for "UP" stops and twice for "DOWN" stops.
- H. Provide Arabic numerals 5/8 inch in height raised 0.03 inch Braille numerals immediately to left of floor buttons to identify each floor.
- I. At each floor landing provide 2 inch floor numerals raised 0.03 inch on door frame jamb.
- J. Provide vision panel in doors to achieve ADA compliance.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Verify that piston and frame anchors, hoist machine room and controls and machinery are in serviceable condition and capable of being reconditioned in accordance with this Section.
- B. Prior to commencing elevator repairs, examine existing conditions at each elevator, as constructed, verify all critical dimensions, and examine each structure and all other conditions under which elevator work is to be performed. Notify Consultant, in writing, of any discrepancies or other conditions detrimental to the proper installation or performance of elevator work. Do not proceed until unsatisfactory conditions have been corrected.

3.02 PREPARATION

- A. Arrange for temporary electrical power for installation work and testing of elevator components.
- B. Hoistway: Examine the hoistway and supporting structure, and the conditions under which the elevator work is to be performed. Do not proceed with the elevator modernization work until unsatisfactory conditions have been corrected.

3.03 MODERNIZATION OF ELEVATOR SYSTEM

- A. General: Comply with Code, manufacturer's instructions and recommendations. Comply with National Electrical Code (ANSI C1 by NFPA) for electrical work required during installation.
- B. Welded Construction: Provide welded connections for installation of elevator work wherever bolted connections are not required for subsequent removal or for normal operation, adjustment, inspection, maintenance and replacement of work parts. Comply with AWS standards for workmanship and for qualification of welding operators.
- C. Coordination: Coordinate elevator work with the work of other trades for proper time and sequence to avoid construction delays. Provide sleeves and inserts to be installed in work by others. Use benchmarks, lines and levels designated by the Contractor to ensure dimensional coordination of the Work.
- D. Sound Isolation: Mount rotating and vibrating elevator equipment and components on vibration-absorption mounts, designed to effectively prevent the transmission of vibrations to the structure, and thereby eliminate the sources of structure-borne noise resulting from the elevator system.
- E. Lubricate operating parts of systems as recommended by manufacturers.
- F. Alignment: Confirm alignment of elevator guide rails for accurate clearances to minimum, safe, workable dimensions of cabs at each landing.
- G. Grout sills with non-staining, non-shrink grout. Set units accurately aligned with and slightly above finished floor at landings.

3.04 FIELD QUALITY CONTROL

- A. Acceptance Testing: Upon nominal completion of each elevator installation, and before permitting use of the elevators (either temporary or permanent), perform acceptance tests as required and recommended by Code, and also perform other tests, if any, as required by governing regulations.
 - 1. Secure from agencies having jurisdiction all approvals required to place the elevators in operation and furnish copies of the certificates for the Authority's records.

3.05 PROTECTION

- A. Provide all recommended protection facilities and procedures to prevent damage and deterioration of completed elevator work during the remainder of the construction period.

3.06 INSTRUCTION AND MAINTENANCE

- A. Instruct Authority's personnel in the proper use, operation and daily maintenance of the elevators. Review emergency provisions, including emergency access and procedures to be followed at time of failure in operation and other building emergencies.
- B. Train Authority's personnel in the normal procedures to be followed in checking for the source of an operational failure or malfunction. Confer with the Authority on the requirements for a complete elevator maintenance program.
- C. Make a final check of each elevator operation just prior to acceptance of the building. Determine that all operating devices are functioning properly.

END OF SECTION 14 21 00.02

SECTION 14 21 00.03**HYDRAULIC ELEVATORS (TMPG)****PART 1 - GENERAL****1.01 DESCRIPTION OF WORK – TEMPLE MEDICAL PARKING GARAGE**

- A. The extent of hydraulic elevator work is hereby defined to include, the repair and renovation of the two (2) traditional in-ground hydraulic Passenger Elevators in a duplex operating configuration, designated as Elevators 1 (093-1077) and 2 (093-1078) in the Temple Medical Parking Garage located at 230 George Street, New Haven, CT 06510. Work shall consist of, but shall not be limited to, the following:

ELEVATOR SCHEDULE	
Elevator Numbers	1, 2
Elevator Layout	Duplex Configuration
Cab Dimensions	49-1/2" D x 79" W x 89" H
Rated Load – lbs.	2,500 lbs.
Contract Speed - fpm	200 fpm
Floors Served	Seven (7) Front Openings: B, 1 thru 6
Equipment	<i>Westinghouse</i> In-Ground Hydraulic (Original)
Controller	<i>Schindler</i> Microprocessor Duplex (2001).
Door Type & Size	Front 42" W x 84" H Center-Parting

1. Review of existing equipment. Existing equipment, associated with the thresholds, sills and jambs, shall be allowed to remain as long as acceptance is documented by the manufacturer and approved by the Consultant. Should replacement be required, replacement shall match other scheduled elevator improvements.
2. Replacement of all associated equipment, switches, disconnects, interlocks, piping, cabling and lighting required by code. Existing control system shall be replaced with a Duplex CPU control system that can integrate with ANSI 17.1 smoke detection elevator recall.

Work shall also include removal and relocation of all items located within hoistways unrelated to elevator operation (i.e. items non-compliant with existing codes), together with all incidental work necessary to successfully modernize existing hydraulic elevators and hoistways in accordance with local, state and federal regulations.

3. Removal and replacement of interior cab finishes with vandal resistant construction, inclusive of textured stainless steel wall panels, along with installation of poured epoxy resin flooring. Cab renovations shall include provisions for vandal resistant ceiling and recessed lighting, new operating panels, handrails, emergency call system, ADA compliant annunciators, call buttons and graphics, together with all incidental work necessary to successfully modernize existing hydraulic elevators and hoistways in accordance with local, state and federal regulations.
4. Power Supply: Refer to Division 26 Sections and Electrical Drawings for characteristics of power supplied for elevator machinery and for lighting and service outlets, including fused disconnect switches or circuit breakers for power supply line disconnect.
5. Removal and proper disposal of all equipment controls, spoils, finishes and accessories removed in modernizing existing equipment.
6. Existing guide rails shall be retained and reused. Guide rails shall be cleaned, all brackets and rail bolts tightened, and joints adjusted and filed smooth. New adjustable roller guides and rollers shall be provided and both elevators adjusted for smooth, comfortable rides.
7. Replace existing power units that control the flow of oil to and from individual hydraulic cylinders. Replacement shall include, but not be limited to motors, pumps, control valves, gaskets, o-rings, piping, oil and electrical relays/line starters and wiring necessary to successfully modernize existing hydraulic elevators and hoistways in accordance with local, state and federal regulations.
8. The elevator contractor shall provide conduit or duct wiring and fittings necessary for proper integration and operation of equipment. Conduit or duct wiring and fittings shall be furnished and installed in accordance with the manufacturer's standard methods and shall be in compliance with the national electric code. Travel cabling shall be replaced as required, and shall be of the best grade for the service. They shall be hung so that proper size loop may be obtained. They shall have a fire resistant outer braid that shall meet the underwriter's standard tests. All wiring installed shall be stranded copper and conform to UL standards. Proper shielding shall be provided where applicable. All wiring shall be neatly routed in metal conduit and secured. Entire wiring system shall be tested for insulation to ground.
9. Elevator Manufacturer shall be required to coordinate with the applicable divisions to provide the following services:

- a. Provision of 75-degree bevel guards on all projections, recesses or setbacks within hoistway over 2 inches, except for the loading and unloading side of hoistway.
 - b. Provision of fire damper for hoistway venting (as required).
 - c. Provision of blockouts/cutouts through wall and the grouting/patching of masonry as required to perform all installation work (i.e. new thresholds, sills, jambs, hall call stations, annunciators and signal fixtures) and maintaining of fire wall rating while maintaining existing aesthetic appearances.
 - d. Provision of GFIC convenience outlet, light fixture and light switch within each elevator pit. Light switches shall be easily accessible from lowest hoistway doors.
10. Contractor shall be responsible for providing all necessary permits for welding, gas burning and cutting associated with the performance of all work.
 11. Contractor shall be responsible for providing and/or coordinating the de-activation and activation of all fire, smoke and/or combustion sensors associated with the performance of their work.

B. Related Work Specified Elsewhere:

1. General provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.
2. Division 26 – Electrical

1.02 QUALITY ASSURANCE

- A. Elevator Code: Except for more stringent requirements as indicated or imposed by governing regulations, comply with applicable requirements of the "American Standard Safety Code for Elevators, Dumbwaiters, Escalators and Moving Walks" (ANSI A17.1) published by the American Society of Mechanical Engineers, hereinafter referred to as the "Code".
- B. Electrical Code: For electrical work included in the elevator work, comply with the "National Electrical Code" (latest edition), by NFPA.
- C. Fire Resistance: Comply with NFPA Standard No. 80 for construction and installation of hoistway entrances. Provide each door unit bearing UL label of approval ("B" label, except as otherwise indicated) as a "Fire Door".
- D. Testing: Comply with Code requirements for testing of elevator components and materials.
- E. Elevator Manufacturers: Elevators shall be the products of one firm or corporation engaged in the business of manufacturing, installing and servicing high grade elevators, for a minimum of 10 years, possessing sufficient shop equipment, technical organization, and maintenance facilities and having demonstrated ability to design, construct and maintain elevators of the types covered by the contract.

1. Elevator hydraulic units, controllers, and associated equipment shall be in accordance with specification requirements and of highest quality and grade of new materials.
2. Elevator components in hoistway including signal equipment shall be suitable for operating in a structure without any climate controls. Materials and equipment must be adequately protected against corrosion due to possible high humidity in the hoistway.
3. Elevator equipment shall be installed, adjusted, tested and placed into operation by competent personnel under the supervision and in the direct employ of the elevator system manufacturer.
4. Maintenance service shall be performed solely by the elevator contractor and shall not be assigned or transferred to any agent or other subcontractor.
5. Basic elevator equipment for each elevator shall be products of the elevator manufacturer. Motors, accessories and appurtenances which are products of another manufacturer of established reputation shall be constructed at direction of, or based upon specifications of the elevator manufacturer.

1.03 SUBMITTALS

- A. **Manufacturer's Data:** Submit the manufacturer's specifications and installation instructions for the complete elevator system, and for each component or product used in the system. Include a complete listing and description of performance and operating characteristics.
- B. **Shop Drawings:** Submit shop drawings for the elevator system and its components, including typical details of assembly, erection and anchorage drawn at large scale. Show maximum dynamic and static loads imposed on the building structure at points of support for the elevator work. Submit smaller scale drawings of the overall plans, elevations and sections to show the floors served, travel distances and similar considerations of the work. Include wiring diagrams for the entire system of power distribution, lighting, control, signals, communication, etc. Assemble shop drawings into one coordinated submittal.
- C. **Samples:** Submit samples of each required finish, not including those intended for painting after installation.
- D. **Certificates and Test Reports:** Submit written, certified reports for required tests, recording the dates performed, test method (description), test results, interpretation of the results, and recommended action. Where required, submit additional copies directly to governing authorities.
- E. **Maintenance Manuals:** Submit bound maintenance manual for each elevator. Include full maintenance and operating instructions, parts lists, recommended spare parts and emergency parts inventory, sources of purchase and similar information. Include legible schematic wiring diagrams of installed electrical equipment, and changes made in the Work. List symbols corresponding to markings on machine room and hoistway apparatus. Provide one copy of master schematic and one copy of lubrication chart, each framed with clear plastic; mount on machine room walls.

1.04 JOB CONDITIONS

- A. Temporary Elevator Use: Do not use or permit anyone to use permanent elevators for any purpose, other than necessary installation and testing procedures, prior to acceptance of the systems and occupancy of the building.
- B. Existing Conditions:
 - 1. It shall be a mandatory requirement that existing elevators under the work of the Contract be individually inspected by the Proposer prior to submission of a Proposal.
 - 2. The contractor shall accept all existing conditions "As is" and install new work as specified, shown on the Drawings, and/or compliance with applicable codes and ADA requirements.
 - 3. The description of work to be performed as specified herein is provided for general information as required to conform to state requirements. Modify existing conditions as necessary to install new items of work.
 - 4. Any existing conditions that may prevent the proper and expeditious completion of the work of repairing/refurbishing the existing elevators shall be immediately brought to the attention of the Engineer.

1.05 WARRANTY

- A. Submit copies of written warranty, signed by the Elevator Manufacturer agreeing to repair or replace defective materials and workmanship of the elevator work during a one (1) year guarantee period, which starts on the date the elevators are completed, placed in operation and accepted by the Authority. Defective materials and workmanship is hereby defined to include operational failures, performance below required minimums, excessive deterioration or aging, evidence that the system will not be reasonably maintainable for the life of the building, abnormal wear considering intensity of use, unsafe conditions, excessive noise or vibration, and similar unusual, unexpected and unsatisfactory conditions; but does not include defects caused by alterations, abusive use, vandalism, failure of the supporting structure or power supply, improper maintenance and similar causes beyond the control of the Elevator Manufacturer.
- B. Elevator Manufacturer shall note that warranty shall include call-back service on a basis of 24-hour availability.

1.06 MAINTENANCE

- A. Maintenance Period: Starting at the time of acceptance of elevator work, provide complete systematic inspection and maintenance of each elevator for a period of 12 months. Furnish equipment and trained experts to check, adjust, lubricate and otherwise maintain the elevators in operation without defects or deterioration. Replace or repair materials and parts which become defective or deteriorate for any reason except through abuse or misuse by the Authority or occupants of the building.

- B. Monthly examinations for each elevator unit and its component parts shall be documented in writing to Authority, with additional copies of each written report placed in a three ring binder to be stored within individual elevator machine rooms for future reference. Written report shall describe items checked, problems identified, maintenance performed and parts replaced.
- C. Include systematic examination, adjustment, and lubrication of elevator equipment. Repair or replace parts whenever required. Use parts produced by the manufacturer of the original equipment.
- D. Perform maintenance work without removing car during peak traffic periods.
- E. Emergency call-back service for minor repairs and adjustments to return an elevator to service shall be available on demand, 24 hours per day, seven days per week.
- F. Maintain locally, near the Building, an adequate stock of parts for replacement or emergency purposes. Have personnel available to ensure the fulfillment of this maintenance service, without unreasonable loss of time.
- G. Perform maintenance work using competent and qualified personnel, under the supervision and in the direct employ of the elevator manufacturer or original installer.

PART 2 - PRODUCTS

2.01 SCHEDULE OF PASSENGER ELEVATOR REQUIREMENTS

Elevators shall be modernized with non-proprietary equipment serviceable and maintainable by others.

2.02 ELEVATOR OPERATIONS

- A. General: Elevator operations are hereby defined to mean the manner in which, and the methods by which the group of elevators function in response to calls for service, and in response to programmed traffic control systems. The terms used herein to describe type of operation are the recognized industry standards. Provide the systems of elevator operations as scheduled.
- B. Automatic Operation: The starting and stopping of the car at the landing occurs in response to the momentary pressing of signal buttons, and in response to programmed operating devices, or safety devices. Power operated doors operate automatically in response to calls and car movements. Car movement is possible only when hoistway door interlocks and car door switch circuits are complete.
- C. Auxiliary Operations: Provide the following additional operations for each elevator or group of elevators, except as otherwise indicated.
 - 1. Manual Door Controls: Car station buttons for "door open" (for power operated doors).
 - 2. Inspection Operation: Top-of-car station, comply with Code.
 - 3. Provide a fireman's key-switch located at the grade level 1, and an in-car key-switch for emergency operation of the elevators, in compliance with the Code.

4. Automatic recall of elevator cars upon signal from smoke detectors. Provide contacts on the elevator controller to receive signals from heat and smoke sensing devices furnished by others.

2.03 WORK BY GENERAL CONTRACTOR (as contracted by Elevator Manufacturer)

- A. Perform all necessary cutting and patching to restore existing finishes.
- B. Protect all existing adjoining surfaces that are to remain.
- C. Provide venting of the hoist-way per ANSI A17.1, rule 100.4.
- D. Provide adequate supports adjacent to side and rear walls for rail brackets, including divider beams for multiple elevators in a common hoist-way at each floor, roof and/or immediate locations, with pockets in metallic decking and patching after brackets are in.
- E. Provide block-outs/cutouts through wall and the grouting/patching required to maintain firewall rating as required to accommodate hall boxes for corridor and signal fixtures.
- F. Provide all barricades either outside of elevator hoist-ways or between elevators inside of hoist-ways as required by OSHA and local codes.
- G. Provide a convenience outlet, light fixture in pit and light switch, easily accessible from the lowest landing door.
- H. Provide a pit ladder in each pit, extending to not less than 3'-6" above the bottom landing.
- I. Removal of existing doors, retain frames and retain sills.
- J. Provide support for sills the full width of hoist-way with two and one-half inches minimum floor recess. Provide grouting full length and width after sills are cleaned.
- K. Provide lighting, ventilation, heating, cooling of machine room and machinery space. Machine room temperature will be maintained between 55° F and 90° F
- L. Provide a fused disconnect switch or circuit breaker for each elevator located per the National Electric Code, and a light switch adjacent to the lock jamb-side of the machine room door.
- M. Provide feeder and branch wiring circuits to the controller of copper wire, including a main line switch and convenience outlets.
- N. Provide all conduit and wire runs as required.
- O. Provide a dedicated telephone and telephone line in the machine room for system access of diagnostics and remote access.

2.04 MACHINES AND COMPONENTS

- A. Jack Hole: The Elevator Contractor shall clean the hole for the jack assembly on a firm price basis anticipating water, rock or other unstable soil conditions. The hole shall be cased with a PVC liner and permanently sealed watertight at the bottom. The top of the casing shall extend at least 6" above the finished pit floor level and shall be capped with a steel plate to prevent foreign material from entering the casing. The 6" casing projection shall be burned off flush with the finished pit floor slab prior to setting of the jack assembly. After installation of the jack assembly the casing shall be made plumb and sealed off from the pit surface to eliminate water intrusion.

- B. Hydraulic Power Unit: Provide manufacturer's self-contained submersible or compact-type hydraulic elevator power unit, including electric motor, adjustable belt drive, non-pulsating constant-displacement type pump, piping, control valve assembly, self-cleaning strainers, oil gauge, overhead oil storage tank on steel support frame, oil drip pan and bed plate. Provide auxiliary devices and fittings required for performance as specified, including manual valve for return of car to lowest landing and manual shut off valves in machine room and in the elevator pit.
1. Motor: Provide high-starting-torque, single speed, A.C. motor, sized for continuous elevator operation at full rated capacity and speed. Provide motor with Wye-Delta starting for reduced voltage starts.
 2. Control Valves: Solenoid-operated, designed for slow opening and closing, as required for controlled acceleration and deceleration and for smooth stopping and starting of car, both for "UP" and "DOWN" travel (automatic two-way leveling).
 3. Mounting: Mount hydraulic power unit bedplate and steel frame assembly onto floor or foundation with efficient, fail-safe isolation mounts, designed to effectively eliminate the transfer of vibrations to the building structure.
 4. Provide viscosity control unit complete with electric heating element in reservoir.
 5. Oil: Provide full supply of hydraulic oil, of the type and grade recommended by the manufacturer.
- C. Electrical Controller Unit: Provide non-proprietary state of the art control equipment with solid-state components on printed circuit boards located in metal cabinets for either floor (free-standing) or wall mounting. Provide equipment designed to control starting and stopping, and soft-starter to protect the motor from damage due to overload or excess current, and to cut off power and bring the car to rest in the event of safety device operation or other possible events which might result in malfunction of elevators.
1. Equip controller unit with electrical and electronic devices needed to perform the specified operations of the elevator or group of elevators. Use flame-resistant wiring, neatly formed and tied to panels.
 - a. Provide "Low Oil Control Feature" which automatically returns cars to lowest level, opens doors and prevents operation of elevator until oil supply has been replenished.
 - b. Mount "power panel" equipment either with other control equipment or on the hydraulic power unit, at manufacturer's option.
- D. Piping: Size, type and weight recommended by the manufacturer and as required by Code. Protect underground piping by coating and wrapping same as specified for cylinder. Provide sound-isolating couplings for connections of piping to power unit. Support all horizontal piping with hangers spaced no more than 10 feet apart.

2.05 MATERIALS AND COMPONENTS IN HOISTWAY

- A. General: Provide manufacturer's standard components and accessories complying with the Code. Protect steel components with paint system or galvanizing to prevent corrosion.
- B. Car Frame and Platform: Undercoat platform with sound-deadening material.
- C. Guide Rollers: Roller guides will be furnished, securely bolted to the car at top and bottom. Each roller guide will consist of sound reducing wheels in precision type ball bearings and held in contact with the rail surfaces by means of adjustable devices. Roller guides will run on dry un-lubricated guide rails.
- D. Buffers: Spring buffers, in the pit for the car and counterweight, shall be mounted on continuous channels fastened to the guide rails. Provide pipe struts for buffers.
- E. Pit Switch: Provide a stop switch in the elevator pit which, when activated, will prevent operation of the elevator.

2.06 DEVICES AND MISCELLANEOUS EQUIPMENT

- A. Automatic Leveling Device: Provide on each car, manufacturer's standard adjustable automatic leveling device, which will position car level with each floor regardless of travel direction or size of load.
- B. Power Door Operators, Passenger: Manufacturer's standard unit of not less than 2.5 ft. per sec. high speed and checking action at both limits of travel, arranged to operate car door and hoistway entrance simultaneously.
- C. Weather Resistant Infrared Detector Device: Pulsed-screen car door protective device projecting across entire entrance opening. Arrange controls to provide nudging operation and/or prevent elevator operation if device is not operative. If detector is obstructed for a predetermined, adjustable interval (10-30 seconds), sound buzzer and attempt to close "doors with a maximum of 2.5 foot pounds kinetic energy nudging action."
- D. Zoned Hoistway Access Keyswitch: Hoistway access shall be provided as per all applicable ANSI code.
- E. Interlocks: Hoistway entrance shall be equipped with an approved type interlock tested as required by Code. The interlock shall be designed to prevent operation of the car away from the landing until the doors are locked in the closed position as defined by Code and shall prevent opening the doors at any landing from the corridor side unless the car is at rest at that landing or is in the leveling zone and stopping at that landing. Interlocks shall bear Underwriter's Laboratories "B" label of approval.
- F. Emergency Moving Device: Include emergency manual valve, to release hydraulic pressure and permit car to move from its stalled position due to power failure or equipment failure.

2.07 LOBBY FIXTURES

- A. General: Except as otherwise indicated, provide manufacturer's standard elevator signal equipment which is consistent with operational complexity of each elevator or group of elevators, and will function properly in a building without climate control and subject to high humidity conditions.
 - 1. Metal Finish: Stainless steel with No. 4 polish and clear baked epoxy coating.
 - 2. Call Buttons: Vandal resistant, non-cancelable LED illuminated type (light extinguishes when call is answered).
 - 3. Raised letter/numeral indications will be furnished on all operating panels to comply with handicapped requirements.
- B. Corridor Push-button Station: A corridor push-button station with an "UP" and "DOWN" station at intermediate floors, single push-button station at each terminal floor.
- C. Lobby Direction Lantern/Gong: A lobby direction lantern will be provided in each lobby to indicate the direction of the elevator. Gong will sound once in "UP" direction and twice in "DOWN" direction. Level 1 shall have an integrated position indicator.

2.08 PASSENGER ELEVATOR CARS

- A. Passenger Elevator Cars: Are hereby defined to include, but not necessarily by way of limitation, the finished walls, doors, ceilings, lighting, trim, hardware and accessories. Signal equipment and operating and safety devices shall be installed as specified. Elevator Manufacturer shall note that existing cabs shall be stripped to shell for installation of noted finishes and hardware. Basis of Design shall be Crown Street Garage cab interiors.
- B. Car Doors: Horizontal center-parting doors of the type scheduled fabricated from 16 gauge stainless steel, #4, satin, by Rigidized Metals Corp.; flush construction.
- C. Door Track and Sheaves: Cold-rolled steel track, sealed ball-bearing sheaves with non-metallic bearing surfaces, 2-point suspension with up-thrust sheave.
- D. Door Frame, Transom and Front Wall: Integrally-formed 16 gauge stainless steel, #4, satin, by Rigidized Metals Corp. Provide cut-outs, reinforcing and cabinets as shown and otherwise required for signal equipment.
- E. Side Walls: 16 gauge #4 satin stainless steel with .036 gauge raised textured stainless steel wall panels 1-CS 304, by Rigidized Metals Corp.
- F. Back Wall: 16 gauge #4 satin stainless steel with .036 gauge raised textured stainless steel wall panels 1-CS 304, by Rigidized Metals Corp.
- G. Provide stainless steel, satin, handrail on back walls, 1 ½" diameter, 32 inches above floor.
- H. Floor Covering: Poured epoxy resin from standard color chart with non-slip finish.
- I. Ceiling and Lighting: Manufacturer's standard ceiling, with concealed frame, 6 baked enamel ceiling panels, white, with 6 LED downlights with lens.
- J. Provide hinged emergency exit on top of car with mechanical stop contacts to

- prevent operation of car when exit door is opened.
- K. Emergency Lighting: Provide emergency lighting. Comply with Code.
- L. Mechanical Ventilation: Supply fan with outlet diffuser, 10 cfm per sq. ft. of floor area, NC rating of 25 or less. Provide emergency power.
- M. Maintenance Devices: Provide a 20 amp 110 VAC duplex outlet and lamp with wire guard on top and bottom of elevator car and one duplex outlet inside car in a position not visible to the public.

2.09 CAR FIXTURES AND ACCESSORIES

- A. Types: Vandal-resistant, non-cancelable illuminated type selected from the elevator manufacturer's standard designs; stainless steel finish.
- B. Car Station: Flush mounted panel, containing banks of illuminated push-buttons numbered and colored to correspond with the landings served, switch for the car light, alarm button which serves as an emergency signal, emergency stop switch, door open button, fan switch, and fireman's service switch.
 - 1. Emergency alarm to be located so that it is audible from the Manager's Office.
 - 2. Car station shall conform with ADA handicapped requirements.
- C. Car Position Indicator: Illuminated numerals located within cab above the control panel to indicate the floor location and direction of travel. In addition to illuminated numerals, an audible signal shall sound to indicate the car is stopping or passing a floor served by the elevator.
- D. Certificate Display Case: Tamper-proof metal frame with acrylic window, sized to match governing authorities' form.
- E. Warning Signs: Standard sign, warning against use of elevators in case of fire and "No Smoking" sign.
- F. Telephone: Provide vandal-resistant, speaker-type phone installed behind perforated grille and connected to auto-dialer located in the machine room. Device shall permit two-way conversation in accordance with the Code:
 - 1. Auto Dialer: Equipped with a solid state charger unit which will automatically provide emergency power within 10 seconds in the event of failure of the normal power supply.
 - 2. Push button: Located in car station at the prescribed handicapped height, identified as "EMERGENCY PHONE - PUSH TO ACTIVATE."
 - 3. Quality: Entire assembly Federal Communication Commission approved.
 - 4. Connections: Authority will arrange for their telephone company to provide incoming lines for connections in the elevator machine room.

2.10 PASSENGER HOISTWAY ENTRANCES

Contractor shall review existing conditions with representative of the elevator manufacturer prior to start of work. Existing equipment, associated with the hoistway entrances, shall be allowed to remain as long as acceptance is documented by the manufacturer and approved by the Engineer. Should replacement be required, the following requirements shall apply:

- A. Hoistway entrances are hereby defined to include doors, frames, sills, hardware, transom panels and accessories as shown and scheduled. Protect steel components with paint or galvanizing to prevent corrosion.
- B. Door Panels: Horizontal sliding of the type scheduled, fabricated from 16 gauge stainless steel, No. 4 finish.
- C. Entrance Frames: Retain existing entrance frames.
- D. Sills: Extruded aluminum, grooved for door guides, grooved surface filled with anti-slip strips.
- E. Fascia Plates: Fascia plates, fabricated from No. 14 gauge steel, shall be fastened to the header and the sill above.
- F. Toe Guard: A toe guard, fabricated from No. 14 gauge steel, shall be fastened at the lowest landing beveled to the wall.
- G. Dust Cover: A dust cover, fabricated from No. 14 gauge steel, shall be furnished at the highest landing.
- H. Headers: Headers of sufficient size and thickness to provide support for the frame and hangers shall be securely fastened to the strut angles and shall include integral hanger tracks.
- I. Struts: Strut angles shall be of sufficient size to support the entrance and shall be securely fastened to the building structure.
- J. Hangers: Hangers shall be of the sheave type, two sheaves per door rotating on a precision ball bearing. The roller shall be on an eccentric stud to provide adjustment. Hangers shall be integral and welded to the top of the doors.

2.11 ELECTRIC WIRING

- A. Furnish and install complete insulated wiring to connect all parts of the equipment.
- B. Insulated wiring shall have a flame retarding and moisture resisting outer cover and shall be run in metal conduit metallic tubing or wire ducts in conformance with Code requirements
- C. Traveling cables between cars and hoistways shall have flame retarding and moisture resisting neoprene outer cover. Cables shall be flexible and shall be suitably suspended to relieve strain in the individual conductors. Each traveling cable, or combination of traveling cables, shall contain not less than eight (8) pairs of shielded wire. Terminate traveling cables at terminal blocks in under car junction box and in halfway box in the hoistway or in the elevator machine room.
- D. Provide 10% spare wires between each controller, selector, hatchway junction box and in each trail cable; all spares shall be properly tagged or otherwise identified with clear and indelible markings.
- E. Car lighting, receptacles, and fan shall be on an individual circuit.
- F. Keep all wiring in troughs or raceways in such a manner that each run may be readily traced from stud blocks to point of entry into a circuit.
- G. Tag code all insulated wiring, control wiring and wiring in traveling cables at their terminals in the motor room, shaft box, elevator cab junction box and push-button stations within the cab. Test entire wiring system for insulation to ground.

- H. Car lighting and car fan shall remain operative for a predetermined adjustable time after the power conversion unit is disconnected. Fan shall have a plug connection for easy removal for maintenance purposes.
- I. All wiring related to Firemen's Operation, Emergency Power, Intercom, building communication system, Firemen's telephone jack and security operation, having interface, is to be terminated in a single junction box external to the elevator group controller.

2.12 PROVISIONS FOR HANDICAP

- A. Comply with State of Connecticut Building Code.
- C. Provide indicators near controls in conformance with FHAA, ADA, and ANSI A117.1.
- D. Landing Buttons: Illuminating type, one for originating "UP" and one for originating "DOWN" calls, one button only at terminating landings; marked with arrows, including indications required by ANSI A117.1.
- E. Locate highest button in elevator cab control panel not more than 54 inches above floor level.
- F. Sound audible voice signal in car when car is stopping at a floor or passing a floor.
- G. Include with illuminated landing indicators, audible tone signals; once for "UP" stops and twice for "DOWN" stops.
- H. Provide Arabic numerals 5/8 inch in height raised 0.03 inch Braille numerals immediately to left of floor buttons to identify each floor.
- I. At each floor landing provide 2 inch floor numerals raised 0.03 inch on door frame jamb.
- J. Provide vision panel in doors to achieve ADA compliance.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Verify that piston and frame anchors, hoist machine room and controls and machinery are in serviceable condition and capable of being reconditioned in accordance with this Section.
- B. Prior to commencing elevator repairs, examine existing conditions at each elevator, as constructed, verify all critical dimensions, and examine each structure and all other conditions under which elevator work is to be performed. Notify Consultant, in writing, of any discrepancies or other conditions detrimental to the proper installation or performance of elevator work. Do not proceed until unsatisfactory conditions have been corrected.

3.02 PREPARATION

- A. Arrange for temporary electrical power for installation work and testing of elevator components.
- B. Hoistway: Examine the hoistway and supporting structure, and the conditions under which the elevator work is to be performed. Do not proceed with the elevator modernization work until unsatisfactory conditions have been corrected.

3.03 MODERNIZATION OF ELEVATOR SYSTEM

- A. General: Comply with Code, manufacturer's instructions and recommendations. Comply with National Electrical Code (ANSI C1 by NFPA) for electrical work required during installation.
- B. Welded Construction: Provide welded connections for installation of elevator work wherever bolted connections are not required for subsequent removal or for normal operation, adjustment, inspection, maintenance and replacement of work parts. Comply with AWS standards for workmanship and for qualification of welding operators.
- C. Coordination: Coordinate elevator work with the work of other trades for proper time and sequence to avoid construction delays. Provide sleeves and inserts to be installed in work by others. Use benchmarks, lines and levels designated by the Contractor to ensure dimensional coordination of the Work.
- D. Sound Isolation: Mount rotating and vibrating elevator equipment and components on vibration-absorption mounts, designed to effectively prevent the transmission of vibrations to the structure, and thereby eliminate the sources of structure-borne noise resulting from the elevator system.
- E. Lubricate operating parts of systems as recommended by manufacturers.
- F. Alignment: Confirm alignment of elevator guide rails for accurate clearances to minimum, safe, workable dimensions of cabs at each landing.
- G. Grout sills with non-staining, non-shrink grout. Set units accurately aligned with and slightly above finished floor at landings.

3.04 FIELD QUALITY CONTROL

- A. Acceptance Testing: Upon nominal completion of each elevator installation, and before permitting use of the elevators (either temporary or permanent), perform acceptance tests as required and recommended by Code, and also perform other tests, if any, as required by governing regulations.
 - 1. Secure from agencies having jurisdiction all approvals required to place the elevators in operation and furnish copies of the certificates for the Authority's records.

3.05 PROTECTION

- A. Provide all recommended protection facilities and procedures to prevent damage and deterioration of completed elevator work during the remainder of the construction period.

3.06 INSTRUCTION AND MAINTENANCE

- A. Instruct Authority's personnel in the proper use, operation and daily maintenance of the elevators. Review emergency provisions, including emergency access and procedures to be followed at time of failure in operation and other building emergencies.
- B. Train Authority's personnel in the normal procedures to be followed in checking for the source of an operational failure or malfunction. Confer with the Authority on the requirements for a complete elevator maintenance program.
- C. Make a final check of each elevator operation just prior to acceptance of the building. Determine that all operating devices are functioning properly.

END OF SECTION 14 21 00.03

SECTION 14 21 10.01

TRACTION ELEVATORS (TSPG)

PART 1 – GENERAL

1.1 DESCRIPTION – TEMPLE STREET PARKING GARAGE

- A. This section specifies the engineering, furnishing and modernization of the complete traction elevator system as described herein and as indicated on the Contract drawings.
- B. Items listed in the singular apply to each elevator in this specification except where noted.
- C. Passenger Elevators 1 thru 4 shall be overhead traction with a microprocessor control system, power operated car and hoistway doors. Elevator shall be Class “A” loading rated.

ELEVATOR SCHEDULE	
Elevator Numbers	1, 2, 3, 4
Elevator Layout	Two (2) Duplex Configurations
Cab Dimensions	43” D x 72” W x 85” H
Rated Load – lbs.	2,000 lbs.
Contract Speed - fpm	250 fpm
Floors Served	Six (6) Front Openings: B3, S, 3, 5, 7, 9
Equipment	<i>Westinghouse</i> Overhead Geared Traction Type 28 (1961 Original). New Hoist Motors during 2001 modernization project.
Controller	<i>Schindler</i> Miconic AM Duplex (2001).
Door Type & Size	Front 38” W x 84” H Center-Parting

1.2 RELATED WORK

- A. General provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.
- B. Division 26 – Electrical

1.3 QUALIFICATIONS

- A. Approval is required for products and services of proposed manufacturers, suppliers, installers, and shall be contingent upon submission of certificates by the Contractor stating the following:
 - 1. Elevator contractor is currently and regularly engaged in the installation of elevator equipment as one of their principal products.
 - 2. Elevator contractor shall have five (5) years of successful experience, trained supervisory personnel, and facilities to install elevator equipment specified herein.
 - 3. Elevator Mechanic (Installer) shall have passed a Mechanic Examination approved by the U.S. Department of Labor and have technical qualifications of at least five years of experience in the elevator industry or 10,000 hours of field experience working in the elevator industry with technical update training. Apprentices shall be actively pursuing Certified Elevator Mechanic status. Certification shall be submitted for all workers employed in this capacity.
- B. Welding at the project site shall be performed by certified welders who have previously qualified by test as prescribed in American Welding Society Publications AWS D1.1 to perform the type of work required. Certificates shall be submitted for all workers employed in this capacity. A welding or hot work permit is required for each day and shall be obtained from the safety department. Request permit one day in advance.
- C. Electrical work shall be performed by a Licensed Master Electrician and Licensed Journeymen Electricians as requirements by NEC. Certificates shall be submitted for all workers employed in this capacity.
- D. Approval will not be given to elevator contractors and manufacturers who have established on prior projects, either government, municipal, or commercial, a record of unsatisfactory elevator installations, have failed to complete awarded contracts within the contract period, and do not have the requisite record of satisfactorily performing elevator installations of similar type and magnitude.
- E. Approval of Elevator Contractor's equipment will be contingent upon their providing factory training, engineering and technical support, including all manuals, wiring diagrams, and tools necessary for adjusting, maintenance, repair, and testing of the equipment.
- F. Identifying an elevator maintenance service provider that shall render services within one day of receipt of notification, together with certification that the quantity and quality of replacement parts stock is enough to warranty continued operation of the elevator installation.
- G. Equipment within a group of traction elevators shall be the product of the same manufacturer.
- H. The Contractor shall provide and install safety devices that have been subjected to tests witnessed and certified by an independent professional testing laboratory that is not a subsidiary of the firm that manufactures, supplies, or installs the equipment.

1.4 APPLICABLE PUBLICATIONS

- A. American Society of Mechanical Engineers (ASME):
 - A17.1 - Safety Code for Elevators and Escalators
 - A17.2 - Inspectors Manual for Electric Elevators and Escalators
- B. National Fire Protection Association:
 - NFPA 13 - Standard for the Installation of Sprinkler Systems
 - NFPA 70 - National Electrical Code (NEC)
 - NFPA 72 - National Fire Alarm and Signaling Code
 - NFPA 101 - Life Safety Code
 - NFPA 252 - Fire Test of Door Assemblies
- C. International Building Code (IBC).
- D. American Society for Testing and Materials (ASTM):
 - A1008/A1008M-09 - Steel, Sheet, Cold Rolled, Carbon, Structural, High-Strength Low-Alloy and High Strength Low-Alloy with Improved Formability
 - E1042-02 - Acoustically Absorptive Materials Applied by Trowel or Spray
- E. Manufacturer's Standardization Society of the Valve and Fittings Industry (MSS):
 - SP-58 - Pipe Hangers and Supports
- F. Society of Automotive Engineers, Inc. (SAE):
 - J517-91 - Hydraulic Hose, Standard
- G. Gauges:
 - Sheet and Plate: U.S. Standard (USS)
 - Wire: American Wire Gauge (AWG)
- H. American Welding Society (AWS):
 - D1.1 - Structured Welding Code Steel
- I. National Electrical Manufacturers Association (NEMA):
 - LD-3 - High-Pressure Decorative Laminates
- J. Underwriter's Laboratories (UL):
 - 486A - Safety Wire Connectors for Copper Conductors
 - 797 - Safety Electrical Metallic Tubing
- K. Institute of Electrical and Electronic Engineers (IEEE)

1.5 SUBMITTALS

- A. Submit in accordance with Division 1 all Shop Drawings, Product Data, And Samples.
- B. Before execution of work, furnish information to evidence full compliance with contract requirements for proposed items. Such information shall include, as required:
 - Manufacturer's Name, Trade Names, Model or Catalog Number, Nameplate Data (size, capacity, and rating) and corresponding specification reference. All submitted drawings and related elevator material shall be forwarded the project manager.
- C. Shop Drawings:
 - 1. Complete scaled and dimensioned layout in plan and section view showing the arrangement of equipment and all details of each elevator unit specified including:
 - a. Hoisting machines, controllers, power conversion devices, governors, and all other components located in machine room.

- b. Car, counterweight, sheaves, supporting beams, guide rails, brackets, buffers, and size of car platform, car frame members, and other components located in hoistway.
- c. Rail bracket spacing and maximum vertical forces on guide rails in accordance with H 18-8 for Seismic Risk Zone 2 or greater.
- d. Reaction at points of support and buffer impact loads.
- e. Weight of principal parts.
- f. Top and bottom clearances and over travel of car and counterweight.
- g. Location of main line switch/shunt trip circuit breaker, switchboard panel, light switch, and feeder extension points in the machine room.
- 2. Drawings of hoistway entrances and doors showing details of construction and method of fastening to the structural members of the building.
 - a. If drywall construction is used to enclose hoistway, submit details of interface fastenings between entrance frames and drywall.
 - b. Sill details including sill support.
- D. Samples:
 - 1. One each of stainless steel, 76 mm x 127 mm (3 in. x 5 in.).
 - 2. One each of baked enamel, 76 mm x 127 mm (3 in. x 5 in.).
 - 3. One each of color floor covering.
 - 4. One each of protection pads, 76 mm x 127 mm (3 in. x 5 in.) if used.
 - 5. One each car and hoistway Braille plate sample.
 - 6. One each car and hall button sample.
 - 7. One each car and hall lantern/position indicator sample.
 - 8. One each wall and ceiling material finish sample.
 - 9. One each car lighting sample.
- E. Name of manufacturer, type or style designation, and applicable data of the following equipment shall be shown on the elevator layouts:
 - 1. Hoisting Machine.
 - 2. Hoisting Machine Motor, HP and RPM ratings, Voltage, Starting and Full Load Ampere, and Number of Phases.
 - 3. Controller.
 - 4. Starters and Overload Current Protection Devices.
 - 5. Car Safety Device; Type "B" safeties and Governor.
 - 6. Electric Door Operator; HP, RPM, Voltage, and Ampere rating of motor.
 - 7. Hoistway Door Interlocks.
 - 8. Car and Counterweight Buffers; maximum and minimum rated loads, maximum rated striking speed and stroke.
 - 9. Cab Ventilation Unit; HP rating and CFM rating.
 - 10. Hoist and Compensation Ropes; breaking strength, allowable working load, and actual working load.
- F. Complete construction drawings of elevator car enclosure showing dimensioned details, fastenings to platform, car lighting, ventilation, ceiling framing, top exits, and location of car equipment.
- G. Complete dimensioned detail of vibration isolating foundations for traction hoisting machines.

- H. Dimensioned drawings showing details of:
 - 1. All signal and operating fixtures.
 - 2. Car and counterweight roller guides.
 - 3. Hoistway door tracks, hangers, and sills.
 - 4. Door operator, infrared curtain units.
- I. Cut sheets and drawings showing details of controllers and supervisory panels.
- J. Furnish certificates as required under: Paragraph "Qualifications".

1.6 WIRING DIAGRAMS

- A. Provide three complete sets of paper and one electronic set field wiring and straight-line wiring diagrams showing all electrical circuits in the hoistway, machine room and fixtures. Install one set coated with an approved plastic sealer and mounted in the elevator machine room.
- B. In the event field modifications are necessary during installation, diagrams shall be revised to include all corrections made prior to and during the final inspection. Corrected diagrams shall be delivered within thirty (30) days of final acceptance.
- C. Provide the following information relating to the specific type of microprocessor controls installed:
 - 1. Owner's information manual, containing job specific data on major components, maintenance, and adjustment.
 - 2. System logic description.
 - 3. Complete wiring diagrams needed for field troubleshooting, adjustment, repair and replacement of components. Diagrams shall be base diagrams, containing all changes and additions made to the equipment during the design and construction period.
 - 4. Changes made during the warranty period shall be noted on the drawings in adequate time to have the finalized drawings reproduced for mounting in the machine room no later than six months prior to the expiration of the warranty period.

1.7 WORK SCHEDULE

- A. Before starting work submit a detailed work schedule for approval and arrange with project manager sequence of procedure, means of access to premises, space for storage, use of approaches, corridors, stairways, elevators, location of temporary partitions, disposal of trash and recyclable materials. The project manager must be notified twenty (20) calendar days, in writing, in advance of starting work on elevators. No work may begin on any elevator until all materials for that elevator have been delivered to the site and verified by the project manager. The phasing of work on the elevators shall be coordinated with the project manager.

1.8 SAFETY PRECAUTIONS

- A. The Temple Street Garage will be occupied during execution of work. Work shall be conducted in a manner to afford maximum protection of patients, public, employees, building and facilities to prevent unreasonable delay or interference with normal functioning of activities.

- B. Where an adjacent elevator is in operation, isolate the elevators from each other with suitable barriers between them, extending from the pit floor to bottom of the slab at top of hoistway, while work is in progress. Remove partition when work is completed.
- C. Provide fire extinguishers that are always readily available.
- D. It shall be the obligation of the contractor to maintain a free and clear passageway in each elevator lobby. Parts and tools shall be kept within the confines of entrance partitions. Trash and debris shall be removed daily.
- E. Provide fire rated partition during the modernization of elevators. Barrier shall extend to the full height of the elevator entrance and shall be dust and vapor proof with dust absorbing mats at access points.

1.9 REMOVAL OF MATERIALS AND EQUIPMENT

- A. Material and equipment that are not specified to be reused or retained under contract shall be removed daily from the site at the expense of the contractor. The contractor shall receive title to all material and equipment not specified to be reused as of date of withdrawal from service.

1.10 PERFORMANCE STANDARDS

- A. The elevators shall meet the highest standards of the industry and specifically the following:
 - 1. Contract speed is high speed in either direction of travel with rated capacity load in the elevator. Speed variation under all load conditions, regardless of direction of travel, shall not vary more than three (3) percent.
 - 2. The controlled rate of change of acceleration and retardation of the car shall not exceed 0.1G per ft/s/s and the maximum acceleration and retardation shall not exceed 0.2G per ft/s/s.
 - 3. Starting, stopping, and leveling shall be smooth and comfortable without appreciable steps of acceleration and deceleration.
- B. Door operator shall open the car door and hoistway door at 2.5-feet per second and close at 1-foot per second.
- C. Floor level stopping accuracy shall be within 3 mm (.125 in.) above or below the floor, regardless of load condition.
- D. Noise and Vibration Isolation: All elevator equipment including their supports and fastenings to the building, shall be mechanically and electrically isolated from the building structure to minimize objectionable noise and vibration transmission to car, building structure, or adjacent occupied areas of building.
- E. Sound Isolation: Noise level relating to elevator equipment operation in machine room shall not exceed 80 db. All db readings shall be taken three (3) feet off the floor and three (3) feet from equipment.
- F. Airborne Noise: Measured noise level of elevator equipment during operation shall not exceed 50 db in elevator lobbies and 60 db inside car under any condition including door operation and car ventilation exhaust blower on its highest speed.

1.11 WARRANTY

- A. The One-Year Warranty and Guarantee Period of Service shall commence and run concurrent after final inspection, completion of performance test, and upon acceptance of each elevator.
- B. During warranty period if a device is not functioning properly in accordance with specification requirements, more maintenance than the contract requires keeping device operational, device shall be removed and a new device meeting all requirements shall be installed as part of work until satisfactory operation of installation is obtained. Period of warranty shall start anew for such parts from date of completion of each new installation performed, in accordance with foregoing requirements.

1.12 POWER SUPPLY

- A. For power supply in each machine room, see Specification 26 05 19, Electrical specifications, and Electrical drawings.
- B. Main Line Fused Disconnect Switch/Shunt Trip Circuit Breaker for each controller shall be located inside the machine room at the strike side of the machine room door and lockable in the "Off" position.
- C. Provide Surge Suppressors to protect the elevator equipment.

1.13 EMERGENCY POWER SUPPLY

- A. If applicable, Emergency power supply, means its starting, transfer switch for transfer of elevator supply from normal to emergency power, two pair of conductors in a conduit from an auxiliary contact on the transfer switch (open or close contacts as required by Elevator Controller Manufacturer) to terminals in the group elevator controller and other related work shall be provided by the Electrical Contractor.
- B. Upon loss of normal power supply there shall be a delay before transferring to emergency power of 10 seconds minimum to 45 seconds maximum, the delay shall be accomplished through an adjustable timing device.
- C. Prior to the return of normal power an adjustable timed circuit shall be activated that will cause all cars to remain at a floor if already there or stop and remain at the next floor if in flight. Actual transfer of power from emergency power to normal building power shall take place after all cars are stopped at a floor with their doors open.
- D. Car lighting circuits shall be connected to the emergency power panel.

1.14 ELEVATOR MACHINE ROOM AND MACHINE SPACE

- A. Reuse existing machine room and meet the requirements of ASME A17.1, NFPA 70, NFPA 101 and IBC. The elevator drive machine and elevator controller shall be in the same code approved machine room.
- B. Locate the shunt trip breaker/main line disconnect and machine room light switch at the lock side of the door inside the machine room.
- C. Locate sprinkler pipes, if required, to provide seven 213.3 cm (7 ft) head clearance. Do not locate sprinkler heads, heat detectors, and smoke detectors directly over elevator equipment.

1.15 HOISTWAY LIGHTING

- A. Provide lighting with 3-way switches at the top and bottom of the hoistway accessible from elevator hoistway entrance prior to entering the pit or stepping onto the car top.
- B. Lighting shall illuminate top of elevator cab when it is at the top floor and the pit when at the bottom floor.

PART 2 – PRODUCTS

2.1 MATERIALS

- A. Where stainless steel is specified, it shall be corrosion resisting steel Condition A with Number 4 finish on exposed surfaces. Stainless steel shall have the grain of belting in the direction of the longest dimension and surfaces shall be smooth and without waves. During installation stainless steel surfaces shall be protected with suitable material.
- B. Where cold rolled steel is specified, it shall be low-carbon steel rolled to stretcher level standard flatness, complying with ASTM A109.

2.2 MANUFACTURED PRODUCTS

- A. Materials, devices, and equipment furnished shall be of current production by manufacturers regularly engaged in the manufacture of such items. The elevator equipment, including controllers, door operators, and supervisory system shall be the product of manufacturers of established reputation, provided such items are capably engineered and produced under coordinated specifications to ensure compatibility with the total operating system.
- B. Manufacturers of equipment assemblies which include components made by others shall assume complete responsibility for the final assembled unit. Components shall be compatible with each other and with the total assembly for the intended service.
- C. Mixing of manufactures related to a single system or group of components shall be identified in the submittals.
- D. If key operated switches are furnished in conjunction with component of this elevator installation, furnish four (4) keys for each individual switch or lock. Provide different key tumblers for different switch and lock functions. Each key shall have a tag bearing a stamped or etched legend identifying its purpose.

2.3 CONDUIT AND WIREWAY

- A. Reuse existing where possible and provide new conduit and wireway where needed. Install electrical conductors, except traveling cable connected to the elevator, in rigid zinc-coated steel or aluminum conduit, electrical metallic tubing or metal wireways. Rigid conduit smaller than .75 inch or electrical metallic tubing smaller than .50-inch electrical trade size shall not be used. All raceways completely embedded in concrete slabs, walls, or floor fill shall be rigid steel conduit. Wireway (duct) shall be installed in the hoistway and to the controller and between similar apparatus in the elevator machine room. Fully protect self-supporting connections, where approved, from abrasion or other mechanical injury.

Flexible metal conduit not less than .375-inch electrical trade size may be used, not exceeding 18 inches in length unsupported, for short connections between risers and limit switches, interlocks, and for other applications permitted by NEC.

- B. All conduit terminating in steel cabinets, junction boxes, wireways, switch boxes, outlet boxes and similar locations shall have approved insulation bushings. Install a steel lock nut under the bushings if they are constructed completely of insulating materials. Protect the conductors at ends of conduits not terminating in steel cabinets or boxes by terminal fittings having an insulated opening for the conductors.
- C. Rigid conduit and EMT fittings using set screws or indentations as a means of attachment shall not be used.
- D. Connect motor or other items subject to movement, vibration or removal to the conduit or EMT systems with flexible, steel conduits.

2.4 CONDUCTORS

- A. Remove existing and provide new conductors, excluding the traveling cables. Conductors shall be stranded or solid coated annealed copper. Where 16 and 18 AWG are permitted by NEC, single conductors or multiple conductor cables may be used provided the insulation of single conductor cable and outer jacket of multiple conductor cable is flame retardant and moisture resistant. Multiple conductor cables shall have color or number coding for each conductor. Conductors for control boards shall be in accordance with NEC. Joints or splices are not permitted in wiring except at outlets. Tap connectors may be used in wireways provided they meet all UL requirements.
- B. Provide all conduit and wiring between machine room, hoistway and fixtures.
- C. All wiring must test free from short circuits or ground faults. Insulation resistance between individual external conductors and between conductors and ground shall be a minimum of one megohm.
- D. Where size of conductor is not given, voltage and amperes shall not exceed limits set by NEC.
- E. Provide equipment grounding. Ground the conduits, supports, controller enclosure, motor, platform and car frame, and all other non-current conducting metal enclosures for electrical equipment in accordance with NEC. The ground wires shall be copper, green insulated and sized as required by NEC. Bond the grounding wires to all junction boxes, cabinets, and wire raceways.
- F. Terminal connections for all conductors used for external wiring between various items of elevator equipment shall be solderless pressure wire connectors.

The Elevator Contractor may, at their option, make these terminal connections on #10 gauge or smaller conductors with approved terminal eyelets set on the conductor with a special setting tool, or with an approved pressure type terminal block. Terminal blocks using pierce-through serrated washers are not acceptable.

2.5 TRAVELING CABLES

- A. Remove existing and provide new flexible traveling cables conforming to the requirements of NEC. Traveling cables shall run from the junction box on the car directly to the controller. Junction boxes on the car shall be equipped with terminal blocks.

Terminal blocks having pressure wire connectors of the clamp type that meet UL 486A requirements for stranded wire may be used in lieu of terminal eyelet connections. Terminal blocks shall have permanent indelible identifying numbers for each connection. Cables shall be securely anchored to avoid strain on individual terminal connections. Flame and moisture resistant outer covering must remain intact between junction boxes. Abrupt bending, twisting and distortion of the cables shall not be permitted.

- B. Provide spare conductors equal to 10 percent of the total number of conductors furnished, but not less than 5 spare conductors in each traveling cable.
- C. Provide shielded wires for the auto dial telephone system within the traveling cable, five (5) pair shielded wires for card reader, one (1) RG-6 Ethernet cable for Wi-Fi, two (2) pair 14-gauge wires for 110 Volt power supply, and wire for video display monitor if specified.
- D. If traveling cables contact the hoistway or elevator due to sway or change in position, provide shields or pads to the elevator and hoistway to prevent damage to the traveling cables.
- E. Hardware cloth may be installed from the hoistway suspension point to the elevator pit to prevent traveling cables from rubbing or chafing and securely fastened and tensioned to prevent buckling. Hardware cloth is not required when traveling cable is hung against a flat wall.

2.6 CONTROLLER AND SUPERVISORY PANEL

- A. Remove existing and provide new UL Labeled Controller. Mount all assemblies, power supplies, chassis switches, and relays on a steel frame in a NEMA Type 1 General Purpose Enclosure. Cabinet shall be securely attached to the building structure.
- B. Properly identify each device on all panels by name, letter, or standard symbol which shall be neatly stencil painted or decaled in an indelible and legible manner. Identification markings shall be coordinated with identical markings used on wiring diagrams. The ampere rating shall be marked adjacent to all fuse holders. All spare conductors to controller and supervisory panel shall be neatly formed, laced, and identified.

2.7 MICROPROCESSOR CONTROL SYSTEM

- A. Provide a new microprocessor control system with absolute position/speed feedback to control dispatching, signal functions, door operation, and VVVF Drive for hoist motor control. Complete details of the components and printed circuit boards, together with a complete operational description, shall be submitted for approval.
- B. Controller manufacturer shall provide factory training, engineering and technical support, including all manuals, wiring diagrams, and tools necessary for adjusting, maintenance, repair, and testing of equipment.

2.8 MACHINE ROOM MONITOR

- A. Provide a monitor in each machine room, separate monitors for each passenger elevator group. Provide a separate keyboard for each monitor.
- B. The monitor shall contain indicators to provide the following information:
 - 1. The floor where each elevator is currently located.

2. The direction that each elevator is currently traveling or is scheduled to travel.
 3. The location and direction of currently registered hall calls.
 4. Elevators that are currently out of service.
 5. Elevators that are currently bypassing hall calls.
 6. Elevators that are currently engaged in passenger transfers.
 7. Operations program under which entire group is currently operating.
 8. Zone divisions of the entire group.
 9. Door positions.
 10. Status indication for elevators on independent service, car top inspection, fire service, earthquake protection, and activated stop switch and alarm bell.
- C. The maintenance terminal shall be suitable for all troubleshooting procedures related to the specific type microprocessor installed on this project.

2.9 EMERGENCY POWER OPERATION

- A. If applicable, the control system for the Elevators shall provide for the operation of at least one car per elevator group on emergency power upon failure of the normal power supply.
- B. Auxiliary equipment on elevator controllers, wiring between associated elevator controllers and wiring between elevator controllers and remote selector panel as required to permit the elevators to operate as detailed, shall be provided by the Elevator Contractor.
- C. Upon loss of normal power supply there shall be a delay before transferring to emergency power of 10 seconds minimum to 45 seconds maximum, the delay shall be accomplished through an adjustable timing device. After adjusting delay, the associated elevators shall function as follows:
 1. Selector switch, Automatic position:
 - a. Not more than one elevator at a time in each group shall be automatically selected and returned to the main floor, at contract speed, cycle its car and hoistway doors and shut down, with "Door Open" button remaining operable.
 - b. As each elevator reaches the designated floor and shuts down, another elevator shall start and return to the designated floor.
 - c. Elevators that have been manually removed from automatic service and are on independent service, fire service or medical emergency shall receive an automatic return signal. Elevators on inspection service or out of service shall not receive a signal.
 - d. When an elevator is given a signal to return and it is unable to start its movement to the designated floor within 30 seconds it shall be by-passed. When an elevator is by-passed, another elevator shall start and return.
 - e. This process shall continue until all elevators have returned to the designated floor and shut down.
 - f. Any elevator or elevators by-passed on initial return signal shall be signaled again.
 - g. When all cars in group have returned to designated floor, one elevator in each group shall be designated for automatic operation. Individual cars in each group shall restart at 5 second intervals.

- h. If elevator(s) are keyed on to medical emergency service in the car prior to transfer to emergency power operation, medical emergency service shall be retained. This elevator shall be the first automatically selected elevator to operate on emergency power operation and complete its selected call demand. The elevator will return to the designated floor after the key switch is reset to normal position.
- 2. Selector switch, Manual operation:
 - a. Selector switch shall be mechanically and electrically interlocked to prevent the selection of more than one elevator from operating on emergency power.
 - b. The selector switch shall have positions marked with the number of each elevator controlled. It shall also have a position marked "Automatic". When the selector switch is set to the automatic position, the medical emergency service car shall operate on emergency power operation, or if none, the last car arriving at the designated floor shall operate on emergency power operation.
 - c. Change in selection of elevators shall be by means of the selection switch and shall occur only when the previous selected elevator is stopped at the designated floor.
 - d. The selector switch shall be locked out of operation when the system is in the normal mode of operation.
 - e. Locate the selector switch above the hall push button at the designated level. The key switch shall be a tumbler type lock furnished with four keys. The enclosure faceplate shall be identified "Emergency Power Control" with 13 mm (.50 in.) engraved letters filled with black paint.
- D. Prior to the return of normal power an adjustable timer circuit shall activate that will cause all cars to remain at a floor if already there or stop and remain at the next floor if in flight. Actual transfer of power from emergency power to normal building power shall take place after all cars are stopped at a floor with their doors open.
- E. Emergency Rescue Operation:

Provide a power source to send the elevator(s) to the nearest landing. After the elevator(s) has leveled at the nearest landing, provide power to open the car and hoistway doors automatically. After a predetermined time, the doors shall close. Power shall stay applied to the door open button to reopen the doors from the inside of the elevator. The elevator shall remain shut down at the landing until normal power is restored. Install a sign on the controller indicating that power is applied to emergency rescue operator and door operator during loss of normal power.

2.10 FIREFIGHTER'S SERVICE

- A. Provide Firefighter's Service.
 - 1. Main Floor
 - 2. Verify main and alternate floors with project manager.

2.11 INDEPENDENT SERVICE

- A. Provide an Independent Service key switch on the face of the main car operating panel or a toggle switch in the service operating panel that shall have its positions marked "ON" and "OFF". When the switch is in the "ON" position, the car shall respond only to calls registered on its car dispatch buttons and shall bypass all calls registered on landing push buttons. The car shall start when a car call is registered, car call button or door close button is pressed, car and hoistway doors are closed, and interlock circuits are made. When switch is returned to "OFF" position, normal service shall be resumed.

2.12 MEDICAL EMERGENCY SERVICE

- A. Provisions shall be made for calling elevator(s) to floors served by the elevator on an emergency basis, operating independently from the dispatch signals and landing call signals.
- B. Install key switch in the floor landing push button fixture above the push buttons.
- C. Provide a call registered light indicator adjacent to key switch. The key switch at the landings and in the car, shall only be operable by authorized personnel with a valid ID badge and key.
- D. When key switch is activated at any floor, the call register light indicator shall illuminate at the call floor and inside the elevator only. The elevator control system shall instantly select an elevator to respond to the medical emergency call. Immediately upon selection, all car calls shall be cancelled. If car is traveling away from the medical emergency call, it shall slow down and stop at the nearest floor, maintain closed doors, reverse direction and proceed nonstop to the medical emergency call floor. If the car is traveling toward the medical emergency call floor, it shall proceed to that floor nonstop. If at the time of selection, it is slowing down for a stop, the car shall stop, maintain doors closed, and start immediately toward the medical emergency floor.
- E. Arriving at the medical emergency floor, the car shall remain with doors open for 30 seconds. After this interval has expired and the car has not been placed on medical emergency operation inside the car, the car shall automatically return to normal service.
- F. Provide an LED illuminated indicator light next to the Medical Emergency key switch the same size as the Fire Service indicator.
 - 1. Locate a "Medical Emergency" key switch above call buttons in the main car operating panel for selecting medical emergency service. Activation of the card reader will allow the car to accept a car call for any floor, close doors, and proceed nonstop to the floor desired.
 - 2. After medical emergency call has been completed the elevator shall return to normal operation after an adjustable time of 30 to 90 seconds has expired.
- G. In the center of the rear cab panel provide a back lighted "MEDICAL EMERGENCY" LED illuminated display that shall flash on and off continuously when the car is assigned to this operation and until it is restored to normal service. "MEDICAL EMERGENCY" indicator shall be a photographic negative type 1828 mm (72 in.) to center above the floor, 152 mm (6 in.) wide X 76 mm (3 in.) high, with 12 mm (.50 in.) high letters legible only when illuminated.

- H. If the car being operated on “Independent Service”, the medical emergency service indicator lights in the car operating panel and rear wall shall be illuminated, buzzer shall sound, and the “Audio Voice” system shall direct the attendant to return the car to automatic operation.
- I. If the car is out of service and unable to answer medical emergency calls, the call register light shall not illuminate.
- J. Each key switch shall have its identity legible and indelible engraved in faceplates. All lettering shall be 6 mm (.25 in.) high, filled with black paint.
- K. When Phase I firefighter’s recall is activated it shall over-ride elevators on medical emergency service and return them to the main or alternate fire service recall floor. When the fire emergency floor has been identified the attendants may complete their medical emergency run on Phase II firefighter’s operation if life safety is not affected.

2.13 LOAD WEIGHING

- A. Provide means for weighing carload for each elevator. When load in a car reaches an adjustable predetermined level of the rated capacity, that car shall bypass registered landing calls until the load in the car drops below the predetermined level. Calls bypassed in this manner shall remain registered for the next car. The initial adjustment of the load weighing bypass setting shall be 60 to 100 percent.

2.14 ANTI-NUISANCE FEATURE

- A. If weight in the car is not commensurate with the number of registered car calls, cancel car calls. Systems that employ either load weighing or door protective device for activation of this feature are acceptable.

2.15 SEISMIC REQUIREMENTS

- A. Meet the requirements of Seismic Design Manual H-18-8.

2.16 ELEVATOR MACHINE BEAMS

- A. Reuse existing beams and add blocking beams as required by machine manufacturer.

2.17 TRACTION HOIST MACHINE

- A. Provide new gearless traction machines with an AC motor, brake, drive sheave, and deflector sheave mounted in proper alignment on an isolated bedplate.
- B. Provide hoist machine mounted direct drive, digital, closed-loop velocity encoder.
- C. Drive sheaves shall be free from cracks, sand holes, and other imperfections that would tend to damage the hoist ropes. Sheave shall be turned smooth and true with rope grooves of proper design to insure maximum traction and maximum life of the hoist ropes.
- D. Hoisting machine brake shall be drum or disc type and shall stop and hold the elevator with 125 percent of rated load.

2.18 DEFLECTOR SHEAVES

- A. Provide new deflector sheaves with a metal guard and a guard to prevent ropes from jumping out of grooves. Securely fasten guard to sheave support beams.

2.19 HOIST ROPES

- A. Provide elevator with the required number and size of new ropes to ensure adequate traction and required safety factor. Hoisting ropes shall be pre-formed 8 x 19 or 8 x 25 traction steel, with minimum nominal diameter of 0.50 inch.
- B. Securely attach a corrosion resistant metal data tag to one hoisting rope fastening on top of the elevator.

2.20 HOIST ROPE COMPENSATION

- A. Provide compensation when required by controller manufacturer. Compensation shall consist of a necessary number and size of encapsulated chains attached to the underside of car and counterweight frames.
 - 1. Provide pit guide to minimize chain sway.
 - 2. Provide take-up adjustment to compensate for hoist rope stretch.
 - 3. Pad areas where compensation may strike car or hoistway items.

2.21 GOVERNOR ROPE

- A. New governor rope shall be 6 x 19 or 8 x 19 wire rope, preformed traction steel, uncoated, fiber core, with minimum nominal diameter of 0.375 inch having a minimum safety factor of 5. Tiller rope construction is not acceptable.
- B. Under normal operation rope shall run free and clear of governor jaws, rope guards, and other stationary parts.
- C. Securely attach governor rope tag to governor rope releasing carrier.

2.22 SPEED GOVERNOR

- A. Provide new centrifugal car driven governor to operate the car safety device. Governor shall be complete with weighted pit tension sheave, governor release carrier and mounting base with protected cable sleeves.
- B. Provide overspeed switch, and a speed reducing switches when required.
- C. The governor rope clamping device shall be designed to prevent appreciable damage to or deformation of the governor rope that results from the stopping action of the device operating the safety.
- D. Provide metal guard over top of governor rope and sheaves.
- E. Where the elevator travel does not exceed 100 feet, the weight tension sheave may be mounted on a pivoted steel arm in lieu of operating in steel guides.

2.23 CAR SAFETY DEVICE

- A. Provide new “Type B Safeties” on the elevator.

2.24 ASCENDING CAR OVERSPEED PROTECTION

- A. Provide new devices to prevent ascending over speed and unintended motion away from the landing when the doors are not closed and locked.

2.25 CAR AND COUNTERWEIGHT BUFFERS

- A. Provide new buffers for each car and each counterweight. Securely fasten buffers and supports to the pit channels and in the alignment with striker plates on car and counterweight. Each installed buffer shall have a permanently attached metal plate indicating its stroke and load rating. Buffer anchorage shall not puncture pit waterproofing.

2.26 COUNTERWEIGHTS

- A. The counterweight shall be cleaned and all missing or damaged bolts, tie rods, and frames members shall be replaced.
- B. Sub-weights shall be added or removed from the counterweights frame to provide counterbalance equal to the weight of the complete car and 40 to 50 percent of the rated capacity, as required by the controller manufacturer. New sub-weights shall be cast iron, flame cut hot rolled steel, or cast lead.
- C. Reuse existing counterweight guard. If compensation chains are required remove counterweight guards.

2.27 GUIDE RAILS, SUPPORTS, AND FASTENINGS

- A. Retain existing car and counterweight guide rails and brackets.
- B. Thoroughly clean all guide rails of dust, grease, oil, rust, and other foreign substances. File and remove all rough edges and surfaces and tighten bracket bolts and guide clips for smooth and quiet operation of car and counterweight.

2.28 NORMAL AND FINAL TERMINAL STOPPING DEVICES

- A. Mount new terminal slowdown switches and direction limit switches on the elevator or in hoistway to reduce speed and bring car to an automatic stop at the terminal landings.
 - 1. Switches shall function with any load up to and including 125 percent of rated elevator capacity at any speed obtained in normal operation.
 - 2. Switches, when opened, shall permit operation of elevator in reverse direction of travel.
- B. Mount new final terminal stopping switches in the hoistway.
 - 1. Switches shall be positively opened should the car travel beyond the terminal direction limit switches.
 - 2. Switches shall be independent of other stopping devices.

3. Switches, when opened, shall remove power from hoist motor, apply hoist machine brake, and prevent operation of car in either direction.

2.29 CROSSHEAD DATA PLATE AND CODE DATA PLATE

- A. Permanently attach a non-corrosive metal Data Plate to car crosshead.
- B. Permanently attach a non-corrosive Code Data Plate to the controller.

2.30 WORKMAN'S LIGHTS AND OUTLETS

- A. Provide new duplex GFCI protected type receptacles and lamps with guards on top of each elevator car and beneath the platform. The receptacles shall be 3-wire grounded type, rated for 15 amperes and 125 volts.

2.31 CARTOP OPERATING DEVICE

- A. Provide a new cartop operating device.
- B. The device shall be activated by a toggle switch mounted in the device. The switch shall be clearly marked "INSPECTION" and "NORMAL" on the faceplate, with 6 mm (.25 in.) letters.
- C. Movement of the elevator shall be accomplished by the continuous pressure on a direction button and a safety button.
- D. Provide an emergency stop switch, push to stop/pull to run.
- E. Provide permanent identification for the operation of all components in the device.
- F. The device shall be permanently attached to the elevator crosshead on the side of the elevator nearest to the hoistway doors used for accessing the top of the car.

2.32 CAR LEVELING DEVICE

- A. Car shall be equipped with a new two-way leveling device to automatically bring the car to within 3 mm (.125 in.) of exact level with the landing for which a stop is initiated regardless of load in car or direction.
- B. If the car stops short or travels beyond the floor, the leveling device, within its zone shall automatically correct this condition and maintain the car within 3 mm (.125 in.) of level with the floor landing regardless of the load carried.

2.33 EMERGENCY STOP SWITCHES

- A. Provide an emergency stop switch, push to stop/pull to run, for the top-of-car device, pit, machine space, service panel and firefighter's control panel inside the elevator. Mount stop switches in the pit adjacent to pit access door, at top of the pit ladder 1220 mm (48 in.) above the bottom landing sill and 1220 mm (48 in.) above the pit floor adjacent to the pit ladder.
- B. Each stop switch shall be red in color and shall have "STOP" and "RUN" positions legibly and indelibly identified.

2.34 MAIN CAR OPERATING PANEL

- A. Provide new vandal resistant main car operating panel in the car enclosure on the front return panel for passenger elevators. The top floor car call push button shall not be more than 1220 mm (48 in.) above the finished floor. Car call push buttons and indicator lights shall be LED illuminated, round with a minimum diameter of 25 mm (1 in.). Each button shall contain an integral registration LED white light which shall illuminate upon registration of a call and shall extinguish when that call is answered.
- B. One-piece with the firefighter's service panel recessed into the upper section and the service operation panel recessed into the lower section fitted with hinged doors. Doors shall have concealed hinges, be in the same front plane as the faceplate and fitted with key operated locks. Secure the faceplate with stainless steel tamperproof screws.
- C. All terminology and tactile symbols on the faceplate shall be on square or rectangular plates recessed into the faceplate with its surface flush with the surface of the faceplate. Use 6 mm (.25 in.) letters to identify all devices in the faceplate. The tactile symbols with contrasting background shall be 12.5 mm (0.5 in.) high raised .075 mm (.030 in.) on the plate.
- D. The upper section shall contain the following items in order listed from top to bottom:
 - 1. Elevator number, 12.5 mm (.50 in.) high with black paint for contrast.
 - 2. Capacity plate information with black paint for contrast with loading class and number of passengers allowed.
 - 3. LED illuminated digital car position indicator with direction arrows.
 - 4. Emergency car lighting system consisting of a rechargeable battery, charger, controls, and LED illuminated light fixture. The system shall automatically provide emergency light in the car upon failure or interruption of the normal car lighting service, and function irrespective of the position of the light control switch in the car. The system shall maintain a minimum illumination of 1.0 foot-candle when measured 1200 mm (48 in.) above the car floor and approximately 300 mm (12 in.) in front of the car operating panel, for not less than four (4) hours.
 - 5. Firefighter's Emergency Operation Panel shall be 167.6 mm (6.6 in.) minimum to 1830 mm (72 in.) maximum to the top of the panel above finished floor.
 - 6. Firefighter's Emergency Indicator Light shall be round with a minimum diameter of 25 mm (1 in.).
 - 7. Medical Emergency card reader/key switch marked "MEDICAL EMERGENCY" with two positions labeled "ON" and "OFF" and Medical Emergency Indicator Light located next to the card reader/key switch shall be round with a minimum diameter of 25 mm (1 in.). Instruction for Medical Emergency operation shall be engraved below the card reader/key switch and light.
 - 8. Key operated Independent Service Switch or toggle switch inside service panel.
 - 9. Provide a Door Hold Button on the faceplate next to the Independent Service Key Switch. It shall have "DOOR HOLD" indelibly marked on the button. Button shall light when activated. When activated, the door shall stay open for a maximum of one minute. To override hold timer, push a car call button or door close button.

10. Complete set of round car call push buttons, minimum diameter of 25 mm (1 in.), and LED white light illuminated, with numbers and colors corresponding to the floors served. Car call buttons shall be legibly and indelibly identified by a floor number and/or letter not less than 12.5 mm (.50 in.) high in the face of the call button.
 11. Door Open and Door Close buttons shall be located below the car call buttons. They shall have "OPEN" and "CLOSE" legibly and indelibly identified by letters in the face of the respective button. The Door Open button shall be located closest to the door jamb.
 12. Red Emergency Alarm button that shall be located below the car operating buttons. Mount the emergency alarm button not lower than 888 mm (35 in.) above the finished floor. It shall be connected to audible signaling devices. Provide audible signaling devices including the necessary wiring.
 13. Emergency Help push button shall activate two-way communications by Auto Dial telephone system that is compatible with the building's telephone system. Help button shall be LED white light illuminated and flash when call is acknowledged. Legibly and indelibly label the button "HELP" in the face of the button with 12.5 mm (.50 in.) high letters.
- E. The service operation panel in the lower section shall contain the following items:
1. Light switch labeled "LIGHTS" for controlling interior car lighting with its two positions marked "ON" and "OFF".
 2. Inspection switch that will disconnect normal operation and activate hoistway access switches at terminal landings. Switch shall be labeled "ACCESS ENABLE" with its two positions marked "ON" and "OFF".
 3. Three position switch labeled "FAN" with its positions marked "HIGH", "LOW" and "OFF" for controlling car ventilating blower.
 4. Two-position spring return toggle switch or push button to test the emergency light and alarm device. It shall be labeled "TEST EMERGENCY LIGHT AND ALARM".
 5. Two-position toggle switch labeled "Independent Service" with its positions marked "ON" and "OFF".
 6. Two-position emergency stop switch, when operated, shall interrupt power supply and stop the elevator independently of regular operating devices. Emergency stop switch shall be marked "PUSH TO STOP" and "PULL TO RUN".

2.35 AUXILIARY CAR OPERATING PANEL

- A. Provide an auxiliary car operating panel in the front return panel opposite the main car operating panel. The auxiliary car operating panel shall contain only those controls essential to passenger (public) operation. The auxiliary car operating panel faceplate shall match the main car operating panel faceplate in material and general design. Secure the faceplate with stainless steel tamperproof screws.
1. Complete set of round car call push buttons, minimum diameter 25 mm (1 in.), and LED white light illuminated, corresponding to the floors served. Car call button shall be legibly and indelibly identified by a floor number and/or letter not less than 12.5 mm (.50 in.) high in the face of the call button corresponding to the numbers of the main car operating buttons.

2. Mount door "OPEN" and door "CLOSE" buttons closest to the door jamb and mount the alarm button no lower than 888 mm (35 in.) above the finished floor. The Door Open button shall be located closest to the door.
 3. Cross-connect all buttons in the auxiliary car operating panels to their corresponding buttons in the main car operating panel. Registration of a car call shall cause the corresponding button to illuminate in the main and auxiliary car operating panel.
 4. Emergency Help push button shall activate two-way communications by auto dial telephone that is compatible with the building's telephone system.
Help button shall be LED white light illuminated and flash when call is acknowledged. Legibly and indelibly label the button "HELP" in the face of the button with 12.5 mm (.50 in.) high letters.
- B. All terminology and tactile symbols on the faceplate shall be on square or rectangular plates recessed into the faceplate with its surface flush with the surface of the faceplate. Use 6 mm (.25 in.) letters to identify all devices in the faceplate. The tactile symbols with contrasting background shall be 12.5 mm (0.5 in.) high raised .030 inch on the plate. Surface mounted plates are not acceptable.

2.36 CAR POSITION INDICATOR

- A. Provide an alpha-numeric digital car position indicator in the main car operating panel, consisting of numerals and arrows not less than 63 mm (2.5 in.) high, to indicate position of car and direction of car travel. Locate position indicator at the top of the main car operating panel, illuminated by light emitting diodes.

2.37 AUDIO VOICE SYSTEM

- A. Provide digitized audio voice system. Audio voice shall announce floor designations, direction of travel, and special announcements. The voice announcement system shall be a natural sounding human voice that receives messages and shall comply with ADA requirements for audible car position indicators. The voice announcer shall have two separate volume controls, one for the floor designations and direction of travel, and another for special announcements. The voice announcer shall have a full range loudspeaker, located on top of the cab. The audio voice unit shall contain the number of ports necessary to accommodate the number of floors, direction messages, and special announcements. Install voice announcer per manufacturer's recommendations and instructions. The voice system shall be the product of a manufacturer of established reputation. Provide manufacturer literature and list of voice messages.
1. Fire Service Message.
 2. "Please do not block doors".

2.38 AUTO DIAL TELEPHONE SYSTEM

- A. Furnish and install a complete ADA compliant auto dial telephone that is compatible with the building's telephone system.
- B. Provide a two-way communication device in the car with automatic dialing, tracking and recall features with shielded wiring to car controller in machine room. Provide dialer with automatic rollover capability with two numbers.

- C. "HELP" button shall illuminate and flash when call is acknowledged. Button shall match floor push button design.
- D. Provide "HELP" button tactile symbol signage and Braille adjacent to button mounted integral with car operating panels.
- E. The auto dial system shall be in the main or auxiliary car operating panel. The speaker and unit shall be mounted on the backside of the perforated stainless-steel plate cover.
- F. Each elevator shall have individual phone numbers.
- G. If the operator ends the call, the passenger shall be able to redial the telephone immediately.

2.39 CORRIDOR OPERATING DEVICES

- A. Provide new elevator operating and signal devices from not less than 3 mm (.125 in.) thick flat stainless steel with all edges beveled 15 degrees.
- B. Corridor push button faceplates shall be sized to accommodate corridor pictograph on faceplate. The centerline of the landing push buttons shall be 106.6 mm (4.2 in.) above the corridor floor.
- C. Elevator Corridor Call Station Pictograph shall be engraved in the faceplate.
- D. Fasten all car and corridor operating device and signal device faceplates with stainless steel tamperproof screws.
- E. All terminology and tactile symbols on the faceplate shall be raised .030 inch with contrasting background, on square or rectangular plates recessed into the faceplate with its surface flush with the surface of the faceplate. The handicapped markings with contrasting background shall be 12.5 mm (0.5 in.) high raised .030 inch on the plate, square or rectangular. Use 6 mm (.25 in.) letters to identify all other devices in the faceplate. Surface mounted plates are not acceptable.
- F. Provide one risers of landing call buttons for each elevator or group of elevators as shown on contract drawings.
- G. Each button shall contain an integral registration LED white light which shall illuminate upon registration of a call and shall extinguish when that call is answered.
- H. The direction of each button shall be legibly and indelibly identified by arrows not less than 12.5 mm (.50 in.) high in the face of each button.
- I. Landing push buttons shall not re-open the doors while the car and hoistway doors are closing at that floor, the call shall be registered for the next available elevator. Calls registered shall be canceled if closing doors are re-opened by means of "DOOR OPEN" button or infrared curtain unit.
- J. Provide a separate fixture above the hall button fixture for emergency power indicator light, fire service recall key switch and indicator light, fire recall instruction, communication failure light, communication audible enunciator, and reset key switch at the designated main floor.
- K. Remove old fixtures, repair, and refinish walls.
- L. Submit design of hall pushbutton fixtures for approval.

2.40 DIGITAL CORRIDOR ARRIVAL LANTERN/POSITION INDICATOR

- A. Provide elevators with new combination corridor lantern/position indicator digital display mounted over the hoistway entrances at each floor. Provide each terminal landing with "UP" or "DOWN", minimum 63 mm (2.5 in.) high digital arrow lanterns and each intermediate landing with "UP" and "DOWN" digital arrow lanterns. Each lens shall be LED illuminated of proper intensity, so shielded to illuminate individual lens only. The lenses in each lantern shall be illuminated green to indicate "UP" travel and red to indicate "DOWN" travel. Lanterns shall signal in advance of car arrival at the landing indicating the direction of travel. Corridor lanterns shall not be illuminated when a car passes a floor without stopping.

Each lantern shall be equipped with an audible electronic chime which shall sound once for "UPWARD" bound car and twice for "DOWNWARD" bound car. Audible signal shall not sound when a car passes the floor without stopping. Provide adjustable sound level on audible signal. Car riding lanterns are not acceptable.

- B. Install alpha-numeric digital position indicator between the arrival lanterns. Indicator faceplate shall be stainless steel. Numerals shall be not less than 63 mm (2.5 in.) high with direction arrows. Cover plates shall be readily removable for re-lamping. The appropriate direction arrow shall be illuminated during entire travel of car in corresponding direction.
- C. Remove old fixtures, repair, and refinish walls.

2.41 HOISTWAY ACCESS

- A. Provide new hoistway access switches for elevator at top terminal landing to permit access to top of car, and at bottom terminal landing to permit access to pit. Elevators with side slide doors, mount the access key switch 1830 mm (6 ft.) above the corridor floor in the wall next to the strike jamb.
- B. Exposed portion of each access switch or its faceplate shall have legible, indelible legends to indicate "UP", "DOWN", and "OFF" positions.
- C. Each access switch shall be a constant pressure cylinder type lock having not less than five pins or five stainless steel disc combination with key removable only when switch is in the "OFF" position.
- D. Lock shall not be operable by any other key which will operate any other lock or device used for any other purpose at the building.
- E. Arrange the hoistway switch to initiate and maintain movement of the car. When the elevator is operated in the down direction from the top terminal landing, limit the zone of travel to a distance not greater than the top of the car crosshead level with the top floor. Submit design and location of access switches for approval.
- F. Provide emergency access for all hoistway entrances, keyways for passenger and elevators.

2.42 HOISTWAY ENTRANCES:

- A. Refinish existing stainless-steel entrance frames or paint existing painted entrance frames or clad existing entrance frames in stainless steel.
- B. Clean and reuse existing hoistway sills, hanger supports, strut angles, fascia plates and toe guards.
- C. Replace all damaged or missing dust covers.
- D. Provide new stainless steel hoistway doors. Door panels shall be not less than 16-gauge sheet steel and not less than 32 mm (1.25 in.) thick flush type construction with the hall side and leading edge wrapped in one continuous piece of 16-gauge stainless steel. Top and bottom of door panels shall have continuous stiffener channels welded in place. Reinforcement of the door panels shall be approximately 1.0 mm (0.04 in.) in thickness and of the hat section type. Reinforce each door panel for hangers, interlock mechanism, opening and closing devices. Do not use hangers that are constructed integrally with the door panels.
- E. Hang doors on two-point suspension hangers having sealed ball-bearing sheaves not less than 76 mm (3 in.) in diameter, with non-metallic sound-reducing tires. Equip hangers with adjustable ball-bearing rollers to take upward thrust of panels. Provide two non-metallic door gibs on each door panel and a separate fire gib. Gibs shall be replaceable without removing of door panel.
One door panel for each entrance shall bear a BOCA label, Underwriters' label, or other labels may be furnished provided they are based on fire test reports and factory inspection procedures acceptable to the project manager. Fasten stainless steel sight guard of 14-gauge metal, extending full height of panel, to leading edge of fast speed panel of two-speed doors.
- F. Provide new hardware, tracks, gibs, separate fire gibs, door rollers, door locks, drive roller assemblies and sill mounted closers.
- G. Reuse Braille plates on both sides of door frame entrances located 152.3 cm (60 in.) to center above finished floor. Replace damaged or missing Braille plates.
- H. Provide unique car number on every elevator entrance at designated main fire service floor level, minimum 76 mm (3 in.) in height.
- I. Equip each hoistway entrance with a new electrical/mechanical interlock, functioning as hoistway unit system, to prevent operation of car until all hoistway doors are locked in closed position.
- J. Wiring installed from the hoistway riser to each door interlock shall be NEC type SF-2 or equivalent.

2.43 CAR AND COUNTERWEIGHT GUIDES

- A. Install four new adjustable roller guides, each assembled on a substantial metal base, to permit individual alignment to the guide rails.
- B. Each guide shall consist of not less than three (3) wheels, each with a durable, resilient oil-resistant material tire rotating on ball bearings having sealed-in lubrication. Assemble rollers on a substantial metal base and mount to provide continuous spring pressure contact of all wheels with the corresponding rail surfaces under all conditions of loading and operation. Secure the roller guides at top and bottom on each side of car frame and

counterweight frame. All mounting bolts shall be fitted with nuts, flat washers, split lock washers, and if required, beveled washers.

- C. Provide sheet metal guards to protect rollers on top of car and counterweight.
- D. Minimum diameter of car rollers shall be 152 mm (6 in.). The entire elevator car shall be properly balanced to equalize pressure on all guide rollers. Cars shall be balanced in post-wise and front-to-back directions. Test for this balanced condition shall be witnessed at time of final inspection.
- E. Minimum diameter of counterweight rollers shall not be less than 101 mm (4 in.). Properly balance counterweight frame to equalize pressure on all guide rollers. The Contractor shall have the option of furnishing, for counterweight only, mechanically adjusted roller guide in lieu of spring-loaded roller guides as specified.
- F. Equip car and counterweight with an auxiliary guiding device for each guide shoe which shall prevent the car or counterweight from leaving the rails if the normal guides fail. These auxiliary guides shall not, during normal operation, touch the guiding surfaces of the rails. The auxiliary guides may be an extension of the normal guide shoe mounting plate if that plate is fabricated from hot rolled steel.
The portion of the auxiliary guide that contacts the rail guiding surfaces in the event of loss of the normal guides shall be lined with an approved bearing material to minimize damage to the rail guiding surfaces.

2.44 CAR FRAME:

- A. Reuse existing car frame. Tighten bolts and replace missing bolts.

2.45 CAR PLATFORM:

- A. Provide a platform guard (toe guard) of not less than 12-gauge sheet-steel on the entrance side, extend 76 mm (3 in.) beyond each side of entrance jamb. Securely brace platform guard to car platform, and bevel bottom edge at a 60-75-degree angle from horizontal. Install platform in the hoistway, so that the clearance between front edge and landing threshold shall not exceed 32 mm (1.25 in.).
- B. Isolate the platform from the car frame by approved rubber pads or other equally effective means.

2.46 CAR ENCLOSURE

- A. Passenger Elevator Cars: Are hereby defined to include, but not necessarily by way of limitation, the finished walls, doors, ceilings, lighting, trim, hardware and accessories. Signal equipment and operating and safety devices shall be installed as specified. Elevator Manufacturer shall note that existing cabs shall be stripped to shell for installation of noted finishes and hardware. Basis of Design shall be Crown Street Garage.
- B. Car Doors: Horizontal center-parting doors of the type scheduled fabricated from 16 gauge stainless steel, #4, satin, by Rigidized Metals Corp.; flush construction.
- C. Door Track and Sheaves: Cold-rolled steel track, sealed ball-bearing sheaves with non-metallic bearing surfaces, 2-point suspension with up-thrust sheave.

- D. Door Frame, Transom and Front Wall: Integrally-formed 16 gauge stainless steel, #4, satin, by Rigidized Metals Corp. Provide cut-outs, reinforcing and cabinets as shown and otherwise required for signal equipment.
- E. Side Walls: 16 gauge #4 satin stainless steel with .036 gauge raised textured stainless steel wall panels 1-CS 304, by Rigidized Metals Corp.
- F. Back Wall: 16 gauge #4 satin stainless steel with .036 gauge raised textured stainless steel wall panels 1-CS 304, by Rigidized Metals Corp.
- G. Provide stainless steel, satin, handrail on back walls, 1 1/2" diameter, 32 inches above floor.
- H. Floor Covering: Poured epoxy resin from standard color chart with non-slip finish.
- I. Ceiling and Lighting: Manufacturer's standard ceiling, equal to Schindler SC04 concealed frame, 6 baked enamel ceiling panels, white, with 6 LED downlights with lens.
- J. Provide hinged emergency exit on top of car with mechanical stop contacts to prevent operation of car when exit door is opened.
- K. Emergency Lighting: Provide emergency lighting. Comply with Code.
- L. Mechanical Ventilation: Supply fan with outlet diffuser, 10 cfm per sq. ft. of floor area, NC rating of 25 or less. Provide emergency power.
- M. Maintenance Devices: Provide a 20 amp 110 VAC duplex outlet and lamp with wire guard on top and bottom of elevator car and one duplex outlet inside car in a position not visible to the public.

2.47 POWER DOOR OPERATORS:

- A. Provide new high-speed heavy-duty door operator to automatically open the car and hoistway doors simultaneously when the car is level with the floor, and automatically close the doors simultaneously at the expiration of the door-open time. Provide microprocessor door control with circuitry to constantly monitor and automatically adjust door operation based upon velocity, position, and motor current. Motor shall be of the high-internal resistance type, capable of withstanding high currents resulting from stall without damage to door operator/motor. The door operator shall open the car door and hoistway door simultaneously, at a speed up to 76.2 cm (2.5 ft) per second. Closing speed of the doors shall be 305 mm (1 ft) per second. Reversal of direction of the doors from the closing to opening operation, whether initiated by obstruction of the infrared curtain or the door "OPEN" button, shall be accomplished within 38 mm (1.50 in.) maximum of door movement. Emphasis is placed on obtaining quiet interlock and door operation; smooth, fast, dynamic braking for door reversals, and stopping of the doors at extremes of travel.
- B. Equip car doors with electric contact that prevents operation of car until doors are closed unless car is operating in leveling zone or hoistway access switch is used. Locate door contact to prevent its being tampered with from inside of car.
- C. Car and hoistway doors shall be manually operable in an emergency without disconnecting the power door operating equipment unless the car is outside the unlocking zone.
 - 1. It shall not be possible for the doors to open by power unless the elevator is within the leveling zone.

2. Provide infrared curtain unit. The device shall cause the car and hoistway doors to reverse automatically to the fully open position should the unit be actuated while the doors are closing. Unit shall function when the doors are not closed, except during firefighter's operation.
- D. Should the doors be prevented from closing for more than a predetermined adjustable interval of 15 to 30 seconds by operation of the curtain unit, the doors shall stay open, the audio voice message and a buzzer located on the car shall sound only on automatic operation. Do not provide door nudging.
 1. If an obstruction of the doors should not activate the photo-electric door control device and prevent the doors from closing for more than a predetermined adjustable interval of 15 to 30 seconds, the doors shall reverse to the fully open position and remain open until the "Door Close" button re-establishes the closing cycle.
- E. Provide door "OPEN" and "CLOSE" buttons. When the door "OPEN" button is pressed and held, the doors, if in the open position, shall remain open and if the doors are closing, they shall stop, reverse and re-open. Momentary pressure of the door "CLOSE" button shall initiate the closing of the doors prior to the expiration of the normal door open time.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Examine work of other trades on which the work of this section depends. Report defects to the project manager in writing that may affect the work of the elevator contractor.
- B. Examine elevator hoistway openings for plumb, level, in line, and that elevator pit is proper size, waterproofed and drained with necessary access door, and ladder.
- C. Examine machine room for proper illumination, heating, ventilation, electrical equipment, and beams are correctly located complete with access stairs and door.
- D. Before fabrication, take necessary job site measurements, and verify where work is governed by other trades. Check measurement of space for equipment and means of access for installation and operation. Obtain dimensions from site for preparation of shop drawings.
- E. Work required prior to the completion of the elevator installation:
 1. Supply of electric feeder wires to the terminals of the elevator control panel, including circuit breaker.
 2. Provide light and GFCI outlets in the elevator pit and machine room.
 3. Furnish electric power for testing and adjusting elevator equipment.
 4. Furnish circuit breaker panel in machine room for car and hoistway lights and receptacles.
 5. Supply power for cab lighting and ventilation from an emergency power panel specified in Division 26, ELECTRICAL.
 6. Machine room enclosed and protected from moisture, with self-closing, self-locking door and access stairs.
 7. Provide fire extinguisher in machine room.

3.2 ARRANGEMENT OF EQUIPMENT

- A. Arrange equipment in machine room so that major equipment components can be removed for repair or replacement without dismantling or removing other equipment in the same machine room. Locate controller near and visible to its respective hoisting machine.

3.3 WORKMANSHIP, INSTALLATION, AND PROTECTION

- A. Installations shall be performed by Certified Elevator Mechanics and Apprentices to best possible industry standards. Details of the installation shall be mechanically and electrically correct. Materials and equipment shall be new and without imperfections.
- B. Recesses, cutouts, slots, holes, patching, grouting, refinishing to accommodate installation of equipment shall be included in the Contractor's work. All new holes in concrete shall be core drilled.
- C. Structural members shall not be cut or altered. Work in place that is damaged or defaced shall be restored equal to original new condition.
- D. Finished work shall be straight, plumb, level, and square with smooth surfaces and lines. All machinery and equipment shall be protected against dirt, water, or mechanical injury. At completion, all work shall be thoroughly cleaned and delivered in perfect unblemished condition.
- E. Sleeves for conduit and other small holes shall project 50 mm (2 in.) above concrete slabs.
- F. Hoist cables that are exposed to accidental contact in the machine room and pit shall be completely enclosed with 16-gauge sheet metal or expanded metal guards.
- G. Exposed gears, sprockets, and sheaves shall be guarded from accidental contact.

3.4 WORK BY GENERAL CONTRACTOR (as contracted by Elevator Manufacturer)

- A. Perform all necessary cutting and patching to restore existing finishes.
- B. Protect all existing adjoining surfaces that are to remain.
- C. Provide venting of the hoist-way per ANSI A17.1, rule 100.4.
- D. Provide adequate supports adjacent to side and rear walls for rail brackets, including divider beams for multiple elevators in a common hoist-way at each floor, roof and/or immediate locations, with pockets in metallic decking and patching after brackets are in.
- E. Provide block-outs/cutouts through wall and the grouting/patching required to maintain firewall rating as required to accommodate hall boxes for corridor and signal fixtures.
- F. Provide all barricades either outside of elevator hoist-ways or between elevators inside of hoist-ways as required by OSHA and local codes.
- G. Provide a convenience outlet, light fixture in pit and light switch, easily accessible from the lowest landing door.
- H. Provide a pit ladder in each pit, extending to not less than 3'-6" above the bottom landing.
- I. Removal of existing doors, retain frames and retain sills.

- J. Provide support for sills the full width of hoist-way with two and one-half inches minimum floor recess. Provide grouting full length and width after sills are cleaned.
- K. Provide lighting, ventilation, heating, cooling of machine room and machinery space. Machine room temperature will be maintained between 55° F and 90° F
- L. Provide a fused disconnect switch or circuit breaker for each elevator located per the National Electric Code, and a light switch adjacent to the lock jamb-side of the machine room door.
- M. Provide feeder and branch wiring circuits to the controller of copper wire, including a main line switch and convenience outlets.
- N. Provide all conduit and wire runs as required.
- O. Provide a dedicated telephone and telephone line in the machine room for system access of diagnostics and remote access.

3.5 CLEANING

- A. Clean machine room and equipment.
- B. Perform hoistway clean down.
- C. Prior to final acceptance remove protective coverings from finished or ornamental surfaces. Clean and polish surfaces regarding type of material.

3.6 PAINTING AND FINISHING

- A. All equipment, except specified as architectural finish, shall be painted one coat of approved color, conforming to manufacturer's standard.
- B. Hoist machine, motor, shall be factory painted with manufacturer's standard finish and color.
- C. Controller, sheave, car frame and platform, counterweight, beams, rails and buffers except their machined surfaces, cams, brackets and all other uncoated ferrous metal items shall be painted one factory primer coat or approved equal.
- D. Stencil or apply decal floor designations not less than 100 mm (4 in.) high on hoistway doors, fascia or walls within door restrictor areas. The color of paint used shall contrast with the color of the surfaces to which it is applied.
- E. Elevator hoisting machine, controller, governor, main line shunt trip circuit breaker, safety plank, and cross head of car shall be identified by 100 mm (4 in.) high numerals and letters located as directed. Numerals shall contrast with surrounding color and shall be stenciled or decaled.
- F. Hoistway Entrances:
 - 1. Door panels, except stainless steel surfaces, shall be given rust resistant treatment and a factory finish of one coat of baked-on primer and one factory finish coat of baked-on enamel.
 - 2. Fascia plates, top and bottom shear guards, dust covers, hanger covers, and other metalwork, including built-in or hidden work and structural metal, (except stainless steel entrance frames and surfaces to receive baked enamel finish) shall be given one approved prime coat in the shop, and one field coat of paint of approved color.

G. Elevator Cabs:

1. Interior and exterior steel surfaces shall be given rust resistant treatment before finish is applied.
2. Interior steel surfaces shall be factory finished with one coat of paint of approved color.
3. Give exterior faces of car doors one finish coat of paint of approved color.

H. Elevator Cabs:

1. Interior and exterior steel surfaces shall be given rust resistant treatment before finish is applied.
2. Interior steel surfaces shall be factory finished with one coat of paint of approved color.
3. Give exterior faces of car doors one finish coat of paint of approved color.

3.7 PRE-TESTS AND TESTS

- A. Pre-test the elevators and related equipment in the presence of the project manager or their authorized representative for proper operation before requesting final inspection. Conduct final inspection at other than normal working hours, if required by the project manager.
1. The building shall furnish electric power including necessary current for starting, testing, and operating machinery of each elevator.
 2. Contractor shall furnish the following test instruments and materials on-site and at the designated time of inspection: properly marked certified test weights, voltmeter, amp probe, thermometers, direct reading tachometer, megohm meter, vibration meter, sound meter, light meter, stopwatch, and a means of two-way communication.
- B. Inspect workmanship, equipment furnished, and installation for compliance with specification.
- C. Balance Tests: The percent of counterbalance shall be checked by placing test weights in car until the car and counterweight are equal in weight when located at the mid-point of travel. If the actual percent of counterbalance does not conform to the specification, the amount of counterweight shall be adjusted until conformance is reached.
- D. Full-Load Run Test: Elevator shall be tested for a period of one-hour continuous run with full contract load in the car. The test run shall consist of the elevator stopping at every floor, in either direction of travel, for not less than five or more than ten seconds per floor.
- E. Speed Test: The actual speed of the elevator shall be determined in both directions of travel with full contract load and no load in the elevator. The actual measured speed of the elevator with all loads in either direction shall be within three (3) percent of specified rated speed. Full speed runs shall be quiet and free from vibration and sway.
- F. Temperature Rise Test: The temperature rise of the hoisting motor shall be determined during the full load test run. Temperatures shall be measured using thermometers. Under these conditions, the temperature rise of the equipment shall not exceed 50 degrees Centigrade above ambient temperature. Test shall start when all machine room equipment is within five (5) degrees Centigrade of the ambient temperature. Other tests for heat run

on motors shall be performed as prescribed by the Institute of Electrical and Electronic Engineers.

- G. Car Leveling Test: Elevator car leveling devices shall be tested for accuracy of leveling at all floors with no load in car and with contract load in car, in both directions of travel. Accuracy of floor level shall be within plus or minus 3 mm (.125 in.) of level with landing floor for which the stop has been initiated regardless of load in car or direction of travel. The car leveling device shall automatically correct over travel as well as under travel and shall maintain the car floor within plus or minus 3 mm (.125 in.) of level with the landing floor regardless of change in load.
- H. Brake Test: The action of the brake shall be prompt and a smooth stop shall result in the up and down directions of travel with no load and rated load in the elevator. Down stopping shall be tested with 125 percent of rated load in the elevator.
- I. Insulation Resistance Test: The elevator's complete wiring system shall be free from short circuits and ground faults and the insulation resistance of the system shall be determined by use of megohm meter, at the discretion of the Elevator Inspector conducting the test.
- J. Safety Devices: Car and counterweight safety devices shall be tested.
- K. Overload Devices: Test all overload current protection devices in the system at final inspection.
- L. Limit Stops:
 - 1. The position of the car when stopped by each of the normal limit switches with no load and with contract load in the car shall be accurately measured.
 - 2. Final position of the elevator relative to the terminal landings shall be determined when the elevator has been stopped by the final limits. The lower limit stop shall be made with contract load in the elevator. Elevator shall be operated at inspection speed for both tests. Normal limit stopping devices shall be inoperative for the tests.
- M. Oil Buffer Tests: These tests shall be conducted with operating device and limit stops inoperative and with contract load in the elevator for the car buffer and with no load in the elevator for the counterweight buffer. Preliminary test shall be made at the lowest (leveling) speed. Final tests shall be conducted at contract speed. Buffers shall compress and return to the fully extended position without oil leakage.
- N. Operating and Signal System: The elevator shall be operated by the operating devices provided and the operation signals and automatic floor leveling shall function in accordance with requirements specified. Starting, stopping and leveling shall be smooth and comfortable without appreciable steps of acceleration or deceleration.
- O. Performance of the Elevator supervisory system shall be witnessed and approved by the elevator inspector and a representative of the Project Manager.
- P. If equipment fails test requirements and a re-inspection is required, the Contractor shall be responsible for the cost of re-inspection; salaries, transportation expenses, and per-diem expenses incurred by the elevator inspector.

3.8 INSTRUCTION TO BUILDING PERSONNEL

- A. Provide competent instruction to personnel regarding the operation of equipment and accessories installed under this contract, for a period equal to one eight-hour day. Instruction shall commence after completion of all work and at the time and place directed by the Project Manager.
- B. Written instructions in triplicate relative to care, adjustments and operation of all equipment and accessories shall be furnished and delivered to the Resident Engineer in independently bound folders. Written instructions shall include correct and legible wiring diagrams, nomenclature sheet of all electrical apparatus including location of each device, complete and comprehensive sequence of operation, complete replacement parts list of with descriptive literature, and identification and diagrams of equipment and parts. Information shall also include electrical operation characteristics of all circuits, relays, timers, electronic devices, and related characteristics for all rotating equipment.
- C. Provide supplementary instruction for any new equipment that may become necessary because of changes, modifications or replacement of equipment or operation under requirements of paragraph entitled "Warranty of Construction".

3.9 ELEVATOR GUARANTEE PERIOD OF SERVICE: MAINTENANCE SERVICE AND INSPECTIONS

- A. Furnish complete maintenance service and inspections on each elevator installation for a period of one (1) year after completion and acceptance of each elevator in this specification by the project manager. This maintenance service shall run concurrently with the warranty. Maintenance work shall be performed by Certified Elevator Mechanics and Apprentices.
- B. This contract will cover full maintenance including emergency call back service, inspections, and servicing the elevators listed in the schedule of elevators. The Elevator Contractor shall perform the following:
 - 1. Monthly systematic examination of equipment.
 - 2. During each maintenance visit the Elevator Contractor shall clean, lubricate, adjust, repair and replace all parts as necessary to keep the equipment in like new condition and proper working order.
 - 3. Furnishing all lubricant, cleaning materials, parts and tools necessary to perform the work required. Lubricants shall be only those products recommended by the manufacturer of the equipment.
 - 4. Equalizing tension, shorten or renew hoisting ropes.
 - 5. As required, motors, controllers, selectors, leveling devices, operating devices, switches on cars and in hoistways, hoistway doors and car doors or gate operating device, interlock contacts, guide shoes, guide rails, car door sills, hangers for doors, car doors or gates, signal system, car safety device, governors, tension sheaves, and buffers shall be cleaned, lubricated and adjusted.
 - 6. Accumulated rubbish shall be removed from the pits monthly. A general cleaning of the entire installation including all machine room equipment and hoistway equipment

- shall be accomplished quarterly. Cleaning supplies and vacuum cleaner shall be furnished by the Contractor.
7. Maintain the performance standards set forth in this specification.
 8. The operational system shall be maintained to the standards specified hereinafter including any changes or adjustments required to meet varying conditions of hospital occupancy.
 9. Always maintain smooth starting and stopping and accurate leveling.
- C. Maintenance service shall not include the performance of work required because of improper use, accidents, and negligence for which the Elevator Contractor is not directly responsible.
 - D. Provide 24-hour emergency call-back service that shall consist of promptly responding to calls within two hours for emergency service should a shutdown or emergency develop between regular examinations. Overtime emergency call-back service shall be limited to minor adjustments and repairs required to protect the immediate safety of persons and equipment in and about the elevator.
 - E. Service and emergency personnel shall report to the garage manager upon arrival and again upon completion of the required work. A copy of the work ticket containing a complete description of the work performed shall be given to an authorized representative.
 - F. The Elevator Contractor shall maintain a logbook in the machine room. The log shall list the date and time of all weekly examinations and all trouble calls. Each trouble call shall be fully described including the nature of the call, necessary correction performed, or parts replaced.
 - G. Written "Maintenance Control Program" shall be in place to maintain the equipment in compliance with ASME A17.1.

END OF SECTION 14 21 10.01

SECTION 14 21 10.02**TRACTION ELEVATORS (ARPG)****PART 1 – GENERAL****1.1 DESCRIPTION – AIR RIGHTS PARKING GARAGE**

- A. This section specifies the engineering, furnishing and modernization of the complete traction elevator system as described herein and as indicated on the Contract drawings.
- B. Items listed in the singular apply to each elevator in this specification except where noted.
- C. Passenger Elevators 1 thru 4 shall be overhead traction with a microprocessor control system, power operated car and hoistway doors. Elevator shall be Class “A” loading rated.

ELEVATOR SCHEDULE	
Elevator Numbers	1, 2, 3, 4
Elevator Layout	Two (2) Duplex Configurations
Cab Dimensions	49” D x 78” W
Rated Load – lbs.	2,500 lbs.
Contract Speed - fpm	400 fpm
Floors Served	Elevators #1 & #2: Six (6) Front Openings: S, 2, 4, 6, 8, 10 Elevators #3 & #4: Six (6) Front Openings: S, 1, 3, 5, 7, 9
Equipment	<i>Westinghouse</i> Overhead Geared Traction Type 38 (Original). New Hoist Motors during 2006-2007 modernization project.
Controller	<i>Schindler</i> Miconic Duplex -Elevators #1 & #2: (2007) -Elevators #3 & #4: (2006)
Door Type & Size	Front 42” W x 84” H Center-Parting

1.2 RELATED WORK

- A. General provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.
- B. Division 26 – Electrical

1.3 QUALIFICATIONS

- A. Approval is required for products and services of proposed manufacturers, suppliers, installers, and shall be contingent upon submission of certificates by the Contractor stating the following:
 - 1. Elevator contractor is currently and regularly engaged in the installation of elevator equipment as one of their principal products.
 - 2. Elevator contractor shall have five (5) years of successful experience, trained supervisory personnel, and facilities to install elevator equipment specified herein.
 - 3. Elevator Mechanic (Installer) shall have passed a Mechanic Examination approved by the U.S. Department of Labor and have technical qualifications of at least five years of experience in the elevator industry or 10,000 hours of field experience working in the elevator industry with technical update training. Apprentices shall be actively pursuing Certified Elevator Mechanic status. Certification shall be submitted for all workers employed in this capacity.
- B. Welding at the project site shall be performed by certified welders who have previously qualified by test as prescribed in American Welding Society Publications AWS D1.1 to perform the type of work required. Certificates shall be submitted for all workers employed in this capacity. A welding or hot work permit is required for each day and shall be obtained from the safety department. Request permit one day in advance.
- C. Electrical work shall be performed by a Licensed Master Electrician and Licensed Journeymen Electricians as requirements by NEC. Certificates shall be submitted for all workers employed in this capacity.
- D. Approval will not be given to elevator contractors and manufacturers who have established on prior projects, either government, municipal, or commercial, a record of unsatisfactory elevator installations, have failed to complete awarded contracts within the contract period, and do not have the requisite record of satisfactorily performing elevator installations of similar type and magnitude.
- E. Approval of Elevator Contractor's equipment will be contingent upon their providing factory training, engineering and technical support, including all manuals, wiring diagrams, and tools necessary for adjusting, maintenance, repair, and testing of the equipment.
- F. Identifying an elevator maintenance service provider that shall render services within one day of receipt of notification, together with certification that the quantity and quality of replacement parts stock is enough to warranty continued operation of the elevator installation.
- G. Equipment within a group of traction elevators shall be the product of the same manufacturer.
- H. The Contractor shall provide and install safety devices that have been subjected to tests witnessed and certified by an independent professional testing laboratory that is not a subsidiary of the firm that manufactures, supplies, or installs the equipment.

1.4 APPLICABLE PUBLICATIONS

- A. American Society of Mechanical Engineers (ASME):
 - A17.1 - Safety Code for Elevators and Escalators
 - A17.2 - Inspectors Manual for Electric Elevators and Escalators

- B. National Fire Protection Association:
 - NFPA 13 - Standard for the Installation of Sprinkler Systems
 - NFPA 70 - National Electrical Code (NEC)
 - NFPA 72 - National Fire Alarm and Signaling Code
 - NFPA 101 - Life Safety Code
 - NFPA 252 - Fire Test of Door Assemblies
- C. International Building Code (IBC).
- D. American Society for Testing and Materials (ASTM):
 - A1008/A1008M-09 - Steel, Sheet, Cold Rolled, Carbon, Structural, High-Strength Low-Alloy and High Strength Low-Alloy with Improved Formability
 - E1042-02 - Acoustically Absorptive Materials Applied by Trowel or Spray
- E. Manufacturer's Standardization Society of the Valve and Fittings Industry (MSS):
 - SP-58 - Pipe Hangers and Supports
- F. Society of Automotive Engineers, Inc. (SAE):
 - J517-91 - Hydraulic Hose, Standard
- G. Gauges:
 - Sheet and Plate: U.S. Standard (USS)
 - Wire: American Wire Gauge (AWG)
- H. American Welding Society (AWS):
 - D1.1 - Structured Welding Code Steel
- I. National Electrical Manufacturers Association (NEMA):
 - LD-3 - High-Pressure Decorative Laminates
- J. Underwriter's Laboratories (UL):
 - 486A - Safety Wire Connectors for Copper Conductors
 - 797 - Safety Electrical Metallic Tubing
- K. Institute of Electrical and Electronic Engineers (IEEE)

1.5 SUBMITTALS

- A. Submit in accordance with Division 1 all Shop Drawings, Product Data, And Samples.
- B. Before execution of work, furnish information to evidence full compliance with contract requirements for proposed items. Such information shall include, as required:
 - Manufacturer's Name, Trade Names, Model or Catalog Number, Nameplate Data (size, capacity, and rating) and corresponding specification reference. All submitted drawings and related elevator material shall be forwarded the project manager.
- C. Shop Drawings:
 - 1. Complete scaled and dimensioned layout in plan and section view showing the arrangement of equipment and all details of each elevator unit specified including:
 - a. Hoisting machines, controllers, power conversion devices, governors, and all other components located in machine room.
 - b. Car, counterweight, sheaves, supporting beams, guide rails, brackets, buffers, and size of car platform, car frame members, and other components located in hoistway.
 - c. Rail bracket spacing and maximum vertical forces on guide rails in accordance with H 18-8 for Seismic Risk Zone 2 or greater.

- d. Reaction at points of support and buffer impact loads.
- e. Weight of principal parts.
- f. Top and bottom clearances and over travel of car and counterweight.
- g. Location of main line switch/shunt trip circuit breaker, switchboard panel, light switch, and feeder extension points in the machine room.
2. Drawings of hoistway entrances and doors showing details of construction and method of fastening to the structural members of the building.
 - a. If drywall construction is used to enclose hoistway, submit details of interface fastenings between entrance frames and drywall.
 - b. Sill details including sill support.
- D. Samples:
 1. One each of stainless steel, 76 mm x 127 mm (3 in. x 5 in.).
 2. One each of baked enamel, 76 mm x 127 mm (3 in. x 5 in.).
 3. One each of color floor covering.
 4. One each of protection pads, 76 mm x 127 mm (3 in. x 5 in.) if used.
 5. One each car and hoistway Braille plate sample.
 6. One each car and hall button sample.
 7. One each car and hall lantern/position indicator sample.
 8. One each wall and ceiling material finish sample.
 9. One each car lighting sample.
- E. Name of manufacturer, type or style designation, and applicable data of the following equipment shall be shown on the elevator layouts:
 1. Hoisting Machine.
 2. Hoisting Machine Motor, HP and RPM ratings, Voltage, Starting and Full Load Ampere, and Number of Phases.
 3. Controller.
 4. Starters and Overload Current Protection Devices.
 5. Car Safety Device; Type "B" safeties and Governor.
 6. Electric Door Operator; HP, RPM, Voltage, and Ampere rating of motor.
 7. Hoistway Door Interlocks.
 8. Car and Counterweight Buffers; maximum and minimum rated loads, maximum rated striking speed and stroke.
 9. Cab Ventilation Unit; HP rating and CFM rating.
 10. Hoist and Compensation Ropes; breaking strength, allowable working load, and actual working load.
- F. Complete construction drawings of elevator car enclosure showing dimensioned details, fastenings to platform, car lighting, ventilation, ceiling framing, top exits, and location of car equipment.
- G. Complete dimensioned detail of vibration isolating foundations for traction hoisting machines.
- H. Dimensioned drawings showing details of:
 1. All signal and operating fixtures.
 2. Car and counterweight roller guides.
 3. Hoistway door tracks, hangers, and sills.
 4. Door operator, infrared curtain units.

- I. Cut sheets and drawings showing details of controllers and supervisory panels.
- J. Furnish certificates as required under: Paragraph "Qualifications".

1.6 WIRING DIAGRAMS

- A. Provide three complete sets of paper and one electronic set field wiring and straight-line wiring diagrams showing all electrical circuits in the hoistway, machine room and fixtures. Install one set coated with an approved plastic sealer and mounted in the elevator machine room.
- B. In the event field modifications are necessary during installation, diagrams shall be revised to include all corrections made prior to and during the final inspection. Corrected diagrams shall be delivered within thirty (30) days of final acceptance.
- C. Provide the following information relating to the specific type of microprocessor controls installed:
 - 1. Owner's information manual, containing job specific data on major components, maintenance, and adjustment.
 - 2. System logic description.
 - 3. Complete wiring diagrams needed for field troubleshooting, adjustment, repair and replacement of components. Diagrams shall be base diagrams, containing all changes and additions made to the equipment during the design and construction period.
 - 4. Changes made during the warranty period shall be noted on the drawings in adequate time to have the finalized drawings reproduced for mounting in the machine room no later than six months prior to the expiration of the warranty period.

1.7 WORK SCHEDULE

- A. Before starting work submit a detailed work schedule for approval and arrange with project manager sequence of procedure, means of access to premises, space for storage, use of approaches, corridors, stairways, elevators, location of temporary partitions, disposal of trash and recyclable materials.

The project manager must be notified twenty (20) calendar days, in writing, in advance of starting work on elevators. No work may begin on any elevator until all materials for that elevator have been delivered to the site and verified by the project manager. The phasing of work on the elevators shall be coordinated with the project manager.

1.8 SAFETY PRECAUTIONS

- A. The Air Rights Garage will be occupied during execution of work. Work shall be conducted in a manner to afford maximum protection of patients, public, employees, building and facilities to prevent unreasonable delay or interference with normal functioning of activities.
- B. Where an adjacent elevator is in operation, isolate the elevators from each other with suitable barriers between them, extending from the pit floor to bottom of the slab at top of hoistway, while work is in progress. Remove partition when work is completed.
- C. Provide fire extinguishers that are always readily available.

- D. It shall be the obligation of the contractor to maintain a free and clear passageway in each elevator lobby. Parts and tools shall be kept within the confines of entrance partitions. Trash and debris shall be removed daily.
- E. Provide fire rated partition during the modernization of elevators. Barrier shall extend to the full height of the elevator entrance and shall be dust and vapor proof with dust absorbing mats at access points.

1.9 REMOVAL OF MATERIALS AND EQUIPMENT

- A. Material and equipment that are not specified to be reused or retained under contract shall be removed daily from the site at the expense of the contractor. The contractor shall receive title to all material and equipment not specified to be reused as of date of withdrawal from service.

1.10 PERFORMANCE STANDARDS

- A. The elevators shall meet the highest standards of the industry and specifically the following:
 - 1. Contract speed is high speed in either direction of travel with rated capacity load in the elevator. Speed variation under all load conditions, regardless of direction of travel, shall not vary more than three (3) percent.
 - 2. The controlled rate of change of acceleration and retardation of the car shall not exceed 0.1G per ft/s/s and the maximum acceleration and retardation shall not exceed 0.2G per ft/s/s.
 - 3. Starting, stopping, and leveling shall be smooth and comfortable without appreciable steps of acceleration and deceleration.
- B. Door operator shall open the car door and hoistway door at 2.5-feet per second and close at 1-foot per second.
- C. Floor level stopping accuracy shall be within 3 mm (.125 in.) above or below the floor, regardless of load condition.
- D. Noise and Vibration Isolation: All elevator equipment including their supports and fastenings to the building, shall be mechanically and electrically isolated from the building structure to minimize objectionable noise and vibration transmission to car, building structure, or adjacent occupied areas of building.
- E. Sound Isolation: Noise level relating to elevator equipment operation in machine room shall not exceed 80 db. All db readings shall be taken three (3) feet off the floor and three (3) feet from equipment.
- F. Airborne Noise: Measured noise level of elevator equipment during operation shall not exceed 50 db in elevator lobbies and 60 db inside car under any condition including door operation and car ventilation exhaust blower on its highest speed.

1.11 WARRANTY

- A. The One-Year Warranty and Guarantee Period of Service shall commence and run concurrent after final inspection, completion of performance test, and upon acceptance of each elevator.

- B. During warranty period if a device is not functioning properly in accordance with specification requirements, more maintenance than the contract requires keeping device operational, device shall be removed and a new device meeting all requirements shall be installed as part of work until satisfactory operation of installation is obtained. Period of warranty shall start anew for such parts from date of completion of each new installation performed, in accordance with foregoing requirements.

1.12 POWER SUPPLY

- A. For power supply in each machine room, see Specification 26 05 19, Electrical specifications, and Electrical drawings.
- B. Main Line Fused Disconnect Switch/Shunt Trip Circuit Breaker for each controller shall be located inside the machine room at the strike side of the machine room door and lockable in the "Off" position.
- C. Provide Surge Suppressors to protect the elevator equipment.

1.13 EMERGENCY POWER SUPPLY

- A. If applicable, Emergency power supply, means its starting, transfer switch for transfer of elevator supply from normal to emergency power, two pair of conductors in a conduit from an auxiliary contact on the transfer switch (open or close contacts as required by Elevator Controller Manufacturer) to terminals in the group elevator controller and other related work shall be provided by the Electrical Contractor.
- B. Upon loss of normal power supply there shall be a delay before transferring to emergency power of 10 seconds minimum to 45 seconds maximum, the delay shall be accomplished through an adjustable timing device.
- C. Prior to the return of normal power an adjustable timed circuit shall be activated that will cause all cars to remain at a floor if already there or stop and remain at the next floor if in flight. Actual transfer of power from emergency power to normal building power shall take place after all cars are stopped at a floor with their doors open.
- D. Car lighting circuits shall be connected to the emergency power panel.

1.14 ELEVATOR MACHINE ROOM AND MACHINE SPACE

- A. Reuse existing machine room and meet the requirements of ASME A17.1, NFPA 70, NFPA 101 and IBC. The elevator drive machine and elevator controller shall be in the same code approved machine room.
- B. Locate the shunt trip breaker/main line disconnect and machine room light switch at the lock side of the door inside the machine room.
- C. Locate sprinkler pipes, if required, to provide seven 213.3 cm (7 ft) head clearance. Do not locate sprinkler heads, heat detectors, and smoke detectors directly over elevator equipment.

1.15 HOISTWAY LIGHTING

- A. Provide lighting with 3-way switches at the top and bottom of the hoistway accessible from elevator hoistway entrance prior to entering the pit or stepping onto the car top.
- B. Lighting shall illuminate top of elevator cab when it is at the top floor and the pit when at the bottom floor.

PART 2 – PRODUCTS

2.1 MATERIALS

- A. Where stainless steel is specified, it shall be corrosion resisting steel Condition A with Number 4 finish on exposed surfaces. Stainless steel shall have the grain of belting in the direction of the longest dimension and surfaces shall be smooth and without waves. During installation stainless steel surfaces shall be protected with suitable material.
- B. Where cold rolled steel is specified, it shall be low-carbon steel rolled to stretcher level standard flatness, complying with ASTM A109.

2.2 MANUFACTURED PRODUCTS

- A. Materials, devices, and equipment furnished shall be of current production by manufacturers regularly engaged in the manufacture of such items. The elevator equipment, including controllers, door operators, and supervisory system shall be the product of manufacturers of established reputation, provided such items are capably engineered and produced under coordinated specifications to ensure compatibility with the total operating system.
- B. Manufacturers of equipment assemblies which include components made by others shall assume complete responsibility for the final assembled unit. Components shall be compatible with each other and with the total assembly for the intended service.
- C. Mixing of manufactures related to a single system or group of components shall be identified in the submittals.
- D. If key operated switches are furnished in conjunction with component of this elevator installation, furnish four (4) keys for each individual switch or lock. Provide different key tumblers for different switch and lock functions. Each key shall have a tag bearing a stamped or etched legend identifying its purpose.

2.3 CONDUIT AND WIREWAY

- A. Reuse existing where possible and provide new conduit and wireway where needed. Install electrical conductors, except traveling cable connected to the elevator, in rigid zinc-coated steel or aluminum conduit, electrical metallic tubing or metal wireways. Rigid conduit smaller than .75 inch or electrical metallic tubing smaller than .50-inch electrical trade size shall not be used. All raceways completely embedded in concrete slabs, walls, or floor fill shall be rigid steel conduit. Wireway (duct) shall be installed in the hoistway and to the controller and between similar apparatus in the elevator machine room. Fully protect self-supporting connections, where approved, from abrasion or other

mechanical injury. Flexible metal conduit not less than .375-inch electrical trade size may be used, not exceeding 18 inches in length unsupported, for short connections between risers and limit switches, interlocks, and for other applications permitted by NEC.

- B. All conduit terminating in steel cabinets, junction boxes, wireways, switch boxes, outlet boxes and similar locations shall have approved insulation bushings. Install a steel lock nut under the bushings if they are constructed completely of insulating materials. Protect the conductors at ends of conduits not terminating in steel cabinets or boxes by terminal fittings having an insulated opening for the conductors.
- C. Rigid conduit and EMT fittings using set screws or indentations as a means of attachment shall not be used.
- D. Connect motor or other items subject to movement, vibration or removal to the conduit or EMT systems with flexible, steel conduits.

2.4 CONDUCTORS

- A. Remove existing and provide new conductors, excluding the traveling cables. Conductors shall be stranded or solid coated annealed copper. Where 16 and 18 AWG are permitted by NEC, single conductors or multiple conductor cables may be used provided the insulation of single conductor cable and outer jacket of multiple conductor cable is flame retardant and moisture resistant. Multiple conductor cables shall have color or number coding for each conductor. Conductors for control boards shall be in accordance with NEC. Joints or splices are not permitted in wiring except at outlets. Tap connectors may be used in wireways provided they meet all UL requirements.
- B. Provide all conduit and wiring between machine room, hoistway and fixtures.
- C. All wiring must test free from short circuits or ground faults. Insulation resistance between individual external conductors and between conductors and ground shall be a minimum of one megohm.
- D. Where size of conductor is not given, voltage and amperes shall not exceed limits set by NEC.
- E. Provide equipment grounding. Ground the conduits, supports, controller enclosure, motor, platform and car frame, and all other non-current conducting metal enclosures for electrical equipment in accordance with NEC. The ground wires shall be copper, green insulated and sized as required by NEC. Bond the grounding wires to all junction boxes, cabinets, and wire raceways.
- F. Terminal connections for all conductors used for external wiring between various items of elevator equipment shall be solderless pressure wire connectors.

The Elevator Contractor may, at their option, make these terminal connections on #10 gauge or smaller conductors with approved terminal eyelets set on the conductor with a special setting tool, or with an approved pressure type terminal block. Terminal blocks using pierce-through serrated washers are not acceptable.

2.5 TRAVELING CABLES

- A. Remove existing and provide new flexible traveling cables conforming to the requirements of NEC. Traveling cables shall run from the junction box on the car directly to the controller. Junction boxes on the car shall be equipped with terminal blocks.

Terminal blocks having pressure wire connectors of the clamp type that meet UL 486A requirements for stranded wire may be used in lieu of terminal eyelet connections.

Terminal blocks shall have permanent indelible identifying numbers for each connection.

Cables shall be securely anchored to avoid strain on individual terminal connections.

Flame and moisture resistant outer covering must remain intact between junction boxes.

Abrupt bending, twisting and distortion of the cables shall not be permitted.

- B. Provide spare conductors equal to 10 percent of the total number of conductors furnished, but not less than 5 spare conductors in each traveling cable.
- C. Provide shielded wires for the auto dial telephone system within the traveling cable, five (5) pair shielded wires for card reader, one (1) RG-6 Ethernet cable for Wi-Fi, two (2) pair 14-gauge wires for 110 Volt power supply, and wire for video display monitor if specified.
- D. If traveling cables contact the hoistway or elevator due to sway or change in position, provide shields or pads to the elevator and hoistway to prevent damage to the traveling cables.
- E. Hardware cloth may be installed from the hoistway suspension point to the elevator pit to prevent traveling cables from rubbing or chafing and securely fastened and tensioned to prevent buckling. Hardware cloth is not required when traveling cable is hung against a flat wall.

2.6 CONTROLLER AND SUPERVISORY PANEL

- A. Remove existing and provide new UL Labeled Controller. Mount all assemblies, power supplies, chassis switches, and relays on a steel frame in a NEMA Type 1 General Purpose Enclosure. Cabinet shall be securely attached to the building structure.
- B. Properly identify each device on all panels by name, letter, or standard symbol which shall be neatly stencil painted or decaled in an indelible and legible manner. Identification markings shall be coordinated with identical markings used on wiring diagrams. The ampere rating shall be marked adjacent to all fuse holders. All spare conductors to controller and supervisory panel shall be neatly formed, laced, and identified.

2.7 MICROPROCESSOR CONTROL SYSTEM

- A. Provide a new microprocessor control system with absolute position/speed feedback to control dispatching, signal functions, door operation, and VVVF Drive for hoist motor control. Complete details of the components and printed circuit boards, together with a complete operational description, shall be submitted for approval.
- B. Controller manufacturer shall provide factory training, engineering and technical support, including all manuals, wiring diagrams, and tools necessary for adjusting, maintenance, repair, and testing of equipment.

2.8 MACHINE ROOM MONITOR

- A. Provide a monitor in each machine room, separate monitors for each passenger elevator group. Provide a separate keyboard for each monitor.
- B. The monitor shall contain indicators to provide the following information:
 - 1. The floor where each elevator is currently located.

2. The direction that each elevator is currently traveling or is scheduled to travel.
 3. The location and direction of currently registered hall calls.
 4. Elevators that are currently out of service.
 5. Elevators that are currently bypassing hall calls.
 6. Elevators that are currently engaged in passenger transfers.
 7. Operations program under which entire group is currently operating.
 8. Zone divisions of the entire group.
 9. Door positions.
 10. Status indication for elevators on independent service, car top inspection, fire service, earthquake protection, and activated stop switch and alarm bell.
- C. The maintenance terminal shall be suitable for all troubleshooting procedures related to the specific type microprocessor installed on this project.

2.9 EMERGENCY POWER OPERATION

- A. If applicable, the control system for the Elevators shall provide for the operation of at least one car per elevator group on emergency power upon failure of the normal power supply.
- B. Auxiliary equipment on elevator controllers, wiring between associated elevator controllers and wiring between elevator controllers and remote selector panel as required to permit the elevators to operate as detailed, shall be provided by the Elevator Contractor.
- C. Upon loss of normal power supply there shall be a delay before transferring to emergency power of 10 seconds minimum to 45 seconds maximum, the delay shall be accomplished through an adjustable timing device. After adjusting delay, the associated elevators shall function as follows:
 1. Selector switch, Automatic position:
 - a. Not more than one elevator at a time in each group shall be automatically selected and returned to the main floor, at contract speed, cycle its car and hoistway doors and shut down, with "Door Open" button remaining operable.
 - b. As each elevator reaches the designated floor and shuts down, another elevator shall start and return to the designated floor.
 - c. Elevators that have been manually removed from automatic service and are on independent service, fire service or medical emergency shall receive an automatic return signal. Elevators on inspection service or out of service shall not receive a signal.
 - d. When an elevator is given a signal to return and it is unable to start its movement to the designated floor within 30 seconds it shall be by-passed. When an elevator is by-passed, another elevator shall start and return.
 - e. This process shall continue until all elevators have returned to the designated floor and shut down.
 - f. Any elevator or elevators by-passed on initial return signal shall be signaled again.
 - g. When all cars in group have returned to designated floor, one elevator in each group shall be designated for automatic operation. Individual cars in each group shall restart at 5 second intervals.

- h. If elevator(s) are keyed on to medical emergency service in the car prior to transfer to emergency power operation, medical emergency service shall be retained. This elevator shall be the first automatically selected elevator to operate on emergency power operation and complete its selected call demand. The elevator will return to the designated floor after the key switch is reset to normal position.
- 2. Selector switch, Manual operation:
 - a. Selector switch shall be mechanically and electrically interlocked to prevent the selection of more than one elevator from operating on emergency power.
 - b. The selector switch shall have positions marked with the number of each elevator controlled. It shall also have a position marked "Automatic". When the selector switch is set to the automatic position, the medical emergency service car shall operate on emergency power operation, or if none, the last car arriving at the designated floor shall operate on emergency power operation.
 - c. Change in selection of elevators shall be by means of the selection switch and shall occur only when the previous selected elevator is stopped at the designated floor.
 - d. The selector switch shall be locked out of operation when the system is in the normal mode of operation.
 - e. Locate the selector switch above the hall push button at the designated level. The key switch shall be a tumbler type lock furnished with four keys. The enclosure faceplate shall be identified "Emergency Power Control" with 13 mm (.50 in.) engraved letters filled with black paint.
- D. Prior to the return of normal power an adjustable timer circuit shall activate that will cause all cars to remain at a floor if already there or stop and remain at the next floor if in flight. Actual transfer of power from emergency power to normal building power shall take place after all cars are stopped at a floor with their doors open.
- E. Emergency Rescue Operation:

Provide a power source to send the elevator(s) to the nearest landing. After the elevator(s) has leveled at the nearest landing, provide power to open the car and hoistway doors automatically. After a predetermined time, the doors shall close. Power shall stay applied to the door open button to reopen the doors from the inside of the elevator. The elevator shall remain shut down at the landing until normal power is restored. Install a sign on the controller indicating that power is applied to emergency rescue operator and door operator during loss of normal power.

2.10 FIREFIGHTER'S SERVICE

- A. Provide Firefighter's Service.
 - 1. Main Floor
 - 2. Verify main and alternate floors with project manager.

2.11 INDEPENDENT SERVICE

- A. Provide an Independent Service key switch on the face of the main car operating panel or a toggle switch in the service operating panel that shall have its positions marked "ON" and "OFF". When the switch is in the "ON" position, the car shall respond only to calls registered on its car dispatch buttons and shall bypass all calls registered on landing push buttons. The car shall start when a car call is registered, car call button or door close button is pressed, car and hoistway doors are closed, and interlock circuits are made. When switch is returned to "OFF" position, normal service shall be resumed.

2.12 MEDICAL EMERGENCY SERVICE

- A. Provisions shall be made for calling elevator(s) to floors served by the elevator on an emergency basis, operating independently from the dispatch signals and landing call signals.
- B. Install key switch in the floor landing push button fixture above the push buttons.
- C. Provide a call registered light indicator adjacent to key switch. The key switch at the landings and in the car, shall only be operable by authorized personnel with a valid ID badge and key.
- D. When key switch is activated at any floor, the call register light indicator shall illuminate at the call floor and inside the elevator only. The elevator control system shall instantly select an elevator to respond to the medical emergency call. Immediately upon selection, all car calls shall be cancelled. If car is traveling away from the medical emergency call, it shall slow down and stop at the nearest floor, maintain closed doors, reverse direction and proceed nonstop to the medical emergency call floor. If the car is traveling toward the medical emergency call floor, it shall proceed to that floor nonstop. If at the time of selection, it is slowing down for a stop, the car shall stop, maintain doors closed, and start immediately toward the medical emergency floor.
- E. Arriving at the medical emergency floor, the car shall remain with doors open for 30 seconds. After this interval has expired and the car has not been placed on medical emergency operation inside the car, the car shall automatically return to normal service.
- F. Provide an LED illuminated indicator light next to the Medical Emergency key switch the same size as the Fire Service indicator.
 - 1. Locate a "Medical Emergency" key switch above call buttons in the main car operating panel for selecting medical emergency service. Activation of the card reader will allow the car to accept a car call for any floor, close doors, and proceed nonstop to the floor desired.
 - 2. After medical emergency call has been completed the elevator shall return to normal operation after an adjustable time of 30 to 90 seconds has expired.
- G. In the center of the rear cab panel provide a back lighted "MEDICAL EMERGENCY" LED illuminated display that shall flash on and off continuously when the car is assigned to this operation and until it is restored to normal service.
"MEDICAL EMERGENCY" indicator shall be a photographic negative type 1828 mm (72 in.) to center above the floor, 152 mm (6 in.) wide X 76 mm (3 in.) high, with 12 mm (.50 in.) high letters legible only when illuminated.

- H. If the car being operated on “Independent Service”, the medical emergency service indicator lights in the car operating panel and rear wall shall be illuminated, buzzer shall sound, and the “Audio Voice” system shall direct the attendant to return the car to automatic operation.
- I. If the car is out of service and unable to answer medical emergency calls, the call register light shall not illuminate.
- J. Each key switch shall have its identity legible and indelible engraved in faceplates. All lettering shall be 6 mm (.25 in.) high, filled with black paint.
- K. When Phase I firefighter’s recall is activated it shall over-ride elevators on medical emergency service and return them to the main or alternate fire service recall floor. When the fire emergency floor has been identified the attendants may complete their medical emergency run on Phase II firefighter’s operation if life safety is not affected.

2.13 LOAD WEIGHING

- A. Provide means for weighing carload for each elevator. When load in a car reaches an adjustable predetermined level of the rated capacity, that car shall bypass registered landing calls until the load in the car drops below the predetermined level. Calls bypassed in this manner shall remain registered for the next car. The initial adjustment of the load weighing bypass setting shall be 60 to 100 percent.

2.14 ANTI-NUISANCE FEATURE

- A. If weight in the car is not commensurate with the number of registered car calls, cancel car calls. Systems that employ either load weighing or door protective device for activation of this feature are acceptable.

2.15 SEISMIC REQUIREMENTS

- A. Meet the requirements of Seismic Design Manual H-18-8.

2.16 ELEVATOR MACHINE BEAMS

- A. Reuse existing beams and add blocking beams as required by machine manufacturer.

2.17 TRACTION HOIST MACHINE

- A. Provide new gearless traction machines with an AC motor, brake, drive sheave, and deflector sheave mounted in proper alignment on an isolated bedplate.
- B. Provide hoist machine mounted direct drive, digital, closed-loop velocity encoder.
- C. Drive sheaves shall be free from cracks, sand holes, and other imperfections that would tend to damage the hoist ropes. Sheave shall be turned smooth and true with rope grooves of proper design to insure maximum traction and maximum life of the hoist ropes.
- D. Hoisting machine brake shall be drum or disc type and shall stop and hold the elevator with 125 percent of rated load.

2.18 DEFLECTOR SHEAVES

- A. Provide new deflector sheaves with a metal guard and a guard to prevent ropes from jumping out of grooves. Securely fasten guard to sheave support beams.

2.19 HOIST ROPES

- A. Provide elevator with the required number and size of new ropes to ensure adequate traction and required safety factor. Hoisting ropes shall be pre-formed 8 x 19 or 8 x 25 traction steel, with minimum nominal diameter of 0.50 inch.
- B. Securely attach a corrosion resistant metal data tag to one hoisting rope fastening on top of the elevator.

2.20 HOIST ROPE COMPENSATION

- A. Provide compensation when required by controller manufacturer. Compensation shall consist of a necessary number and size of encapsulated chains attached to the underside of car and counterweight frames.
 - 1. Provide pit guide to minimize chain sway.
 - 2. Provide take-up adjustment to compensate for hoist rope stretch.
 - 3. Pad areas where compensation may strike car or hoistway items.

2.21 GOVERNOR ROPE

- A. New governor rope shall be 6 x 19 or 8 x 19 wire rope, preformed traction steel, uncoated, fiber core, with minimum nominal diameter of 0.375 inch having a minimum safety factor of 5. Tiller rope construction is not acceptable.
- B. Under normal operation rope shall run free and clear of governor jaws, rope guards, and other stationary parts.
- C. Securely attach governor rope tag to governor rope releasing carrier.

2.22 SPEED GOVERNOR

- A. Provide new centrifugal car driven governor to operate the car safety device. Governor shall be complete with weighted pit tension sheave, governor release carrier and mounting base with protected cable sleeves.
- B. Provide overspeed switch, and a speed reducing switches when required.
- C. The governor rope clamping device shall be designed to prevent appreciable damage to or deformation of the governor rope that results from the stopping action of the device operating the safety.
- D. Provide metal guard over top of governor rope and sheaves.
- E. Where the elevator travel does not exceed 100 feet, the weight tension sheave may be mounted on a pivoted steel arm in lieu of operating in steel guides.

2.23 CAR SAFETY DEVICE

- A. Provide new "Type B Safeties" on the elevator.

2.24 ASCENDING CAR OVERSPEED PROTECTION

- A. Provide new devices to prevent ascending over speed and unintended motion away from the landing when the doors are not closed and locked.

2.25 CAR AND COUNTERWEIGHT BUFFERS

- A. Provide new buffers for each car and each counterweight. Securely fasten buffers and supports to the pit channels and in the alignment with striker plates on car and counterweight. Each installed buffer shall have a permanently attached metal plate indicating its stroke and load rating. Buffer anchorage shall not puncture pit waterproofing.

2.26 COUNTERWEIGHTS

- A. The counterweight shall be cleaned and all missing or damaged bolts, tie rods, and frames members shall be replaced.
- B. Sub-weights shall be added or removed from the counterweights frame to provide counterbalance equal to the weight of the complete car and 40 to 50 percent of the rated capacity, as required by the controller manufacturer. New sub-weights shall be cast iron, flame cut hot rolled steel, or cast lead.
- C. Reuse existing counterweight guard. If compensation chains are required remove counterweight guards.

2.27 GUIDE RAILS, SUPPORTS, AND FASTENINGS

- A. Retain existing car and counterweight guide rails and brackets.
- B. Thoroughly clean all guide rails of dust, grease, oil, rust, and other foreign substances. File and remove all rough edges and surfaces and tighten bracket bolts and guide clips for smooth and quiet operation of car and counterweight.

2.28 NORMAL AND FINAL TERMINAL STOPPING DEVICES

- A. Mount new terminal slowdown switches and direction limit switches on the elevator or in hoistway to reduce speed and bring car to an automatic stop at the terminal landings.
 - 1. Switches shall function with any load up to and including 125 percent of rated elevator capacity at any speed obtained in normal operation.
 - 2. Switches, when opened, shall permit operation of elevator in reverse direction of travel.
- B. Mount new final terminal stopping switches in the hoistway.
 - 1. Switches shall be positively opened should the car travel beyond the terminal direction limit switches.
 - 2. Switches shall be independent of other stopping devices.
 - 3. Switches, when opened, shall remove power from hoist motor, apply hoist machine brake, and prevent operation of car in either direction.

2.29 CROSSHEAD DATA PLATE AND CODE DATA PLATE

- A. Permanently attach a non-corrosive metal Data Plate to car crosshead.
- B. Permanently attach a non-corrosive Code Data Plate to the controller.

2.30 WORKMAN'S LIGHTS AND OUTLETS

- A. Provide new duplex GFCI protected type receptacles and lamps with guards on top of each elevator car and beneath the platform. The receptacles shall be 3-wire grounded type, rated for 15 amperes and 125 volts.

2.31 CARTOP OPERATING DEVICE

- A. Provide a new cartop operating device.
- B. The device shall be activated by a toggle switch mounted in the device. The switch shall be clearly marked "INSPECTION" and "NORMAL" on the faceplate, with 6 mm (.25 in.) letters.
- C. Movement of the elevator shall be accomplished by the continuous pressure on a direction button and a safety button.
- D. Provide an emergency stop switch, push to stop/pull to run.
- E. Provide permanent identification for the operation of all components in the device.
- F. The device shall be permanently attached to the elevator crosshead on the side of the elevator nearest to the hoistway doors used for accessing the top of the car.

2.32 CAR LEVELING DEVICE

- A. Car shall be equipped with a new two-way leveling device to automatically bring the car to within 3 mm (.125 in.) of exact level with the landing for which a stop is initiated regardless of load in car or direction.
- B. If the car stops short or travels beyond the floor, the leveling device, within its zone shall automatically correct this condition and maintain the car within 3 mm (.125 in.) of level with the floor landing regardless of the load carried.

2.33 EMERGENCY STOP SWITCHES

- A. Provide an emergency stop switch, push to stop/pull to run, for the top-of-car device, pit, machine space, service panel and firefighter's control panel inside the elevator. Mount stop switches in the pit adjacent to pit access door, at top of the pit ladder 1220 mm (48 in.) above the bottom landing sill and 1220 mm (48 in.) above the pit floor adjacent to the pit ladder.
- B. Each stop switch shall be red in color and shall have "STOP" and "RUN" positions legibly and indelibly identified.

2.34 MAIN CAR OPERATING PANEL

- A. Provide new main car operating panel in the car enclosure on the front return panel for passenger elevators. The top floor car call push button shall not be more than 1220 mm (48 in.) above the finished floor. Car call push buttons and indicator lights shall be LED illuminated, round with a minimum diameter of 25 mm (1 in.).
Each button shall contain an integral registration LED white light which shall illuminate upon registration of a call and shall extinguish when that call is answered.
- B. One-piece with the firefighter's service panel recessed into the upper section and the service operation panel recessed into the lower section fitted with hinged doors. Doors shall have concealed hinges, be in the same front plane as the faceplate and fitted with key operated locks. Secure the faceplate with stainless steel tamperproof screws.
- C. All terminology and tactile symbols on the faceplate shall be on square or rectangular plates recessed into the faceplate with its surface flush with the surface of the faceplate. Use 6 mm (.25 in.) letters to identify all devices in the faceplate. The tactile symbols with contrasting background shall be 12.5 mm (0.5 in.) high raised .075 mm (.030 in.) on the plate.
- D. The upper section shall contain the following items in order listed from top to bottom:
 - 1. Elevator number, 12.5 mm (.50 in.) high with black paint for contrast.
 - 2. Capacity plate information with black paint for contrast with loading class and number of passengers allowed.
 - 3. LED illuminated digital car position indicator with direction arrows.
 - 4. Emergency car lighting system consisting of a rechargeable battery, charger, controls, and LED illuminated light fixture. The system shall automatically provide emergency light in the car upon failure or interruption of the normal car lighting service, and function irrespective of the position of the light control switch in the car. The system shall maintain a minimum illumination of 1.0 foot-candle when measured 1200 mm (48 in.) above the car floor and approximately 300 mm (12 in.) in front of the car operating panel, for not less than four (4) hours.
 - 5. Firefighter's Emergency Operation Panel shall be 167.6 mm (66 in.) minimum to 1830 mm (72 in.) maximum to the top of the panel above finished floor.
 - 6. Firefighter's Emergency Indicator Light shall be round with a minimum diameter of 25 mm (1 in.).
 - 7. Medical Emergency card reader/key switch marked "MEDICAL EMERGENCY" with two positions labeled "ON" and "OFF" and Medical Emergency Indicator Light located next to the card reader/key switch shall be round with a minimum diameter of 25 mm (1 in.). Instruction for Medical Emergency operation shall be engraved below the card reader/key switch and light.
 - 8. Key operated Independent Service Switch or toggle switch inside service panel.
 - 9. Provide a Door Hold Button on the faceplate next to the Independent Service Key Switch. It shall have "DOOR HOLD" indelibly marked on the button. Button shall light when activated. When activated, the door shall stay open for a maximum of one minute. To override hold timer, push a car call button or door close button.
 - 10. Complete set of round car call push buttons, minimum diameter of 25 mm (1 in.), and LED white light illuminated, with numbers and colors corresponding to the floors

- served. Car call buttons shall be legibly and indelibly identified by a floor number and/or letter not less than 12.5 mm (.50 in.) high in the face of the call button.
11. Door Open and Door Close buttons shall be located below the car call buttons. They shall have "OPEN" and "CLOSE" legibly and indelibly identified by letters in the face of the respective button. The Door Open button shall be located closest to the door jamb.
 12. Red Emergency Alarm button that shall be located below the car operating buttons. Mount the emergency alarm button not lower than 888 mm (35 in.) above the finished floor. It shall be connected to audible signaling devices. Provide audible signaling devices including the necessary wiring.
 13. Emergency Help push button shall activate two-way communications by Auto Dial telephone system that is compatible with the building's telephone system. Help button shall be LED white light illuminated and flash when call is acknowledged. Legibly and indelibly label the button "HELP" in the face of the button with 12.5 mm (.50 in.) high letters.
- E. The service operation panel in the lower section shall contain the following items:
1. Light switch labeled "LIGHTS" for controlling interior car lighting with its two positions marked "ON" and "OFF".
 2. Inspection switch that will disconnect normal operation and activate hoistway access switches at terminal landings. Switch shall be labeled "ACCESS ENABLE" with its two positions marked "ON" and "OFF".
 3. Three position switch labeled "FAN" with its positions marked "HIGH", "LOW" and "OFF" for controlling car ventilating blower.
 4. Two-position spring return toggle switch or push button to test the emergency light and alarm device. It shall be labeled "TEST EMERGENCY LIGHT AND ALARM".
 5. Two-position toggle switch labeled "Independent Service" with its positions marked "ON" and "OFF".
 5. Two-position emergency stop switch, when operated, shall interrupt power supply and stop the elevator independently of regular operating devices. Emergency stop switch shall be marked "PUSH TO STOP" and "PULL TO RUN".

2.35 AUXILIARY CAR OPERATING PANEL

- A. Provide an auxiliary car operating panel in the front return panel opposite the main car operating panel. The auxiliary car operating panel shall contain only those controls essential to passenger (public) operation. The auxiliary car operating panel faceplate shall match the main car operating panel faceplate in material and general design. Secure the faceplate with stainless steel tamperproof screws.
1. Complete set of round car call push buttons, minimum diameter 25 mm (1 in.), and LED white light illuminated, corresponding to the floors served. Car call button shall be legibly and indelibly identified by a floor number and/or letter not less than 12.5 mm (.50 in.) high in the face of the call button corresponding to the numbers of the main car operating buttons.
 2. Mount door "OPEN" and door "CLOSE" buttons closest to the door jamb and mount the alarm button no lower than 888 mm (35 in.) above the finished floor. The Door Open button shall be located closest to the door.

3. Cross-connect all buttons in the auxiliary car operating panels to their corresponding buttons in the main car operating panel. Registration of a car call shall cause the corresponding button to illuminate in the main and auxiliary car operating panel.
 4. Emergency Help push button shall activate two-way communications by auto dial telephone that is compatible with the building's telephone system.
Help button shall be LED white light illuminated and flash when call is acknowledged. Legibly and indelibly label the button "HELP" in the face of the button with 12.5 mm (.50 in.) high letters.
- B. All terminology and tactile symbols on the faceplate shall be on square or rectangular plates recessed into the faceplate with its surface flush with the surface of the faceplate. Use 6 mm (.25 in.) letters to identify all devices in the faceplate. The tactile symbols with contrasting background shall be 12.5 mm (0.5 in.) high raised .030 inch on the plate. Surface mounted plates are not acceptable.

2.36 CAR POSITION INDICATOR

- A. Provide an alpha-numeric digital car position indicator in the main car operating panel, consisting of numerals and arrows not less than 63 mm (2.5 in.) high, to indicate position of car and direction of car travel. Locate position indicator at the top of the main car operating panel, illuminated by light emitting diodes.

2.37 AUDIO VOICE SYSTEM

- A. Provide digitized audio voice system. Audio voice shall announce floor designations, direction of travel, and special announcements. The voice announcement system shall be a natural sounding human voice that receives messages and shall comply with ADA requirements for audible car position indicators. The voice announcer shall have two separate volume controls, one for the floor designations and direction of travel, and another for special announcements. The voice announcer shall have a full range loudspeaker, located on top of the cab. The audio voice unit shall contain the number of ports necessary to accommodate the number of floors, direction messages, and special announcements. Install voice announcer per manufacturer's recommendations and instructions. The voice system shall be the product of a manufacturer of established reputation. Provide manufacturer literature and list of voice messages.
1. Fire Service Message.
 2. "Please do not block doors".

2.38 AUTO DIAL TELEPHONE SYSTEM

- A. Furnish and install a complete ADA compliant auto dial telephone that is compatible with the building's telephone system.
- B. Provide a two-way communication device in the car with automatic dialing, tracking and recall features with shielded wiring to car controller in machine room. Provide dialer with automatic rollover capability with two numbers.
- C. "HELP" button shall illuminate and flash when call is acknowledged. Button shall match floor push button design.

- D. Provide "HELP" button tactile symbol signage and Braille adjacent to button mounted integral with car operating panels.
- E. The auto dial system shall be in the main or auxiliary car operating panel. The speaker and unit shall be mounted on the backside of the perforated stainless-steel plate cover.
- F. Each elevator shall have individual phone numbers.
- G. If the operator ends the call, the passenger shall be able to redial the telephone immediately.

2.39 CORRIDOR OPERATING DEVICES

- A. Provide new elevator operating and signal devices from not less than 3 mm (.125 in.) thick flat stainless steel with all edges beveled 15 degrees.
- B. Corridor push button faceplates shall be sized to accommodate corridor pictograph on faceplate. The centerline of the landing push buttons shall be 106.6 mm (42 in.) above the corridor floor.
- C. Elevator Corridor Call Station Pictograph shall be engraved in the faceplate.
- D. Fasten all car and corridor operating device and signal device faceplates with stainless steel tamperproof screws.
- E. All terminology and tactile symbols on the faceplate shall be raised .030 inch with contrasting background, on square or rectangular plates recessed into the faceplate with its surface flush with the surface of the faceplate. The handicapped markings with contrasting background shall be 12.5 mm (0.5 in.) high raised .030 inch on the plate, square or rectangular. Use 6 mm (.25 in.) letters to identify all other devices in the faceplate. Surface mounted plates are not acceptable.
- F. Provide one risers of landing call buttons for each elevator or group of elevators as shown on contract drawings.
- G. Each button shall contain an integral registration LED white light which shall illuminate upon registration of a call and shall extinguish when that call is answered.
- H. The direction of each button shall be legibly and indelibly identified by arrows not less than 12.5 mm (.50 in.) high in the face of each button.
- I. Landing push buttons shall not re-open the doors while the car and hoistway doors are closing at that floor, the call shall be registered for the next available elevator. Calls registered shall be canceled if closing doors are re-opened by means of "DOOR OPEN" button or infrared curtain unit.
- J. Provide a separate fixture above the hall button fixture for emergency power indicator light, fire service recall key switch and indicator light, fire recall instruction, communication failure light, communication audible enunciator, and reset key switch at the designated main floor.
- K. Remove old fixtures, repair, and refinish walls.
- L. Submit design of hall pushbutton fixtures for approval.

2.40 DIGITAL CORRIDOR ARRIVAL LANTERN/POSITION INDICATOR

- A. Provide elevators with new combination corridor lantern/position indicator digital display mounted over the hoistway entrances at each floor. Provide each terminal landing with "UP" or "DOWN", minimum 63 mm (2.5 in.) high digital arrow lanterns and each intermediate landing with "UP" and "DOWN" digital arrow lanterns. Each lens shall be LED illuminated of proper intensity, so shielded to illuminate individual lens only. The lenses in each lantern shall be illuminated green to indicate "UP" travel and red to indicate "DOWN" travel. Lanterns shall signal in advance of car arrival at the landing indicating the direction of travel. Corridor lanterns shall not be illuminated when a car passes a floor without stopping. Each lantern shall be equipped with an audible electronic chime which shall sound once for "UPWARD" bound car and twice for "DOWNWARD" bound car. Audible signal shall not sound when a car passes the floor without stopping. Provide adjustable sound level on audible signal. Car riding lanterns are not acceptable.
- B. Install alpha-numeric digital position indicator between the arrival lanterns. Indicator faceplate shall be stainless steel. Numerals shall be not less than 63 mm (2.5 in.) high with direction arrows. Cover plates shall be readily removable for re-lamping. The appropriate direction arrow shall be illuminated during entire travel of car in corresponding direction.
- C. Remove old fixtures, repair, and refinish walls.

2.41 HOISTWAY ACCESS

- A. Provide new hoistway access switches for elevator at top terminal landing to permit access to top of car, and at bottom terminal landing to permit access to pit. Elevators with side slide doors, mount the access key switch 1830 mm (6 ft.) above the corridor floor in the wall next to the strike jamb.
- B. Exposed portion of each access switch or its faceplate shall have legible, indelible legends to indicate "UP", "DOWN", and "OFF" positions.
- C. Each access switch shall be a constant pressure cylinder type lock having not less than five pins or five stainless steel disc combination with key removable only when switch is in the "OFF" position.
- D. Lock shall not be operable by any other key which will operate any other lock or device used for any other purpose at the building.
- E. Arrange the hoistway switch to initiate and maintain movement of the car. When the elevator is operated in the down direction from the top terminal landing, limit the zone of travel to a distance not greater than the top of the car crosshead level with the top floor. Submit design and location of access switches for approval.
- F. Provide emergency access for all hoistway entrances, keyways for passenger elevators.

2.42 HOISTWAY ENTRANCES:

- A. Refinish existing stainless-steel entrance frames or paint existing painted entrance frames or clad existing entrance frames in stainless steel.
- B. Clean and reuse existing hoistway sills, hanger supports, strut angles, fascia plates and toe guards.
- C. Replace all damaged or missing dust covers.
- D. Provide new stainless steel hoistway doors. Door panels shall be not less than 16-gauge sheet steel and not less than 32 mm (1.25 in.) thick flush type construction with the hall side and leading edge wrapped in one continuous piece of 16-gauge stainless steel. Top and bottom of door panels shall have continuous stiffener channels welded in place. Reinforcement of the door panels shall be approximately 1.0 mm (0.04 in.) in thickness and of the hat section type. Reinforce each door panel for hangers, interlock mechanism, opening and closing devices. Do not use hangers that are constructed integrally with the door panels.
- E. Hang doors on two-point suspension hangers having sealed ball-bearing sheaves not less than 76 mm (3 in.) in diameter, with non-metallic sound-reducing tires. Equip hangers with adjustable ball-bearing rollers to take upward thrust of panels. Provide two non-metallic door gibs on each door panel and a separate fire gib. Gibs shall be replaceable without removing of door panel.
One door panel for each entrance shall bear a BOCA label, Underwriters' label, or other labels may be furnished provided they are based on fire test reports and factory inspection procedures acceptable to the project manager. Fasten stainless steel sight guard of 14-gauge metal, extending full height of panel, to leading edge of fast speed panel of two-speed doors.
- F. Provide new hardware, tracks, gibs, separate fire gibs, door rollers, door locks, drive roller assemblies and sill mounted closers.
- G. Reuse Braille plates on both sides of door frame entrances located 152.3 cm (60 in.) to center above finished floor. Replace damaged or missing Braille plates.
- H. Provide unique car number on every elevator entrance at designated main fire service floor level, minimum 76 mm (3 in.) in height.
- I. Equip each hoistway entrance with a new electrical/mechanical interlock, functioning as hoistway unit system, to prevent operation of car until all hoistway doors are locked in closed position.
- J. Wiring installed from the hoistway riser to each door interlock shall be NEC type SF-2 or equivalent.

2.43 CAR AND COUNTERWEIGHT GUIDES

- A. Install four new adjustable roller guides, each assembled on a substantial metal base, to permit individual alignment to the guide rails.
- B. Each guide shall consist of not less than three (3) wheels, each with a durable, resilient oil-resistant material tire rotating on ball bearings having sealed-in lubrication. Assemble rollers on a substantial metal base and mount to provide continuous spring pressure contact of all wheels with the corresponding rail surfaces under all conditions of loading and operation. Secure the roller guides at top and bottom on each side of car frame and

counterweight frame. All mounting bolts shall be fitted with nuts, flat washers, split lock washers, and if required, beveled washers.

- C. Provide sheet metal guards to protect rollers on top of car and counterweight.
- D. Minimum diameter of car rollers shall be 152 mm (6 in.). The entire elevator car shall be properly balanced to equalize pressure on all guide rollers. Cars shall be balanced in post-wise and front-to-back directions. Test for this balanced condition shall be witnessed at time of final inspection.
- E. Minimum diameter of counterweight rollers shall not be less than 101 mm (4 in.). Properly balance counterweight frame to equalize pressure on all guide rollers. The Contractor shall have the option of furnishing, for counterweight only, mechanically adjusted roller guide in lieu of spring-loaded roller guides as specified.
- F. Equip car and counterweight with an auxiliary guiding device for each guide shoe which shall prevent the car or counterweight from leaving the rails if the normal guides fail. These auxiliary guides shall not, during normal operation, touch the guiding surfaces of the rails. The auxiliary guides may be an extension of the normal guide shoe mounting plate if that plate is fabricated from hot rolled steel. The portion of the auxiliary guide that contacts the rail guiding surfaces in the event of loss of the normal guides shall be lined with an approved bearing material to minimize damage to the rail guiding surfaces.

2.44 CAR FRAME:

- A. Reuse existing car frame. Tighten bolts and replace missing bolts.

2.45 CAR PLATFORM:

- A. Provide a platform guard (toe guard) of not less than 12-gauge sheet-steel on the entrance side, extend 76 mm (3 in.) beyond each side of entrance jamb. Securely brace platform guard to car platform, and bevel bottom edge at a 60-75-degree angle from horizontal. Install platform in the hoistway, so that the clearance between front edge and landing threshold shall not exceed 32 mm (1.25 in.).
- B. Isolate the platform from the car frame by approved rubber pads or other equally effective means.

2.46 CAR ENCLOSURE

- A. Existing Corian Panels to be retained and sufficiently protected during the work.
- B. Provide car top railings.
- C. Provide a hinged top emergency exit cover. Exit shall be unobstructed when open and shall have mechanical stops on the cover. Provide an exit switch to prevent operation of the elevator when the emergency exit is open.
- D. Provide duplex, GFCI protected receptacle in car. Locate flush-mounted receptacle on the centerline of the main car operating panel, 150 mm (6 in.) above the car floor.
- E. Lighting:
 - 1. Provide LED illuminated car light fixtures above the ceiling panels. Maintain a minimum light level of 50-foot candles at 914 mm (36 in.) above the finished floor.

2. Equip the lighting cove with asymmetrical reflectors having specular finish. Maintain a minimum light level of 50-foot candles 914 mm (36 in.) above finished floor at the car operating panels.
 3. Enclose the entire vertical space between the light trough outer edge and the cab canopy with approved opaque white or clear lumicite sheeting. Lumicite sheeting shall be removable for cleaning and re-lamping.
- F. Provide a blower unit arranged to exhaust through an opening in the canopy. Provide a stainless or chrome plated fan grill on the interior side of the opening. Provide screening over intake and exhaust end of blower. Provide 2-speed fan, with rated air displacement of 250 cfm and 400 cfm at respective speeds. Mount fan on top of car with rubber isolation to prevent transmission of vibration to car structure. Provide a 3-position switch to control the unit in the service panel.
- G. Provide car enclosure with two sets of handrails with centerlines 762 mm and 1067 mm (30 in. and 42 in.) above the car floor.
1. Locate handrails 38 mm (1.50 in.) from cab wall. Install handrails on side and rear walls. Conceal all handrail fastenings. Handrails shall be removable from inside the car enclosure.
- H. Provide single-speed center opening horizontal sliding doors constructed the same as hoistway doors. Door panels shall be not less than 16-gauge sheet steel and not less than 32 mm (1.25 in.) thick flush type construction with the hall side and leading edge wrapped in one continuous piece of 16-gauge stainless steel. Top and bottom of door panels shall have continuous stiffener channels welded in place. Reinforcement of the door panels shall be approximately 1.0 mm (0.04 in.) in thickness and of the hat section type. Reinforce each door panel for hangers, interlock mechanism, opening and closing devices. Do not use hangers that are constructed integrally with the door panels.
- I. Hang doors on two-point suspension hangers having sealed ball-bearing sheaves not less than 76 mm (3 in.) in diameter, with non-metallic sound-reducing tires. Equip hangers with adjustable ball-bearing rollers to take upward thrust of panels. Provide two non-metallic door gibs on each door panel and a separate fire gib. Gibs shall be replaceable without removing of door panel. One door panel for each entrance shall bear a BOCA label, Underwriters' label, or other labels may be furnished provided they are based on fire test reports and factory inspection procedures acceptable to the project manager. Fasten stainless steel sight guard of 14-gauge metal, extending full height of panel, to leading edge of fast speed panel of two-speed doors.
- J. Provide new hardware, tracks, gibs, separate fire gibs, gate switch, door drive clutch assemblies and door restrictor.
- K. Provide one set of protective pads of sufficient length to completely cover two sides, rear walls and front return of cab interior. Pads shall consist of a minimum of 6 mm (.25 in.) thick glass fiber insulation securely sewn between flame resistant vinyl coated coverings. Color of the covering shall be approved by the project manager. Provide stainless steel pad buttons or hooks, spaced at intervals of not more than 457 mm (18 in.) to adequately support pads.
- L. Provide new flooring in accordance with the following specifications - 8"x8"x1/2" unglazed Quarry Tile with abrasive grain and square edges, Quarry Naturals, N46: Shadow Grey with abrasive grain, as manufactured by American Olean. Grout shall be

latex-Portland cement grout consisting of Portland cement, selected and graded aggregates, color pigments and latex additives that is compatible with latex additive in latex-modified thin-set mortar, color to be selected by Owner from manufacturer's standard colors, as manufactured by Laticrete International.

2.47 POWER DOOR OPERATORS:

- A. Provide new high-speed heavy-duty door operator to automatically open the car and hoistway doors simultaneously when the car is level with the floor, and automatically close the doors simultaneously at the expiration of the door-open time. Provide microprocessor door control with circuitry to constantly monitor and automatically adjust door operation based upon velocity, position, and motor current. Motor shall be of the high-internal resistance type, capable of withstanding high currents resulting from stall without damage to door operator/motor. The door operator shall open the car door and hoistway door simultaneously, at a speed up to 76.2 cm (2.5 ft) per second. Closing speed of the doors shall be 305 mm (1 ft) per second. Reversal of direction of the doors from the closing to opening operation, whether initiated by obstruction of the infrared curtain or the door "OPEN" button, shall be accomplished within 38 mm (1.50 in.) maximum of door movement. Emphasis is placed on obtaining quiet interlock and door operation; smooth, fast, dynamic braking for door reversals, and stopping of the doors at extremes of travel.
- B. Equip car doors with electric contact that prevents operation of car until doors are closed unless car is operating in leveling zone or hoistway access switch is used. Locate door contact to prevent its being tampered with from inside of car.
- C. Car and hoistway doors shall be manually operable in an emergency without disconnecting the power door operating equipment unless the car is outside the unlocking zone.
 - 1. It shall not be possible for the doors to open by power unless the elevator is within the leveling zone.
 - 2. Provide infrared curtain unit. The device shall cause the car and hoistway doors to reverse automatically to the fully open position should the unit be actuated while the doors are closing. Unit shall function when the doors are not closed, except during firefighter's operation.
- D. Should the doors be prevented from closing for more than a predetermined adjustable interval of 15 to 30 seconds by operation of the curtain unit, the doors shall stay open, the audio voice message and a buzzer located on the car shall sound only on automatic operation. Do not provide door nudging.
 - 1. If an obstruction of the doors should not activate the photo-electric door control device and prevent the doors from closing for more than a predetermined adjustable interval of 15 to 30 seconds, the doors shall reverse to the fully open position and remain open until the "Door Close" button re-establishes the closing cycle.
- E. Provide door "OPEN" and "CLOSE" buttons. When the door "OPEN" button is pressed and held, the doors, if in the open position, shall remain open and if the doors are closing, they shall stop, reverse and re-open. Momentary pressure of the door "CLOSE" button shall initiate the closing of the doors prior to the expiration of the normal door open time.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Examine work of other trades on which the work of this section depends. Report defects to the project manager in writing that may affect the work of the elevator contractor.
- B. Examine elevator hoistway openings for plumb, level, in line, and that elevator pit is proper size, waterproofed and drained with necessary access door, and ladder.
- C. Examine machine room for proper illumination, heating, ventilation, electrical equipment, and beams are correctly located complete with access stairs and door.
- D. Before fabrication, take necessary job site measurements, and verify where work is governed by other trades. Check measurement of space for equipment and means of access for installation and operation. Obtain dimensions from site for preparation of shop drawings.
- E. Work required prior to the completion of the elevator installation:
 - 1. Supply of electric feeder wires to the terminals of the elevator control panel, including circuit breaker.
 - 2. Provide light and GFCI outlets in the elevator pit and machine room.
 - 3. Furnish electric power for testing and adjusting elevator equipment.
 - 4. Furnish circuit breaker panel in machine room for car and hoistway lights and receptacles.
 - 5. Supply power for cab lighting and ventilation from an emergency power panel specified in Division 26, ELECTRICAL.
 - 6. Machine room enclosed and protected from moisture, with self-closing, self-locking door and access stairs.
 - 7. Provide fire extinguisher in machine room.

3.2 ARRANGEMENT OF EQUIPMENT

- A. Arrange equipment in machine room so that major equipment components can be removed for repair or replacement without dismantling or removing other equipment in the same machine room. Locate controller near and visible to its respective hoisting machine.

3.3 WORKMANSHIP, INSTALLATION, AND PROTECTION

- A. Installations shall be performed by Certified Elevator Mechanics and Apprentices to best possible industry standards. Details of the installation shall be mechanically and electrically correct. Materials and equipment shall be new and without imperfections.
- B. Recesses, cutouts, slots, holes, patching, grouting, refinishing to accommodate installation of equipment shall be included in the Contractor's work. All new holes in concrete shall be core drilled.
- C. Structural members shall not be cut or altered. Work in place that is damaged or defaced shall be restored equal to original new condition.
- D. Finished work shall be straight, plumb, level, and square with smooth surfaces and lines. All machinery and equipment shall be protected against dirt, water, or mechanical injury.

At completion, all work shall be thoroughly cleaned and delivered in perfect unblemished condition.

- E. Sleeves for conduit and other small holes shall project 50 mm (2 in.) above concrete slabs.
- F. Hoist cables that are exposed to accidental contact in the machine room and pit shall be completely enclosed with 16-gauge sheet metal or expanded metal guards.
- G. Exposed gears, sprockets, and sheaves shall be guarded from accidental contact.

3.4 WORK BY GENERAL CONTRACTOR (as contracted by Elevator Manufacturer)

- A. Perform all necessary cutting and patching to restore existing finishes.
- B. Protect all existing adjoining surfaces that are to remain.
- C. Provide venting of the hoist-way per ANSI A17.1, rule 100.4.
- D. Provide adequate supports adjacent to side and rear walls for rail brackets, including divider beams for multiple elevators in a common hoist-way at each floor, roof and/or immediate locations, with pockets in metallic decking and patching after brackets are in.
- E. Provide block-outs/cutouts through wall and the grouting/patching required to maintain firewall rating as required to accommodate hall boxes for corridor and signal fixtures.
- F. Provide all barricades either outside of elevator hoist-ways or between elevators inside of hoist-ways as required by OSHA and local codes.
- G. Provide a convenience outlet, light fixture in pit and light switch, easily accessible from the lowest landing door.
- H. Provide a pit ladder in each pit, extending to not less than 3'-6" above the bottom landing.
- I. Removal of existing doors, retain frames and retain sills.
- J. Provide support for sills the full width of hoist-way with two and one-half inches minimum floor recess. Provide grouting full length and width after sills are cleaned.
- K. Provide lighting, ventilation, heating, cooling of machine room and machinery space. Machine room temperature will be maintained between 55° F and 90° F
- L. Provide a fused disconnect switch or circuit breaker for each elevator located per the National Electric Code, and a light switch adjacent to the lock jamb-side of the machine room door.
- M. Provide feeder and branch wiring circuits to the controller of copper wire, including a main line switch and convenience outlets.
- N. Provide all conduit and wire runs as required.
- O. Provide a dedicated telephone and telephone line in the machine room for system access of diagnostics and remote access.

3.5 CLEANING

- A. Clean machine room and equipment.
- B. Perform hoistway clean down.
- C. Prior to final acceptance remove protective coverings from finished or ornamental surfaces. Clean and polish surfaces regarding type of material.

3.6 PAINTING AND FINISHING

- A. All equipment, except specified as architectural finish, shall be painted one coat of approved color, conforming to manufacturer's standard.
- B. Hoist machine, motor, shall be factory painted with manufacturer's standard finish and color.
- C. Controller, sheave, car frame and platform, counterweight, beams, rails and buffers except their machined surfaces, cams, brackets and all other uncoated ferrous metal items shall be painted one factory primer coat or approved equal.
- D. Stencil or apply decal floor designations not less than 100 mm (4 in.) high on hoistway doors, fascia or walls within door restrictor areas. The color of paint used shall contrast with the color of the surfaces to which it is applied.
- E. Elevator hoisting machine, controller, governor, main line shunt trip circuit breaker, safety plank, and cross head of car shall be identified by 100 mm (4 in.) high numerals and letters located as directed. Numerals shall contrast with surrounding color and shall be stenciled or decaled.
- F. Hoistway Entrances:
 - 1. Door panels, except stainless steel surfaces, shall be given rust resistant treatment and a factory finish of one coat of baked-on primer and one factory finish coat of baked-on enamel.
 - 2. Fascia plates, top and bottom shear guards, dust covers, hanger covers, and other metalwork, including built-in or hidden work and structural metal, (except stainless steel entrance frames and surfaces to receive baked enamel finish) shall be given one approved prime coat in the shop, and one field coat of paint of approved color.
- G. Elevator Cabs:
 - 1. Interior and exterior steel surfaces shall be given rust resistant treatment before finish is applied.
 - 2. Interior steel surfaces shall be factory finished with one coat of paint of approved color.
 - 3. Give exterior faces of car doors one finish coat of paint of approved color.
- H. Elevator Cabs:
 - 1. Interior and exterior steel surfaces shall be given rust resistant treatment before finish is applied.
 - 2. Interior steel surfaces shall be factory finished with one coat of paint of approved color.
 - 3. Give exterior faces of car doors one finish coat of paint of approved color.

3.7 PRE-TESTS AND TESTS

- A. Pre-test the elevators and related equipment in the presence of the project manager or their authorized representative for proper operation before requesting final inspection. Conduct final inspection at other than normal working hours, if required by the project manager.
 - 1. The building shall furnish electric power including necessary current for starting, testing, and operating machinery of each elevator.
 - 2. Contractor shall furnish the following test instruments and materials on-site and at the designated time of inspection: properly marked certified test weights, voltmeter, amp probe, thermometers, direct reading tachometer, megohm meter, vibration meter, sound meter, light meter, stopwatch, and a means of two-way communication.
- B. Inspect workmanship, equipment furnished, and installation for compliance with specification.
- C. Balance Tests: The percent of counterbalance shall be checked by placing test weights in car until the car and counterweight are equal in weight when located at the mid-point of travel. If the actual percent of counterbalance does not conform to the specification, the amount of counterweight shall be adjusted until conformance is reached.
- D. Full-Load Run Test: Elevator shall be tested for a period of one-hour continuous run with full contract load in the car. The test run shall consist of the elevator stopping at every floor, in either direction of travel, for not less than five or more than ten seconds per floor.
- E. Speed Test: The actual speed of the elevator shall be determined in both directions of travel with full contract load and no load in the elevator. The actual measured speed of the elevator with all loads in either direction shall be within three (3) percent of specified rated speed. Full speed runs shall be quiet and free from vibration and sway.
- F. Temperature Rise Test: The temperature rise of the hoisting motor shall be determined during the full load test run. Temperatures shall be measured using thermometers. Under these conditions, the temperature rise of the equipment shall not exceed 50 degrees Centigrade above ambient temperature. Test shall start when all machine room equipment is within five (5) degrees Centigrade of the ambient temperature.
Other tests for heat run on motors shall be performed as prescribed by the Institute of Electrical and Electronic Engineers.
- G. Car Leveling Test: Elevator car leveling devices shall be tested for accuracy of leveling at all floors with no load in car and with contract load in car, in both directions of travel. Accuracy of floor level shall be within plus or minus 3 mm (.125 in.) of level with landing floor for which the stop has been initiated regardless of load in car or direction of travel. The car leveling device shall automatically correct over travel as well as under travel and shall maintain the car floor within plus or minus 3 mm (.125 in.) of level with the landing floor regardless of change in load.
- H. Brake Test: The action of the brake shall be prompt and a smooth stop shall result in the up and down directions of travel with no load and rated load in the elevator. Down stopping shall be tested with 125 percent of rated load in the elevator.
- I. Insulation Resistance Test: The elevator's complete wiring system shall be free from short circuits and ground faults and the insulation resistance of the system shall be

determined by use of megohm meter, at the discretion of the Elevator Inspector conducting the test.

- J. Safety Devices: Car and counterweight safety devices shall be tested.
- K. Overload Devices: Test all overload current protection devices in the system at final inspection.
- L. Limit Stops:
 - 1. The position of the car when stopped by each of the normal limit switches with no load and with contract load in the car shall be accurately measured.
 - 2. Final position of the elevator relative to the terminal landings shall be determined when the elevator has been stopped by the final limits. The lower limit stop shall be made with contract load in the elevator. Elevator shall be operated at inspection speed for both tests. Normal limit stopping devices shall be inoperative for the tests.
- M. Oil Buffer Tests: These tests shall be conducted with operating device and limit stops inoperative and with contract load in the elevator for the car buffer and with no load in the elevator for the counterweight buffer.
Preliminary test shall be made at the lowest (leveling) speed. Final tests shall be conducted at contract speed. Buffers shall compress and return to the fully extended position without oil leakage.
- N. Operating and Signal System: The elevator shall be operated by the operating devices provided and the operation signals and automatic floor leveling shall function in accordance with requirements specified. Starting, stopping and leveling shall be smooth and comfortable without appreciable steps of acceleration or deceleration.
- O. Performance of the Elevator supervisory system shall be witnessed and approved by the elevator inspector and a representative of the Project Manager.
- P. If equipment fails test requirements and a re-inspection is required, the Contractor shall be responsible for the cost of re-inspection; salaries, transportation expenses, and per-diem expenses incurred by the elevator inspector.

3.8 INSTRUCTION TO BUILDING PERSONNEL

- A. Provide competent instruction to personnel regarding the operation of equipment and accessories installed under this contract, for a period equal to one eight-hour day. Instruction shall commence after completion of all work and at the time and place directed by the Project Manager.
- B. Written instructions in triplicate relative to care, adjustments and operation of all equipment and accessories shall be furnished and delivered to the Resident Engineer in independently bound folders. Written instructions shall include correct and legible wiring diagrams, nomenclature sheet of all electrical apparatus including location of each device, complete and comprehensive sequence of operation, complete replacement parts list of with descriptive literature, and identification and diagrams of equipment and parts. Information shall also include electrical operation characteristics of all circuits, relays, timers, electronic devices, and related characteristics for all rotating equipment.
- C. Provide supplementary instruction for any new equipment that may become necessary because of changes, modifications or replacement of equipment or operation under requirements of paragraph entitled "Warranty of Construction".

3.9 ELEVATOR GUARANTEE PERIOD OF SERVICE: MAINTENANCE SERVICE AND INSPECTIONS

- A. Furnish complete maintenance service and inspections on each elevator installation for a period of one (1) year after completion and acceptance of each elevator in this specification by the project manager. This maintenance service shall run concurrently with the warranty. Maintenance work shall be performed by Certified Elevator Mechanics and Apprentices.
- B. This contract will cover full maintenance including emergency call back service, inspections, and servicing the elevators listed in the schedule of elevators. The Elevator Contractor shall perform the following:
 - 1. Monthly systematic examination of equipment.
 - 2. During each maintenance visit the Elevator Contractor shall clean, lubricate, adjust, repair and replace all parts as necessary to keep the equipment in like new condition and proper working order.
 - 3. Furnishing all lubricant, cleaning materials, parts and tools necessary to perform the work required. Lubricants shall be only those products recommended by the manufacturer of the equipment.
 - 4. Equalizing tension, shorten or renew hoisting ropes.
 - 5. As required, motors, controllers, selectors, leveling devices, operating devices, switches on cars and in hoistways, hoistway doors and car doors or gate operating device, interlock contacts, guide shoes, guide rails, car door sills, hangers for doors, car doors or gates, signal system, car safety device, governors, tension sheaves, and buffers shall be cleaned, lubricated and adjusted.
 - 6. Accumulated rubbish shall be removed from the pits monthly. A general cleaning of the entire installation including all machine room equipment and hoistway equipment shall be accomplished quarterly. Cleaning supplies and vacuum cleaner shall be furnished by the Contractor.
 - 7. Maintain the performance standards set forth in this specification.
 - 8. The operational system shall be maintained to the standards specified hereinafter including any changes or adjustments required to meet varying conditions of hospital occupancy.
 - 9. Always maintain smooth starting and stopping and accurate leveling.
- C. Maintenance service shall not include the performance of work required because of improper use, accidents, and negligence for which the Elevator Contractor is not directly responsible.
- D. Provide 24-hour emergency call-back service that shall consist of promptly responding to calls within two hours for emergency service should a shutdown or emergency develop between regular examinations. Overtime emergency call-back service shall be limited to minor adjustments and repairs required to protect the immediate safety of persons and equipment in and about the elevator.
- E. Service and emergency personnel shall report to the garage manager upon arrival and again upon completion of the required work. A copy of the work ticket containing a complete description of the work performed shall be given to an authorized representative.

- F. The Elevator Contractor shall maintain a logbook in the machine room. The log shall list the date and time of all weekly examinations and all trouble calls. Each trouble call shall be fully described including the nature of the call, necessary correction performed, or parts replaced.
- G. Written "Maintenance Control Program" shall be in place to maintain the equipment in compliance with ASME A17.1.

END OF SECTION 14 21 10.02

DIVISION 23
HEATING, VENTILATING AND
AIR CONDITIONING

SECTION 23 05 00

COMMON WORK RESULTS FOR HVAC

PART 1 - GENERAL

1.01 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.

1.02 SUMMARY:

- A. This Section includes the following:
 - 1. Piping materials and installation instructions to most piping systems.
 - 2. Transition fittings.
 - 3. Dielectric fittings.
 - 4. Mechanical sleeve seals.
 - 5. Sleeves.
 - 6. Grout.
 - 7. Mechanical demolition.
 - 8. Equipment installation requirements common to equipment sections.
 - 9. Painting and finishing.
 - 10. Supports and anchorages.

1.03 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.
Exposed, Exterior Installations: Exposed to view outdoors or subject to outdoor ambient temperatures and weather conditions. Examples include rooftop locations.
Concealed, Interior Installations: Concealed from view and protected from physical contact by building occupants. Examples include above ceilings and chases.
- C. 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.

- D. The following are industry abbreviations for plastic materials:
 - 1. CPVC: Chlorinated polyvinyl chloride plastic.
 - 2. PVC: Polyvinyl chloride plastic.
- E. The following are industry abbreviations for rubber materials:
 - 1. EPDM: Ethylene-propylene-diene terpolymer rubber.
 - 2. NBR: Acrylonitrile-butadiene rubber.

1.04 SUBMITTALS

- A. Product Data: For the following:
 - 1. Transition fittings.
 - 2. Dielectric fittings.
 - 3. Mechanical sleeve seals.
 - 4. Escutcheons.
- B. Welding certificates.

1.05 QUALITY ASSURANCE

- C. Steel Support Welding: Qualify processes and operators according to AWS D1.1, "Structural Welding Code--Steel."
- D. 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.
- E. 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.

1.06 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.

1.07 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 08 Section "Access Doors and Frames."

PART 2 - PRODUCTS

2.01 MANUFACTURERS

- A. In other Part 2 articles where subparagraph titles below introduce lists, the following requirements apply for product selection:
 - 1. Manufacturers: Subject to compliance with requirements, provide products by the manufacturers specified.

2.02 PIPE, TUBE, AND FITTINGS

- A. Refer to individual Division 23 piping Sections for pipe, tube, and fitting materials and joining methods.
- B. Pipe Threads: ASME B1.20.1 for factory-threaded pipe and pipe fittings.

2.03 JOINING MATERIALS

- A. Refer to individual Division 23 piping Sections for special joining materials not listed below.

- B. Pipe-Flange Gasket Materials: Suitable for chemical and thermal conditions of piping system contents.
 - 1. ASME B16.21, nonmetallic, flat, asbestos-free, 1/8-inch maximum thickness unless thickness or specific material is indicated.
 - a. Full-Face Type: For flat-face, Class 125, cast-iron and cast-bronze flanges.
 - b. Narrow-Face Type: For raised-face, Class 250, cast-iron and steel flanges.
 - 2. A WWA C110, rubber, flat face, 1/8 inch thick, unless otherwise indicated; and full-face or ring type, unless otherwise indicated.
- C. Flange Bolts and Nuts: ASME B18.2.1, carbon steel, unless otherwise indicated.
- D. Plastic, Pipe-Flange Gasket, Bolts, and Nuts: Type and material recommended by piping system manufacturer, unless otherwise indicated.
- E. Solder Filler Metals: ASTM B 32, lead-free alloys. Include water-flushable flux according to ASTM B 813.
- F. Brazing Filler Metals: AWS A5.8, BCuP Series, copper-phosphorus alloys for general-duty brazing, unless otherwise indicated; and AWS A5.8, BAg1, silver alloy for refrigerant piping, unless otherwise indicated.
- G. Welding Filler Metals: Comply with AWS D10.12 for welding materials appropriate for wall thickness and chemical analysis of steel pipe being welded.
- H. Solvent Cements for Joining Plastic Piping:
 - 1. CPVC Piping: ASTM F 493.
 - 2. PVC Piping: ASTM D 2564. Include primer according to ASTM F 656.
- I. Fiberglass Pipe Adhesive: As furnished or recommended by pipe manufacturer.

2.04 TRANSITION FITTINGS

- A. Plastic-to-Metal Transition Fittings: CPVC and PVC one-piece fitting with manufacturer's Schedule 80 equivalent dimensions; one end with threaded brass insert, and one solvent-cement-joint end.
 - 1. Manufacturers:
 - a. Eslon Thermoplastics

- B. Plastic-to-Metal Transition Adaptors: One-piece fitting with manufacturer's SDR 11 equivalent dimensions; one end with threaded brass insert, and one solvent-cement-joint end.
 - 1. Manufacturers:
 - a. Thompson Plastics, Inc.
- C. Plastic-to-Metal Transition Unions: MSS SP-107, CPVC and PVC four-part union. Include brass end, solvent-cement-joint end, rubber O-ring, and union nut.
 - 1. Manufacturers:
 - a. NIBCO INC.
 - b. NIBCO, Inc.; Chemtrol Div.

2.05 DIELECTRIC FITTINGS

- A. Description: Combination fitting of copper alloy and ferrous materials with threaded, solder-joint, plain, or weld-neck end connections that match piping system materials.
- B. Insulating Material: Suitable for system fluid, pressure, and temperature.
- C. Dielectric Unions: Factory-fabricated, union assembly, for 250-psig minimum working pressure at 180 deg F (82 deg C).
 - 1. Manufacturers:
 - a. Capitol Manufacturing Co.
 - b. Epco Sales, Inc.
 - c. Zurn Industries, Inc.; Wilkins Div.
 - d. Watts Industries, Inc.; Water Products Div.
 - e. Eclipse, Inc.
- D. Dielectric Flanges: Factory-fabricated, companion-flange assembly, for 300-psig minimum working pressure as required to suit system pressures.
 - 1. Manufacturers:
 - a. Capitol Manufacturing Co.
 - b. Epco Sales, Inc.
 - c. Watts Industries, Inc.; Water Products Div.
- E. Dielectric-Flange Kits: Companion-flange assembly for field assembly. Include flanges, full-face- or ring-type neoprene or phenolic gasket, phenolic or polyethylene bolt sleeves, phenolic washers, and steel backing washers.

1. Manufacturers:

- a. Capitol Manufacturing Co.
- b. Advance Products & Systems, Inc.
- c. Calpico, Inc.
- d. Pipeline Seal and Insulator, Inc.

2. Separate companion flanges and steel bolts and nuts shall have 300-psig minimum working pressure where required to suit system pressures.

F. Dielectric Couplings: Galvanized-steel coupling with inert and noncorrosive, thermoplastic lining; threaded ends; and 300-psig minimum working pressure at 225 deg F (107 deg C).

1. Manufacturers:

- a. Calpico, Inc.
- b. Lochinvar Corp.

G. Dielectric Nipples: Electroplated steel nipple with inert and noncorrosive, thermoplastic lining; plain, threaded, or grooved ends; and 300-psig minimum working pressure at 225 deg F (107 deg C).

2. Manufacturers:

- a. Perfection Corp.
- b. Precision Plumbing Products, Inc.
- c. Sioux Chief Manufacturing Co., Inc.

2.06 MECHANICAL SLEEVE SEALS

A. Description: Modular sealing element unit, designed for field assembly, to fill annular space between pipe and sleeve.

1. Manufacturers:

- a. Advance Products & Systems, Inc.
- b. Metraflex Co.
- c. Pipeline Seal and Insulator, Inc.
- d. Calpico, Inc.

- 2. Sealing Elements: EPDM interlocking links shaped to fit surface of pipe. Include type and number required for pipe material and size of pipe.
- 3. Pressure Plates: Plastic. Include two (2) for each sealing element.
- 4. Connecting Bolts and Nuts: Carbon steel of length required to secure pressure plates to sealing elements. Include one (1) for each sealing element.

2.07 SLEEVES

- A. Galvanized-Steel Sheet: 0.0239-inch minimum thickness; round tube closed with welded longitudinal joint.
- B. Steel Pipe: ASTM A 53, Type E, Grade B, Schedule 40, galvanized, plain ends.
- C. Cast Iron: Cast or fabricated "wall pipe" equivalent to ductile-iron pressure pipe, with plain ends and integral waterstop, unless otherwise indicated.
- D. 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.
- E. Molded PVC: Permanent, with nailing flange for attaching to wooden forms.
- F. PVC Pipe: ASTM D 1785, Schedule 40.

2.08 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, twenty-eight (28) day compressive strength.
 - 3. Packaging: Premixed and factory packaged.

PART 3 - EXECUTION

3.01 MECHANICAL DEMOLITION

- A. Refer to Division 01 Section "Cutting and Patching" for general demolition requirements and procedures.
- B. Disconnect, demolish, and remove HVAC systems, equipment, and components indicated to be removed.
 - 1. Piping to Be Removed: Remove portion of piping indicated to be removed.
 - 2. Ducts to Be Removed: Remove portion of ducts indicated to be removed.
 - 3. Equipment to Be Removed: Disconnect and cap services and remove equipment.
- C. If pipe, insulation, or equipment to remain is damaged in appearance or is unserviceable, remove damaged or unserviceable portions and replace with new

products of equal capacity and quality. Where affected by demolition or new construction, relocate, extend or repair ductwork and piping to allow continued use of mechanical systems. Use methods and materials as specified for new construction.

- D. Remove obsolete piping, ductwork, hangers, miscellaneous equipment promptly from site and dispose of legally.

3.02 PIPING SYSTEMS - COMMON REQUIREMENTS

- A. Install piping according to the following requirements and Division 23 Sections specifying piping systems.
- B. 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 Coordination Drawings.
- 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.
- E. Install piping above accessible ceilings to allow sufficient space for ceiling panel removal.
- F. Install piping to permit valve servicing.
- G. Install piping at indicated slopes.
- H. Install piping free of sags and bends.
- I. Install fittings for changes in direction and branch connections.
- J. Install piping to allow application of insulation.
- K. Select system components with pressure rating equal to or greater than system operating pressure.
- L. Install escutcheons for penetrations of walls, ceilings, and floors according to the following:
 - 1. New Piping:
 - a. Piping with Fitting or Sleeve Protruding from Wall: One-piece, deep-pattern type.

- b. Chrome-Plated Piping: One-piece, cast-brass type with polished chrome-plated finish.
 - c. Insulated Piping: One-piece, stamped-steel type with spring clips.
 - d. Bare Piping at Wall and Floor Penetrations in Finished Spaces: One-piece, cast-brass type with polished chrome-plated finish.
 - e. Bare Piping at Wall and Floor Penetrations in Finished Spaces: One-piece, stamped-steel type.
 - f. Bare Piping at Ceiling Penetrations in Finished Spaces: One-piece, cast-brass type with polished chrome-plated finish.
 - g. Bare Piping in Unfinished Service Spaces: One-piece, cast-brass type with polished chrome-plated finish.
 - h. Bare Piping in Equipment Rooms: One-piece, cast-brass type.
 - i. Bare Piping at Floor Penetrations in Equipment Rooms: One-piece, floor-plate type.
- M. Sleeves are not required for core-drilled holes.
- N. Permanent sleeves are not required for holes formed by removable PE sleeves.
- O. Install sleeves for pipes passing through concrete and masonry walls and concrete floor and roof slabs.
- P. Install sleeves for pipes passing through concrete and masonry walls, gypsum-board partitions, and concrete floor and roof slabs.
 - 1. Cut sleeves to length for mounting flush with both surfaces.
 - a. Exception: Extend sleeves installed in floors of mechanical equipment areas or other wet areas 2 inches above finished floor level. Extend cast-iron sleeve fittings below floor slab as required to secure clamping ring if ring is specified.
 - 2. Install sleeves in new walls and slabs as new walls and slabs are constructed.
 - 3. Install sleeves that are large enough to provide ¼ inch annular clear space between sleeve and pipe or pipe insulation. Use the following sleeve materials:
 - a. Steel Pipe Sleeves: For pipes smaller than NPS 6 (DN 150).
 - b. Stack Sleeve Fittings: For pipes penetrating floors with membrane waterproofing. Secure flashing between clamping flanges. Install section of cast-iron soil pipe to extend sleeve to 2 inches above finished floor level. Refer to Division 07 Section "Sheet Metal Flashing and Trim" for flashing.
 - 1) Seal space outside of sleeve fittings with grout.
 - 4. Except for underground wall penetrations, seal annular space between sleeve and pipe or pipe insulation, using joint sealants appropriate for size, depth, and

location of joint. Refer to Division 07 Section "Joint Sealants" for materials and installation.

- Q. Aboveground, Exterior-Wall Pipe Penetrations: Seal penetrations using sleeves and mechanical sleeve seals. Select sleeve size to allow for 1-inch annular clear space between pipe and sleeve for installing mechanical sleeve seals.
1. Install steel pipe for sleeves smaller than 6 inches in diameter.
 2. Mechanical Sleeve Seal Installation: Select type and number of sealing elements required for pipe material and size. Position pipe in center of sleeve. Assemble mechanical sleeve seals and install in annular space between pipe and sleeve. Tighten bolts against pressure plates that cause sealing elements to expand and make watertight seal.
- R. Underground, Exterior-Wall Pipe Penetrations: Install cast-iron "wall pipes" for sleeves. Seal pipe penetrations using mechanical sleeve seals. Select sleeve size to allow for 1-inch annular clear space between pipe and sleeve for installing mechanical sleeve seals.
1. Mechanical Sleeve Seal Installation: Select type and number of sealing elements required for pipe material and size. Position pipe in center of sleeve. Assemble mechanical sleeve seals and install in annular space between pipe and sleeve. Tighten bolts against pressure plates that cause sealing elements to expand and make watertight seal.
- S. Fire-Barrier Penetrations: Maintain indicated fire rating of walls, partitions, ceilings, and floors at pipe penetrations. Seal pipe penetrations with firestop materials. Refer to Division 07 Section "Penetration Firestopping" for materials.
- T. Verify final equipment locations for roughing-in.
- U. Refer to equipment specifications in other Sections of these Specifications for roughing-in requirements.

3.03 PIPING JOINT CONSTRUCTION

- A. Join pipe and fittings according to the following requirements and Division 23 Sections specifying piping systems.
- B. Ream ends of pipes and tubes and remove burrs. Bevel plain ends of steel pipe.
- C. Remove scale, slag, dirt, and debris from inside and outside of pipe and fittings before assembly.

- D. Soldered Joints: Apply ASTM B 813, water-flushable flux, unless otherwise indicated, to tube end. Construct joints according to ASTM B 828 or CDA's "Copper Tube Handbook," using lead-free solder alloy complying with ASTM B 32.
- E. Brazed Joints: Construct joints according to AWS's "Brazing Handbook," "Pipe and Tube" Chapter, using copper-phosphorus brazing filler metal complying with AWS A5.8.
- F. Threaded Joints: Thread pipe with tapered pipe threads according to ASME B1.20.1. Cut threads full and clean using sharp dies. Ream threaded pipe ends to remove burrs and restore full ID. Join pipe fittings and valves as follows:
 - 1. Apply appropriate tape or thread compound to external pipe threads unless dry seal threading is specified.
 - 2. Damaged Threads: Do not use pipe or pipe fittings with threads that are corroded or damaged. Do not use pipe sections that have cracked or open welds.
- G. Welded Joints: Construct joints according to AWS D10.12, using qualified processes and welding operators according to Part 1 "Quality Assurance" Article.
- H. Flanged Joints: Select appropriate gasket material, size, type, and thickness for service application. Install gasket concentrically positioned. Use suitable lubricants on bolt threads.
- I. Plastic Piping Solvent-Cement Joints: Clean and dry joining surfaces. Join pipe and fittings according to the following:
 - 1. Comply with ASTM F 402 for safe-handling practice of cleaners, primers, and solvent cements.
 - 2. CPVC Piping: Join according to ASTM D 2846 Appendix.
 - 3. PVC Pressure Piping: Join schedule number ASTM D 1785, PVC pipe and PVC socket fittings according to ASTM D 2672. Join other-than-schedule-number PVC pipe and socket fittings according to ASTM D 2855.
 - 4. PVC Nonpressure Piping: Join according to ASTM D 2855.
- J. Plastic Pressure Piping Gasketed Joints: Join according to ASTM D 3139.
- K. Plastic Nonpressure Piping Gasketed Joints: Join according to ASTM D 3212.
- L. PE Piping Heat-Fusion Joints: Clean and dry joining surfaces by wiping with clean cloth or paper towels. Join according to ASTM D 2657.
 - 1. Plain-End Pipe and Fittings: Use butt fusion.
 - 2. Plain-End Pipe and Socket Fittings: Use socket fusion.
- M. Fiberglass Bonded Joints: Prepare pipe ends and fittings, apply adhesive, and join according to pipe manufacturer's written instructions.

3.04 PIPING CONNECTIONS

- A. Make connections according to the following, unless otherwise indicated:
 - 1. Install unions, in piping NPS 2 (DN 50) and smaller, adjacent to each valve and at final connection to each piece of equipment.
 - 2. Install flanges, in piping NPS 2-1/2 (DN 65) and larger, adjacent to flanged valves and at final connection to each piece of equipment.
 - 3. Wet Piping Systems: Install dielectric coupling and nipple fittings to connect piping materials of dissimilar metals.

3.05 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 HVAC 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.
- D. Install equipment to allow right of way for piping installed at required slope.

3.06 PAINTING

- A. Painting of HVAC systems, equipment, and components is specified in Division 09 Sections "Interior Painting" and "Exterior Painting."
- B. Damage and Touchup: Repair marred and damaged factory-painted finishes with materials and procedures to match original factory finish.

3.07 CONCRETE BASES

- A. Concrete Bases: Anchor equipment to concrete base according to equipment manufacturer's written instructions and according to seismic codes at Project.
 - 1. Construct concrete bases of dimensions indicated, but not less than 4 inches larger in both directions than supported unit.
 - 2. Install dowel rods to connect concrete base to concrete floor. Unless otherwise indicated, install dowel rods on 18-inch centers around the full perimeter of the base.
 - 3. Install epoxy-coated anchor bolts for supported equipment that extend through concrete base, and anchor into structural concrete floor.

4. Place and secure anchorage devices. Use supported equipment manufacturer's setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.
5. Install anchor bolts to elevations required for proper attachment to supported equipment.
6. Install anchor bolts according to anchor-bolt manufacturer's written instructions.
7. Use 3000-psi, twenty-eight (28) day compressive-strength concrete and reinforcement as specified in Division 03.

3.08 ERECTION OF METAL SUPPORTS AND ANCHORAGES

- A. Refer to Division 05 Section "Metal Fabrications" for structural steel.
- B. Cut, fit, and place miscellaneous metal supports accurately in location, alignment, and elevation to support and anchor HVAC materials and equipment.
- C. Field Welding: Comply with AWS D1.1.

3.09 ERECTION OF WOOD SUPPORTS AND ANCHORAGES

- A. Cut, fit, and place wood grounds, nailers, blocking, and anchorages to support, and anchor HVAC materials and equipment.
- B. Select fastener sizes that will not penetrate members if opposite side will be exposed to view or will receive finish materials. Tighten connections between members. Install fasteners without splitting wood members.
- C. Attach to substrates as required to support applied loads.

3.10 GROUTING

- A. Mix and install grout for HVAC equipment base bearing surfaces, pump and other equipment base plates, and anchors.
- B. Clean surfaces that will come into contact with grout.
- C. Provide forms as required for placement of grout.
- D. Avoid air entrapment during placement of grout.
- E. Place grout, completely filling equipment bases.
- F. Place grout on concrete bases and provide smooth bearing surface for equipment.
- G. Place grout around anchors.

H. Cure placed grout.

END OF SECTION 23 05 00

SECTION 23 05 29

HANGERS AND SUPPORTS FOR HVAC PIPING AND EQUIPMENT

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SUMMARY

A. Section Includes:

- 1. Metal pipe hangers and supports.
- 2. Trapeze pipe hangers.
- 3. Metal framing systems.
- 4. Thermal-hanger shield inserts.
- 5. Fastener systems.
- 6. Pipe stands.
- 7. Equipment supports.

B. Related Sections:

- 1. Division 23 Section "Vibration and Seismic Controls for HVAC Piping and Equipment" for vibration isolation devices.
- 2. Division 23 Section Metal Ducts for duct hangers and supports.

1.03 SUBMITTALS

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

B. Shop Drawings: Signed and sealed by a qualified professional engineer. Show fabrication and installation details and include calculations for the following; include Product Data for components:

- 1. Trapeze pipe hangers.
- 2. Metal framing systems.
- 3. Pipe stands.
- 4. Equipment supports.

- C. Delegated-Design Submittal: For trapeze hangers indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.
 - 1. Detail fabrication and assembly of trapeze hangers.
 - 2. Design Calculations: Calculate requirements for designing trapeze hangers.
- D. Welding certificates.

1.04 QUALITY ASSURANCE

- A. Structural Steel Welding Qualifications: Qualify procedures and personnel according to AWS D1.1/D1.1M, "Structural Welding Code - Steel."
- B. Pipe Welding Qualifications: Qualify procedures and operators according to ASME Boiler and Pressure Vessel Code.

PART 2 - PRODUCTS

2.01 PERFORMANCE REQUIREMENTS

- A. Delegated Design: Design trapeze pipe hangers and equipment supports, including comprehensive engineering analysis by a qualified professional engineer, using performance requirements and design criteria indicated.
- B. Structural Performance: Hangers and supports for HVAC piping and equipment shall withstand the effects of gravity loads and stresses within limits and under conditions indicated according to ASCE/SEI 7.
 - 1. Design supports for multiple pipes, including pipe stands, capable of supporting combined weight of supported systems, system contents, and test water.
 - 2. Design equipment supports capable of supporting combined operating weight of supported equipment and connected systems and components.
 - 3. Design seismic-restraint hangers and supports for piping and equipment and obtain approval from authorities having jurisdiction.

2.02 METAL PIPE HANGERS AND SUPPORTS

- A. Carbon-Steel Pipe Hangers and Supports:
 - 1. Description: MSS SP-58, Types 1 through 58, factory-fabricated components.
 - 2. Galvanized Metallic Coatings: Pregalvanized or hot dipped.
 - 3. Nonmetallic Coatings: Plastic coating, jacket, or liner.

4. Padded Hangers: Hanger with fiberglass or other pipe insulation pad or cushion to support bearing surface of piping.
5. Hanger Rods: Continuous-thread rod, nuts, and washer made of carbon steel.

B. Copper Pipe Hangers:

1. Description: MSS SP-58, Types 1 through 58, copper-coated-steel, factory-fabricated components.
2. Hanger Rods: Continuous-thread rod, nuts, and washer made of copper-coated steel.

2.03 TRAPEZE PIPE HANGERS

- A. Description: MSS SP-69, Type 59, shop- or field-fabricated pipe-support assembly made from structural carbon-steel shapes with MSS SP-58 carbon-steel hanger rods, nuts, saddles, and U-bolts.

2.04 METAL FRAMING SYSTEMS

A. MFMA Manufacturer Metal Framing Systems:

1. Manufacturers: Subject to compliance with requirements, provide products by one (1) of the following:
 - a. Flex-Strut Inc.
 - b. Unistrut Corporation; Tyco International, Ltd.
 - c. Wesanco, Inc.
 - d. GS Metals Corp.
2. Description: Shop- or field-fabricated pipe-support assembly for supporting multiple parallel pipes.
3. Standard: MFMA-4.
4. Channels: Continuous slotted steel channel with inturned lips.
5. Channel Nuts: Formed or stamped steel nuts or other devices designed to fit into channel slot and, when tightened, prevent slipping along channel.
6. Hanger Rods: Continuous-thread rod, nuts, and washer made of carbon steel.
7. Metallic Coating: Electroplated zinc.

B. Non-MFMA Manufacturer Metal Framing Systems:

1. Manufacturers: Subject to compliance with requirements, provide products by one (1) of the following:
 - a. Anvil International; a subsidiary of Mueller Water Products Inc.
 - b. Empire Industries, Inc.

c. ERICO International Corporation

2. Description: Shop- or field-fabricated pipe-support assembly made of steel channels, accessories, fittings, and other components for supporting multiple parallel pipes.
3. Standard: Comply with MFMA-4.
4. Channels: Continuous slotted steel channel with inturned lips.
5. Channel Nuts: Formed or stamped steel nuts or other devices designed to fit into channel slot and, when tightened, prevent slipping along channel.
6. Hanger Rods: Continuous-thread rod, nuts, and washer made of carbon steel.
7. Coating: Zinc.

2.05 THERMAL-HANGER SHIELD INSERTS

- A. Manufacturers: Subject to compliance with requirements, provide products by one (1) of the following:
1. Carpenter & Paterson, Inc.
 2. Clement Support Services
 3. ERICO International Corporation
 4. National Pipe Hanger Corporation
 5. PHS Industries, Inc.
- B. Insulation-Insert Material for Cold Piping: ASTM C 591, Type VI, Grade 1 polyisocyanurate with 125-psig minimum compressive strength and vapor barrier.
- C. Insulation-Insert Material for Hot Piping ASTM C 591, Type VI, Grade 1 polyisocyanurate with 125-psig minimum compressive strength.
- D. For Trapeze or Clamped Systems: Insert and shield shall cover entire circumference of pipe.
- E. For Clevis or Band Hangers: Insert and shield shall cover lower 180 degrees of pipe.
- F. Insert Length: Extend 2 inches beyond sheet metal shield for piping operating below ambient air temperature.

2.06 FASTENER SYSTEMS

- A. Powder-Actuated Fasteners: Threaded-steel stud, for use in hardened Portland cement concrete with pull-out, tension, and shear capacities appropriate for supported loads and building materials where used.

- B. Mechanical-Expansion Anchors: Insert-wedge-type, zinc-coated steel anchors, for use in hardened Portland cement concrete; with pull-out, tension, and shear capacities appropriate for supported loads and building materials where used.

2.07 PIPE STANDS

- A. General Requirements for Pipe Stands: Shop- or field-fabricated assemblies made of manufactured corrosion-resistant components to support roof-mounted piping.
- B. Compact Pipe Stand: One-piece plastic unit with integral-rod roller, pipe clamps, or V-shaped cradle to support pipe, for roof installation without membrane penetration.
- C. Low-Type, Single-Pipe Stand: One-piece plastic base unit with plastic roller, for roof installation without membrane penetration.
- D. High-Type, Multiple-Pipe Stand:
 - 1. Description: Assembly of bases, vertical and horizontal members, and pipe supports, for roof installation without membrane penetration.
 - 2. Bases: One (1) or more; plastic.
 - 3. Vertical Members: Two (2) or more protective-coated-steel channels.
 - 4. Horizontal Member: Protective-coated-steel channel.
 - 5. Pipe Supports: Galvanized-steel, clevis-type pipe hangers.
- E. Curb-Mounted-Type Pipe Stands: Shop- or field-fabricated pipe supports made from structural-steel shapes, continuous-thread rods, and rollers, for mounting on permanent stationary roof curb.

2.08 EQUIPMENT SUPPORTS

- A. Description: Welded, shop- or field-fabricated equipment support made from structural carbon-steel shapes.

2.09 MISCELLANEOUS MATERIALS

- A. Structural Steel: ASTM A 36, carbon-steel plates, shapes, and bars; black and galvanized.
- B. Threaded Rods: Continuously threaded. Zinc-plated steel or galvanized steel for indoor applications and stainless-steel for outdoor applications. Mating nuts and washers of similar material as rods.
- C. Grout: ASTM C 1107, factory-mixed and -packaged, dry, hydraulic-cement, nonshrink and nonmetallic grout; suitable for interior and exterior applications.

1. Properties: Nonstaining, noncorrosive, and nongaseous.
2. Design Mix: 5000-psi, twenty-eight (28) day compressive strength.

PART 3 - EXECUTION

3.01 APPLICATION

- A. Comply with requirements in Section 078413 "Penetration Firestopping" for firestopping materials and installation for penetrations through fire-rated walls, ceilings, and assemblies.
- B. Strength of Support Assemblies: Where not indicated, select sizes of components so strength will be adequate to carry present and future static loads within specified loading limits. Minimum static design load used for strength determination shall be weight of supported components plus 200 lbs.

3.02 HANGER AND SUPPORT INSTALLATION

- A. Metal Pipe-Hanger Installation: Comply with MSS SP-69 and MSS SP-89. Install hangers, supports, clamps, and attachments as required to properly support piping from the building structure.
- B. Metal Trapeze Pipe-Hanger Installation: Comply with MSS SP-69 and MSS SP-89. Arrange for grouping of parallel runs of horizontal piping, and support together on field-fabricated trapeze pipe hangers.
 1. Pipes of Various Sizes: Support together and space trapezes for smallest pipe size or install intermediate supports for smaller diameter pipes as specified for individual pipe hangers.
 2. Field fabricate from ASTM A 36, carbon-steel shapes selected for loads being supported. Weld steel according to AWS D1.1.
- C. Metal Framing System Installation: Arrange for grouping of parallel runs of piping, and support together on field-assembled metal framing systems.
- D. Thermal-Hanger Shield Installation: Install in pipe hanger or shield for insulated piping.
- E. Fastener System Installation:
 1. Install powder-actuated fasteners for use in lightweight concrete or concrete slabs less than 4 inches thick in concrete after concrete is placed and completely cured. Use operators that are licensed by powder-actuated tool manufacturer. Install fasteners according to powder-actuated tool manufacturer's operating manual.

2. Install mechanical-expansion anchors in concrete after concrete is placed and completely cured. Install fasteners according to manufacturer's written instructions.
- F. Pipe Stand Installation:
1. Pipe Stand Types except Curb-Mounted Type: Assemble components and mount on smooth roof surface. Do not penetrate roof membrane.
 2. Curb-Mounted-Type Pipe Stands: Assemble components or fabricate pipe stand and mount on permanent, stationary roof curb. See Division 07 Section "Roof Accessories" for curbs.
- G. Install hangers and supports complete with necessary attachments, inserts, bolts, rods, nuts, washers, and other accessories.
- H. Equipment Support Installation: Fabricate from welded-structural-steel shapes.
- I. Install hangers and supports to allow controlled thermal and seismic movement of piping systems, to permit freedom of movement between pipe anchors, and to facilitate action of expansion joints, expansion loops, expansion bends, and similar units.
- J. Install lateral bracing with pipe hangers and supports to prevent swaying.
- K. Install building attachments within concrete slabs or attach to structural steel. Install additional attachments at concentrated loads, including valves, flanges, and strainers, NPS 2-1/2 (DN 65) and larger and at changes in direction of piping. Install concrete inserts before concrete is placed; fasten inserts to forms and install reinforcing bars through openings at top of inserts.
- L. Load Distribution: Install hangers and supports so that piping live and dead loads and stresses from movement will not be transmitted to connected equipment.
- M. Pipe Slopes: Install hangers and supports to provide indicated pipe slopes and to not exceed maximum pipe deflections allowed by ASME B31.9 for building services piping.
- N. Insulated Piping:
1. Attach clamps and spacers to piping.
 - a. Piping Operating above Ambient Air Temperature: Clamp may project through insulation.
 - b. Piping Operating below Ambient Air Temperature: Use thermal-hanger shield insert with clamp sized to match OD of insert.
 - c. Do not exceed pipe stress limits allowed by ASME B31.9 for building services piping.

2. Install MSS SP-58, Type 39, protection saddles if insulation without vapor barrier is indicated. Fill interior voids with insulation that matches adjoining insulation.
3. Install MSS SP-58, Type 40, protective shields on cold piping with vapor barrier. Shields shall span an arc of 180 degrees.
4. Shield Dimensions for Pipe: Not less than the following:
 - a. NPS 1/4 to NPS 3-1/2 (DN 8 to DN 90): 12 inches long and 0.048 inch thick.
 - b. NPS 4 (DN 100): 12 inches long and 0.06 inch thick.
5. Thermal-Hanger Shields: Install with insulation same thickness as piping insulation.

3.03 EQUIPMENT SUPPORTS

- A. Fabricate structural-steel stands to suspend equipment from structure overhead or to support equipment above floor.
- B. Grouting: Place grout under supports for equipment and make bearing surface smooth.
- C. Provide lateral bracing, to prevent swaying, for equipment supports.

3.04 METAL FABRICATIONS

- A. Cut, drill, and fit miscellaneous metal fabrications for trapeze pipe hangers and equipment supports.
- B. Fit exposed connections together to form hairline joints. Field weld connections that cannot be shop welded because of shipping size limitations.
- C. Field Welding: Comply with AWS D1.1 procedures for shielded, metal arc welding; appearance and quality of welds; and methods used in correcting welding work; and with the following:
 1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
 2. Obtain fusion without undercut or overlap.
 3. Remove welding flux immediately.
 4. Finish welds at exposed connections so no roughness shows after finishing and so contours of welded surfaces match adjacent contours.

3.05 ADJUSTING

- A. Hanger Adjustments: Adjust hangers to distribute loads equally on attachments and to achieve indicated slope of pipe.
- B. Trim excess length of continuous-thread hanger and support rods to 1½ inches.

3.06 PAINTING

- A. Touchup: Clean field welds and abraded areas of shop paint. Paint exposed areas immediately after erecting hangers and supports. Use same materials as used for shop painting. Comply with SSPC-PA 1 requirements for touching up field-painted surfaces.
 - 1. Apply paint by brush or spray to provide a minimum dry film thickness of 2.0 mils.
- B. Touchup: Cleaning and touchup painting of field welds, bolted connections, and abraded areas of shop paint on miscellaneous metal are specified in Division 09 painting Sections.
- C. Galvanized Surfaces: Clean welds, bolted connections, and abraded areas and apply galvanizing-repair paint to comply with ASTM A 780.

3.07 HANGER SUPPORT AND SPACING:

- A. Install hangers for drawn-temper copper piping with the following maximum spacing and minimum rod sizes:
 - 1. Sizes through NPS 3/4: Maximum span, 5 feet; minimum rod size, ¼-inch.
 - 2. NPS 1: Maximum span, 6 feet; minimum rod size, ¼-inch.
 - 3. NPS 1-1/4: Maximum span, 6 feet; minimum rod size, 3/8-inch.
 - 4. NPS 1-1/2: Maximum span, 6 feet; minimum rod size, 3/8-inch.
 - 5. NPS 2: Maximum span, 8 feet; minimum rod size, 3/8-inch.

3.08 HANGER AND SUPPORT SCHEDULE

- A. Specific hanger and support requirements are in Sections specifying piping systems and equipment.
- B. Comply with MSS SP-58 for pipe-hanger selections and applications that are not specified in piping system Sections.
- C. Use hangers and supports with galvanized metallic coatings for piping and equipment that will not have field-applied finish.

- D. Use nonmetallic coatings on attachments for electrolytic protection where attachments are in direct contact with copper tubing.
- E. Use carbon-steel pipe hangers and supports, metal trapeze pipe hangers and metal framing systems and attachments for general service applications.
- F. Use copper-plated pipe hangers and copper attachments for copper piping and tubing.
- G. Use padded hangers for piping that is subject to scratching.
- H. Use thermal-hanger shield inserts for insulated piping and tubing.
- I. Horizontal-Piping Hangers and Supports: Unless otherwise indicated and except as specified in piping system Sections, install the following types:
 - 1. Adjustable, Steel Clevis Hangers (MSS Type 1): For suspension of non-insulated or insulated, stationary pipes NPS 1/2 to NPS 30.
 - 2. Pipe Hangers (MSS Type 5): For suspension of pipes NPS 1/2 to NPS 4, to allow off-center closure for hanger installation before pipe erection.
 - 3. U-Bolts (MSS Type 24): For support of heavy pipes NPS 1/2 to NPS 30.
 - 4. Clips (MSS Type 26): For support of insulated pipes not subject to expansion or contraction.
 - 5. Pipe Saddle Supports (MSS Type 36): For support of pipes NPS 4 to NPS 36, with steel-pipe base stanchion support and cast-iron floor flange or carbon-steel plate.
 - 6. Pipe Stanchion Saddles (MSS Type 37): For support of pipes NPS 4 to NPS, with steel-pipe base stanchion support and cast-iron floor flange or carbon-steel plate, and with U-bolt to retain pipe.
 - 7. Adjustable Pipe Saddle Supports (MSS Type 38): For stanchion-type support for pipes NPS 2-1/2 to NPS 36 if vertical adjustment is required, with steel-pipe base stanchion support and cast-iron floor flange.
 - 8. Single-Pipe Rolls (MSS Type 41): For suspension of pipes NPS 1 to NPS 30, from two (2) rods if longitudinal movement caused by expansion and contraction might occur.
 - 9. Adjustable Roller Hangers (MSS Type 43): For suspension of pipes NPS 2-1/2 to NPS 24, from single rod if horizontal movement caused by expansion and contraction might occur.
- J. Vertical-Piping Clamps: Unless otherwise indicated and except as specified in piping system Sections, install the following types:
 - 1. Extension Pipe or Riser Clamps (MSS Type 8): For support of pipe risers NPS 3/4 to NPS 24 (DN 24 to DN 600).
 - 2. Carbon- or Alloy-Steel Riser Clamps (MSS Type 42): For support of pipe risers NPS 3/4 to NPS 24 (DN 20 to DN 600) if longer ends are required for riser clamps.

- K. Hanger-Rod Attachments: Unless otherwise indicated and except as specified in piping system Sections, install the following types:
1. Steel Turnbuckles (MSS Type 13): For adjustment up to 6 inches for heavy loads.
 2. Steel Clevises (MSS Type 14): For 120 to 450 deg F (49 to 232 deg C) piping installations.
 3. Swivel Turnbuckles (MSS Type 15): For use with MSS Type 11, split pipe rings.
 4. Malleable-Iron Sockets (MSS Type 16): For attaching hanger rods to various types of building attachments.
 5. Steel Weldless Eye Nuts (MSS Type 17): For 120 to 450 deg F (49 to 232 deg C) piping installations.
- L. Building Attachments: Unless otherwise indicated and except as specified in piping system Sections, install the following types:
1. Steel or Malleable Concrete Inserts (MSS Type 18): For upper attachment to suspend pipe hangers from concrete ceiling.
 2. Top-Beam C-Clamps (MSS Type 19): For use under roof installations with bar-joint construction, to attach to top flange of structural shape.
 3. Side-Beam or Channel Clamps (MSS Type 20): For attaching to bottom flange of beams, channels, or angles.
 4. Center-Beam Clamps (MSS Type 21): For attaching to center of bottom flange of beams.
 5. Welded Beam Attachments (MSS Type 22): For attaching to bottom of beams if loads are considerable and rod sizes are large.
 6. C-Clamps (MSS Type 23): For structural shapes.
 7. Top-Beam Clamps (MSS Type 25): For top of beams if hanger rod is required tangent to flange edge.
 8. Side-Beam Clamps (MSS Type 27): For bottom of steel I-beams.
 9. Steel-Beam Clamps with Eye Nuts (MSS Type 28): For attaching to bottom of steel I-beams for heavy loads.
 10. Linked-Steel Clamps with Eye Nuts (MSS Type 29): For attaching to bottom of steel I-beams for heavy loads, with link extensions.
 11. Malleable-Beam Clamps with Extension Pieces (MSS Type 30): For attaching to structural steel.
 12. Welded-Steel Brackets: For support of pipes from below or for suspending from above by using clip and rod. Use one of the following for indicated loads:
 - a. Light (MSS Type 31): 750 lb.
 - b. Medium (MSS Type 32): 1500 lb.
 - c. Heavy (MSS Type 33): 3000 lb.
 13. Side-Beam Brackets (MSS Type 34): For sides of steel or wooden beams.
 14. Plate Lugs (MSS Type 57): For attaching to steel beams if flexibility at beam is required.

15. Horizontal Travelers (MSS Type 58): For supporting piping systems subject to linear horizontal movement where headroom is limited.
- M. Saddles and Shields: Unless otherwise indicated and except as specified in piping system Sections, install the following types:
1. Steel-Pipe-Covering Protection Saddles (MSS Type 39): To fill interior voids with insulation that matches adjoining insulation.
 2. Protection Shields (MSS Type 40): Of length recommended in writing by manufacturer to prevent crushing insulation.
 3. Thermal-Hanger Shield Inserts: For supporting insulated pipe.
- N. Spring Hangers and Supports: Unless otherwise indicated and except as specified in piping system Sections, install the following types:
1. Restraint-Control Devices (MSS Type 47): Where indicated to control piping movement.
 2. Spring Cushions (MSS Type 48): For light loads if vertical movement does not exceed 1¼ inches.
 3. Spring-Cushion Roll Hangers (MSS Type 49): For equipping Type 41, roll hanger with springs.
 4. Spring Sway Braces (MSS Type 50): To retard sway, shock, vibration, or thermal expansion in piping systems.
 5. Variable-Spring Hangers (MSS Type 51): Preset to indicated load and limit variability factor to twenty-five percent (25%) to allow expansion and contraction of piping system from hanger.
 6. Variable-Spring Base Supports (MSS Type 52): Preset to indicated load and limit variability factor to twenty-five percent (25%) to allow expansion and contraction of piping system from base support.
 7. Variable-Spring Trapeze Hangers (MSS Type 53): Preset to indicated load and limit variability factor to twenty-five percent (25%) to allow expansion and contraction of piping system from trapeze support.
 8. Constant Supports: For critical piping stress and if necessary to avoid transfer of stress from one support to another support, critical terminal, or connected equipment. Include auxiliary stops for erection, hydrostatic test, and load-adjustment capability. These supports include the following types:
 - a. Horizontal (MSS Type 54): Mounted horizontally.
 - b. Vertical (MSS Type 55): Mounted vertically.
 - c. Trapeze (MSS Type 56): Two (2) vertical-type supports and one (1) trapeze member.
- O. Comply with MSS SP-69 for trapeze pipe-hanger selections and applications that are not specified in piping system Sections.
- P. Comply with MFMA-103 for metal framing system selections and applications that are not specified in piping system Sections.

- Q. Use powder-actuated fasteners or mechanical-expansion anchors instead of building attachments where required in concrete construction.

END OF SECTION 23 05 29

SECTION 23 05 48

VIBRATION & SEISMIC CONTROLS FOR HVAC PIPING & EQUIPMENT

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SUMMARY

- A. This Section includes the following:
 - 1. Design for vibration isolation, seismic and wind restraint.
 - 2. Isolation mounts.
 - 3. Restrained elastomeric isolation mounts.
 - 4. Elastomeric hangers.
 - 5. Pipe riser resilient supports.
 - 6. Resilient pipe guides.
 - 7. Seismic snubbers.
 - 8. Restraining braces and cables.
 - 9. Seismic Restraint Accessories
 - 10. Mechanical anchor bolts.
 - 11. Adhesive anchors bolts.
 - 12. Vibration isolation equipment bases.

1.03 SUBMITTALS

- A. Product Data: For the following:
 - 1. Include rated load, rated deflection, and overload capacity for each vibration isolation device.
 - 2. Include load rating for each wind-force-restraint fitting and assembly.
 - 3. Illustrate and indicate style, material, strength, fastening provision, and finish for each type and size of seismic-restraint component used.
 - 4. Annotate to indicate application of each product submitted and compliance with requirements.
 - 5. Interlocking Snubbers: Include ratings for horizontal, vertical, and combined loads.

B. Shop Drawings:

1. Detail fabrication and assembly of equipment bases.
2. Vibration Isolation Base Details: Detail fabrication including anchorages and attachments to structure and to supported equipment. Include adjustable motor bases, rails, and frames for equipment mounting.

C. Delegated-Design Submittal:

1. For each seismic-restraint and wind-load protection device, including seismic-restrained mounting, pipe-riser resilient support, snubber, seismic restraint, seismic-restraint accessory and concrete anchor and insert that is required by this Section or is indicated on Drawings, submit the following:
 - a. Seismic and Wind-Load Restraint, and Vibration Isolation Base Selection: Select vibration isolators, seismic and wind-load restraints, and vibration isolation bases complying with performance requirements, design criteria, and analysis data.
 - b. Riser Supports: Include riser diagrams and calculations showing anticipated expansion and contraction at each support point, initial and final loads on building structure, spring deflection changes, and seismic loads. Include certification by professional engineer that riser system was examined for excessive stress and that none exists.
 - c. Concrete Anchors and Inserts: Include calculations showing anticipated seismic and wind loads. Include certification that device is approved by an NRTL for seismic reinforcement use.
 - d. Seismic Design Calculations: Submit all input data and loading calculations prepared under "Seismic Design Calculations" Paragraph in "Performance Requirements" Article.
 - e. Wind-Load Design Calculations: Submit all static and dynamic loading calculations prepared under "Wind-Load Design Calculations" Paragraph in "Performance Requirements" Article.
 - f. Qualified Professional Engineer: All designated-design submittals for seismic- and wind-restraint calculations are to be signed and sealed by qualified professional engineer responsible for their preparation.
2. Seismic- and Wind-Restraint Detail Drawing:
 - a. Design Analysis: To support selection and arrangement of seismic and wind restraints. Include calculations of combined tensile and shear loads.
 - b. Details: Indicate fabrication and arrangement. Detail attachments of restraints to restrained items and to the structure. Show attachment locations, methods, and spacings. Identify components, list their strengths, and indicate directions and values of forces transmitted to the structure during seismic events. Indicate association with vibration isolation devices.

- c. Coordinate seismic-restraint and vibration isolation details with wind-restraint details required for equipment mounted outdoors. Comply also with requirements in other Sections for equipment mounted outdoors.
- 3. All delegated-design submittals for seismic- and wind-restraint detail Drawings are to be signed and sealed by qualified professional engineer responsible for their preparation.
- 4. Product Listing, Preapproval, and Evaluation Documentation: By an agency acceptable to authorities having jurisdiction, showing maximum ratings of restraint items and basis for approval (tests or calculations).
- 5. Design Calculations for Vibration Isolation Devices: Calculate static and dynamic loading due to equipment weight and operating forces required to select proper vibration isolators, and to design vibration isolation bases.
- 6. Riser Supports: Include riser diagrams and calculations showing anticipated expansion and contraction at each support point, initial and final loads on building structure, and spring deflection changes. Include certification that riser system was examined for excessive stress and that none exists.

1.04 INFORMATIONAL SUBMITTALS

- A. Coordination Drawings: Show coordination of vibration isolation device installation and seismic bracing for HVAC piping and equipment with other systems and equipment in the vicinity, including other supports and restraints, if any.
- B. Qualification Data: For professional engineer and testing agency.
- C. Welding certificates.
- D. Field quality-control reports.

1.05 QUALITY ASSURANCE

- A. Testing Agency Qualifications: An independent agency, with the experience and capability to conduct testing indicated, be an NRTL as defined by OSHA in 29 CFR 1910.7, and be acceptable to authorities having jurisdiction.
- B. Comply with seismic-restraint requirements in the IBC unless requirements in this Section are more stringent.
- C. Welding: Qualify procedures and personnel according to AWS D1.1, "Structural Welding Code - Steel."
- D. Seismic-restraint devices shall have horizontal and vertical load testing and analysis and shall bear anchorage preapproval OPA number from OSHPD, preapproval by ICC-ES, or preapproval by another agency acceptable to authorities having jurisdiction, showing maximum seismic-restraint ratings. Ratings based on independent testing are preferred

to ratings based on calculations. If preapproved ratings are not available, submittals based on independent testing are preferred. Calculations (including combining shear and tensile loads) to support seismic-restraint designs must be signed and sealed by a qualified professional engineer.

PART 2 - PRODUCTS

2.01 ISOLATION PADS

- A. Manufacturers: Subject to compliance with requirements, provide products by one (1) of the following:
 - 1. Cambridgeport
 - 2. Mason Industries
 - 3. Vibro-Acoustics, A Swegon Group Company
 - 4. Vibration Eliminator Co., Inc.
 - 5. Vibration Isolation.
- B. 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.
- C. Size: Factory or field cut to match requirements of supported equipment.
- D. Pad Material: Oil and water resistant with elastomeric properties.
- E. Load-bearing metal plates adhered to pads.
- F. Sandwich-Core Material: Resilient and elastomeric.
 - 1. Surface Pattern: Waffle pattern.
 - 2. Infused nonwoven cotton or synthetic fibers.

2.02 ELASTOMERIC ISOLATION MOUNTS (Double Deflection)

- A. Manufacturers: Subject to compliance with requirements, provide products by one (1) of the following:
 - 1. Cambridgeport
 - 2. Mason Industries
 - 3. Vibro-Acoustics, A Swegon Group Company
 - 4. Vibration Eliminator Co., Inc.
 - 5. Vibration Isolation
- B. Mounting Plates:

1. Top Plate: Encapsulated steel load transfer top plates, factory drilled and threaded with threaded studs or bolts.
 2. Baseplate: Encapsulated steel bottom plates with holes provided for anchoring to support structure.
- C. Elastomeric Material: Molded, oil-resistant rubber, neoprene, or other elastomeric material.

2.03 RESTRAINED ELASTOMERIC ISOLATION MOUNTS

- A. Manufacturers: Subject to compliance with requirements, provide products by one (1) of the following:
1. Mason Industries
 2. Cambridgeport
 3. Vibro-Acoustics, A Swegon Group Company
 4. Vibration Eliminator Co., Inc.
 5. Vibration Isolation
- B. Description: All-directional isolator with restraints containing two (2) separate and opposing elastomeric elements that prevent central threaded element and attachment hardware from contacting the housing during normal operation.
1. Housing: Cast-ductile iron or welded steel.
 2. Elastomeric Material: Molded, oil-resistant rubber, neoprene, or other elastomeric material.

2.04 ELASTOMERIC HANGERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one (1) of the following:
1. Mason Industries
 2. Vibro-Acoustics, A Swegon Group Company
 3. Vibration Management Corp.
 4. Vibration Eliminator Co., Inc.
 5. Vibration Isolation
- B. Description: Elastomeric Mount in a Steel Frame with Upper and Lower Steel Hanger Rods:
1. Frame: Steel, fabricated with a connection for an upper threaded hanger rod and an opening on the underside to allow for a maximum of 30 degrees of angular lower hanger-rod misalignment without binding or reducing isolation efficiency.
 2. Dampening Element: Molded, oil-resistant rubber, neoprene, or other elastomeric material with a projecting bushing for the underside opening preventing steel to steel contact.

2.05 PIPE-RISER RESILIENT SUPPORT

- A. Description: All-directional, acoustical pipe anchor consisting of two (2) steel tubes separated by a minimum of ½-inch-thick neoprene. Include steel and neoprene vertical-limit stops arranged to prevent vertical travel in both directions. Design support for a maximum load on the isolation material of 500 psig and for equal resistance in all directions.

2.06 RESILIENT PIPE GUIDES

- A. Description: Telescopic arrangement of two (2) steel tubes or post and sleeve arrangement separated by a minimum of ½-inch-thick neoprene. Where clearances are not readily visible, a factory-set guide height with a shear pin to allow vertical motion due to pipe expansion and contraction shall be fitted. Shear pin shall be removable and reinsertable to allow for selection of pipe movement. Guides shall be capable of motion to meet location requirements.
- B. Pipe Riser Resilient Support: All-directional, acoustical pipe anchor consisting of two (2) steel tubes separated by a minimum of ½-inch-thick neoprene. Include steel and neoprene vertical-limit stops arranged to prevent vertical travel in both directions. Design support for a maximum load on the isolation material of 500 psig and for equal resistance in all directions.
- C. Resilient Pipe Guides: Telescopic arrangement of two (2) steel tubes or post and sleeve arrangement separated by a minimum of ½-inch-thick neoprene. Where clearances are not readily visible, a factory-set guide height with a shear pin to allow vertical motion due to pipe expansion and contraction shall be fitted. Shear pin shall be removable and reinsertable to allow for selection of pipe movement. Guides shall be capable of motion to meet location requirements.

2.07 SEISMIC SNUBBERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one (1) of the following:
 - 1. Mason Industries
 - 2. Vibration Management Corp.
 - 3. Vibration Mounting and Controls, Inc.
- B. Description: Factory fabricated using welded structural-steel shapes and plates, anchor bolts, and replaceable resilient isolation washers and bushings.
 - 1. Anchor bolts for attaching to concrete shall be seismic-rated, drill-in, and stud-wedge or female-wedge type.
 - 2. Resilient Isolation Washers and Bushings: Oil- and water-resistant neoprene.
 - 3. Maximum ¼-inch air gap, and minimum ¼-inch-thick resilient cushion.

2.08 RESTRAINT CHANNEL BRACINGS

- A. Manufacturers: Subject to compliance with requirements, provide products by one (1) of the following:
 - 1. Atkore International (Unistrut)
 - 2. Eaton (B-line)
 - 3. Hilti, Inc
 - 4. nVent CADDY
- B. Description: MFMA-4, shop- or field-fabricated bracing assembly made of slotted steel channels with accessories for attachment to braced component at one end and to building structure at the other end and other matching components and with corrosion-resistant coating; rated in tension, compression, and torsion forces.

2.09 RESTRAINT CABLES

- A. Manufacturers: Subject to compliance with requirements, provide products by one (1) of the following:
 - 1. Vibro-Acoustics, A Swegon Group Company
 - 2. nVent CADDY
 - 3. Vibration Mounting and Controls Inc.
- B. Restraint Cables: ASTM A 603 galvanized-steel cables. End connections made of steel assemblies with thimbles, brackets, swivel, and bolts designed for restraining cable service; with a minimum of two (2) clamping bolts for cable engagement.

2.10 SEISMIC-RESTRAINT ACCESSORIES

- A. Manufacturers: Subject to compliance with requirements, provide products by one (1) of the following:
 - 1. Mason Industries
 - 2. Eaton (B-line)
 - 3. Vibro-Acoustics, A Swegon Group Company
 - 4. nVent CADDY
 - 5. Hilti, Inc.
- B. General Requirements for Restraint Components: Rated strengths, features, and applications shall be as defined in reports by an agency acceptable to authorities having jurisdiction.
 - 1. Structural Safety Factor: Allowable strength in tension, shear, and pullout force of components shall be at least four (4) times the maximum seismic forces to which they will be subjected.

- C. Hanger Rod Stiffener: Steel tube or steel slotted-support-system sleeve with internally bolted connections to hanger rod.
- D. Bushings for Floor-Mounted Equipment Anchor Bolts: Neoprene bushings designed for rigid equipment mountings and matched to type and size of anchor bolts and studs.
- E. Bushing Assemblies for Wall-Mounted Equipment Anchorage: Assemblies of neoprene elements and steel sleeves designed for rigid equipment mountings and matched to type and size of attachment devices used.
- F. Resilient Isolation Washers and Bushings: One-piece, molded, oil- and water-resistant neoprene, with a flat washer face.

2.11 MECHANICAL ANCHOR BOLTS

- A. Manufacturers: Subject to compliance with requirements, provide products by one (1) of the following:
 - 1. Atkore International (Unistrut)
 - 2. Eaton (B-line)
 - 3. Hilti, Inc
 - 4. Mason Industries
 - 5. Powers Fasteners
 - 6. Simpson Strong-Tie Co., Inc.
- B. Mechanical Anchor Bolts: Drilled-in and stud-wedge or female-wedge type in zinc-coated steel for interior applications and stainless steel for exterior applications. Select anchor bolts with strength required for anchor and as tested according to ASTM E 488.

2.12 ADHESIVE ANCHOR BOLTS

- A. Manufacturers: Subject to compliance with requirements, provide products by one (1) of the following:
 - 1. Atkore International (Unistrut)
 - 2. Eaton (B-line)
 - 3. Hilti, Inc
 - 4. Mason Industries
 - 5. Powers Fasteners
 - 6. Simpson Strong-Tie Co., Inc.
- B. Adhesive Anchor Bolts: Drilled-in and capsule anchor system containing PVC or urethane methacrylate-based resin and accelerator, or injected polymer or hybrid mortar adhesive. Provide anchor bolts and hardware with zinc-coated steel for interior applications and stainless-steel for exterior applications. Select anchor bolts with strength required for anchor and as tested according to ASTM E 488.

2.13 FACTORY FINISHES

- A. Finish: Manufacturer's standard paint applied to factory-assembled and -tested equipment before shipping.
 - 1. Powder coating on springs and housings.
 - 2. All hardware shall be galvanized. Hot-dip galvanize metal components for exterior use.
 - 3. Baked enamel or powder coat for metal components on isolators for interior use.
 - 4. Color-code or otherwise mark vibration isolation and seismic- and wind-control devices to indicate capacity range.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Examine areas and equipment to receive vibration isolation and seismic and wind control devices for compliance with requirements for installation tolerances and other conditions affecting performance.
- B. Examine roughing-in of reinforcement and cast-in-place anchors to verify actual locations before installation.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 APPLICATIONS

- A. Hanger Rod Stiffeners: Install hanger rod stiffeners where indicated or scheduled on Drawings to receive them and where required to prevent buckling of hanger rods due to seismic forces.
- B. Strength of Support and Seismic-Restraint Assemblies: Where not indicated, select sizes of components so strength will be adequate to carry present and future static and seismic loads within specified loading limits.
- C. Provide steel framing for support and restraint of equipment. Secure equipment to framing as required to resist wind and seismic loads.

3.03 INSTALLATION OF VIBRATION-CONTROL, WIND LOAD CONTROL, AND SEISMIC-RESTRAINT DEVICES

- A. Provide vibration-control devices for systems and equipment where indicated in Equipment Schedules and/or Drawings.

- B. Provide seismic-restraint and wind-load control devices for systems and equipment where indicated in Equipment Schedules and/or Drawings.
- C. Coordinate location of embedded connection hardware with supported equipment attachment and mounting points and with requirements for concrete reinforcement and formwork specified in Division 03.
- D. Installation of vibration isolators must not cause any change of position of equipment, piping, or ductwork resulting in stresses or misalignment.
- E. Equipment Restraints:
 - 1. Install seismic snubbers on HVAC equipment mounted on vibration isolators. Locate snubbers as close as possible to vibration isolators and bolt to equipment base and supporting structure.
 - 2. Install resilient bolt isolation washers on equipment anchor bolts where clearance between anchor and adjacent surface exceeds 0.125-inch.
 - 3. Install seismic-restraint devices using methods approved by an agency acceptable to authorities having jurisdiction that provides required submittals for component.
- F. Piping Restraints:
 - 1. Comply with requirements in MSS SP-127.
 - 2. Space lateral supports a maximum of 40 feet o.c., and longitudinal supports a maximum of 80 feet o.c.
 - 3. Brace a change of direction longer than 12 feet.
- G. Install seismic and wind load restraint cables so they do not bend across edges of adjacent equipment or building structure.
- H. Install seismic-restraint devices using methods approved by an agency acceptable to authorities having jurisdiction that provides required submittals for component.
- I. Install bushing assemblies for anchor bolts for floor-mounted equipment, arranged to provide resilient media between anchor bolt and mounting hole in concrete base.
- J. Install bushing assemblies for mounting bolts for wall-mounted equipment, arranged to provide resilient media where equipment or equipment-mounting channels are attached to wall.
- K. Attachment to Structure: If specific attachment is not indicated, anchor bracing to structure at flanges of beams, at upper truss chords of bar joists, or at concrete members.
- L. Drilled-in Anchors:
 - 1. Identify position of reinforcing steel and other embedded items prior to drilling holes for anchors. Do not damage existing reinforcing or embedded items during

coring or drilling. Notify Structural Engineer if reinforcing steel or other embedded items are encountered during drilling. Locate and avoid prestressed tendons, electrical and telecommunications conduit, and gas lines.

2. Do not drill holes in concrete or masonry until concrete, mortar, or grout has achieved full design strength.
3. Wedge-Type Anchor Bolts: Protect threads from damage during anchor installation. Heavy-duty sleeve anchors shall be installed with sleeve fully engaged in the structural element to which anchor is to be fastened.
4. Adhesive-Type Anchor Bolts: Clean holes to remove loose material and drilling dust prior to installation of adhesive. Place adhesive in holes proceeding from the bottom of the hole and progressing toward the surface in such a manner as to avoid introduction of air pockets in the adhesive.
5. Set anchors to manufacturer's recommended torque, using a torque wrench.
6. Install zinc-coated steel anchors for interior and stainless-steel anchors for exterior applications.
7. Do not drill holes in concrete or masonry until concrete, mortar, or grout has achieved full design strength.
8. Wedge Anchors: Protect threads from damage during anchor installation. Heavy-duty sleeve anchors shall be installed with sleeve fully engaged in the structural element to which anchor is to be fastened.
9. Adhesive Anchors: Clean holes to remove loose material and drilling dust prior to installation of adhesive. Place adhesive in holes proceeding from the bottom of the hole and progressing toward the surface in such a manner as to avoid introduction of air pockets in the adhesive.
10. Set anchors to manufacturer's recommended torque, using a torque wrench.
11. Install zinc-coated steel anchors for interior and stainless-steel anchors for exterior applications.

3.04 ACCOMMODATION OF DIFFERENTIAL SEISMIC MOTION

A. Coordinate this Article with Drawings.

1. Install flexible connections in piping where they cross seismic joints, where adjacent sections or branches are supported by different structural elements, and where the connections terminate with connection to equipment that is anchored to a different structural element from the one supporting the connections as they approach equipment.

3.05 FIELD QUALITY CONTROL

- A. Testing Agency: Engage a qualified testing agency to perform tests and inspections.
- B. Perform tests and inspections.
- C. Tests and Inspections:

1. Provide evidence of recent calibration of test equipment by a testing agency acceptable to authorities having jurisdiction.
2. Schedule test with Owner, through Architect, before connecting anchorage device to restrained component (unless postconnection testing has been approved), and with at least seven (7) days advance notice.
3. Obtain Architect's approval before transmitting test loads to structure. Provide temporary load-spreading members.
4. Test at least four (4) of each type and size of installed anchors and fasteners selected by Architect.
5. Test to ninety percent (90%) of rated proof load of device.
6. Measure isolator restraint clearance.
7. Measure isolator deflection.
8. Verify snubber minimum clearances.

D. Remove and replace malfunctioning units and retest as specified above.

E. Prepare test and inspection reports.

3.06 ADJUSTING

- A. Adjust isolators after piping system is at operating weight.
- B. Adjust limit stops on restrained spring isolators to mount equipment at normal operating height. After equipment installation is complete, adjust limit stops so they are out of contact during normal operation.
- C. Adjust active height of spring isolators.
- D. Adjust restraints to permit free movement of equipment within normal mode of operation.

END OF SECTION 23 05 48

SECTION 23 05 53

IDENTIFICATION FOR HVAC PIPING AND EQUIPMENT

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SUMMARY

- A. Section Includes:
 - 1. Equipment labels.
 - 2. Warning signs and labels.
 - 3. Pipe labels.
 - 4. Valve tags.
 - 5. Warning tags.

1.03 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.
- D. Valve numbering scheme.
- E. Valve Schedules: For each piping system to include in maintenance manuals.

1.04 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

2.01 EQUIPMENT LABELS

A. Metal Labels for Equipment:

1. Manufacturers: Subject to compliance with requirements, provide products by one (1) of the following:
 - a. Brady Corporation
 - b. Brimar Industries, Inc.
 - c. Carlton Industries, LP
 - d. Seton Identification Products
2. Material and Thickness: Brass, 0.032-inch minimum thickness, and having predrilled or stamped holes for attachment hardware.
3. Letter Color: White.
4. Background Color: Black.
5. Minimum Label Size: Length and width vary for required label content, but not less than 2½-by-¾-inch.
6. Minimum Letter Size: ¼-inch for name of units if viewing distance is less than 24 inches, ½-inch for viewing distances up to 72 inches, and proportionately larger lettering for greater viewing distances. Include secondary lettering two-thirds to three-quarters 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 8½-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.

2.02 WARNING SIGNS AND LABELS

1. Manufacturers: Subject to compliance with requirements, provide products by one (1) of the following:
 - a. Brady Corporation
 - b. Brimar Industries, Inc.
 - c. Carlton Industries, LP

d. Seton Identification Products

- D. Material and Thickness: Multilayer, multicolor, plastic labels for mechanical engraving, 1/16 inch thick, and having predrilled holes for attachment hardware.
- E. Letter Color: Black
- F. Background Color: Yellow.
- G. Maximum Temperature: Able to withstand temperatures up to 160 deg F (71 deg C).
- H. Minimum Label Size: Length and width vary for required label content, but not less than 2½ by ¾ inch.
- I. Minimum Letter Size: ¼ inch for name of units if viewing distance is less than 24 inches, ½ 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.
- J. Fasteners: Stainless-steel rivets or self-tapping screws.
- K. Adhesive: Contact-type permanent adhesive, compatible with label and with substrate.
- L. Label Content: Include caution and warning information, plus emergency notification instructions.

2.03 PIPE LABELS

- M. Manufacturers: Subject to compliance with requirements, provide products by one (1) of the following:
 - 1. Brady Corporation
 - 2. Carlton Industries, LP
 - 3. Brimar Industries, Inc.
 - 4. Seton Identification Products
- N. General Requirements for Manufactured Pipe Labels: Preprinted, color-coded, with lettering indicating service, and showing flow direction.
- O. Pretensioned Pipe Labels: Precoiled, semirigid plastic formed to partially cover circumference of pipe and to attach to pipe without fasteners or adhesive.
- P. Self-Adhesive Pipe Labels: Printed plastic with contact-type, permanent-adhesive backing.
- Q. Pipe Label Contents: Include identification of piping service using same designations or abbreviations as used on Drawings, pipe size, and an arrow indicating flow direction.

1. Flow-Direction Arrows: Integral with piping system service lettering to accommodate both directions, or as separate unit on each pipe label to indicate flow direction.
2. Lettering Size: At least 1½ inches high.

2.04 VALVE TAGS

- R. Valve Tags: Stamped or engraved with ¼ inch letters for piping system abbreviation and ½ inch numbers.
1. Tag Material: Brass, 0.032-inch minimum thickness, and having predrilled or stamped holes for attachment hardware.
 2. Fasteners: Brass wire-link chain.
- S. Valve Schedules: For each piping system, on 8½-by-11-inch (A4) bond paper. Tabulate valve number, piping system, system abbreviation (as shown on valve tag), location of valve (room or space), normal-operating position (open, closed, or modulating), and variations for identification. Mark valves for emergency shutoff and similar special uses.
1. Valve-tag schedule shall be included in operation and maintenance data.

2.05 WARNING TAGS

- T. Manufacturers: Subject to compliance with requirements, provide products by one (1) of the following:
1. Brady Corporation
 2. Carlton Industries, LP
 3. Brimar Industries, Inc.
 4. Seton Identification Products
- U. Warning Tags: Preprinted or partially preprinted, accident-prevention tags, of plasticized card stock with matte finish suitable for writing.
1. Size: 3 by 5¼ inches minimum.
 2. Fasteners: Reinforced grommet and wire or string.
 3. Nomenclature: Large-size primary caption such as "DANGER," "CAUTION," or "DO NOT OPERATE."
 4. Color: Yellow background with black lettering.

PART 3 - EXECUTION

3.01 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.

3.02 EQUIPMENT LABEL INSTALLATION

- B. Install or permanently fasten labels on each major item of mechanical equipment.
- C. Locate equipment labels where accessible and visible.

3.03 PIPE LABEL INSTALLATION

- D. Piping Color-Coding: Painting of piping is specified in Division 09 Section "Interior Painting."
- E. Stenciled Pipe Label Option: Stenciled labels may be provided instead of manufactured pipe labels, at Installer's option. Install stenciled pipe labels, complying with ASME A13.1, on each piping system.
 - 1. Identification Paint: Use for contrasting background.
 - 2. Stencil Paint: Use for pipe marking.
- F. Locate pipe labels where piping is exposed or above accessible ceilings in finished spaces; machine rooms; accessible maintenance spaces such as shafts, tunnels, and plenums; and exterior exposed locations as follows:
 - 1. Near each valve and control device.
 - 2. Near each branch connection, excluding short takeoffs for fixtures and terminal units. Where flow pattern is not obvious, mark each pipe at branch.
 - 3. Near penetrations through walls, floors, ceilings, and inaccessible enclosures.
 - 4. At access doors, manholes, and similar access points that permit view of concealed piping.
 - 5. Near major equipment items and other points of origination and termination.
 - 6. Spaced at maximum intervals of 50 feet along each run. Reduce intervals to 25 feet in areas of congested piping and equipment.
 - 7. On piping above removable acoustical ceilings. Omit intermediately spaced labels.

3.04 VALVE-TAG INSTALLATION

- G. Install tags on valves and control devices in piping systems, except check valves; valves within factory-fabricated equipment units; shutoff valves; faucets; convenience and lawn-watering hose connections; and HVAC terminal devices and similar roughing-in connections of end-use fixtures and units. List tagged valves in a valve schedule.
- H. Valve-Tag Application Schedule: Tag valves according to size, shape, and color scheme and with captions similar to those indicated in the following subparagraphs:
 - 1. Valve-Tag Size and Shape:
 - a. Refrigerant: 1½ inches round.
 - 2. Letter Color:
 - a. Refrigerant: Black.

3.05 WARNING-TAG INSTALLATION

- I. Write required message on, and attach warning tags to, equipment and other items where required.

END OF SECTION 23 05 53

SECTION 23 07 19

HVAC PIPING INSULATION

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SUMMARY

- A. Section includes insulation for the following HVAC piping systems:
 - 1. Refrigerant liquid, suction piping.
 - 2. Condensate drain piping.
- B. Related Sections:
 - 1. Section 230713 "Duct Insulation" for duct insulation.
 - 2. Section 230716 "HVAC Equipment Insulation" for equipment insulation.

1.03 ACTION SUBMITTALS

- A. Product Data: For each type of product. 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 protective shields, saddles, and inserts at hangers for each type of insulation and hanger.
 - 2. Detail attachment and covering of heat tracing inside insulation.
 - 3. Detail insulation application at pipe expansion joints for each type of insulation.
 - 4. Detail insulation application at elbows, fittings, flanges, valves, and specialties for each type of insulation.
 - 5. Detail removable insulation at piping specialties.
 - 6. Detail application of field-applied jackets.
 - 7. Detail application at linkages of control devices.

1.04 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.

1.05 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 in accordance with ASTM E84, by a testing 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.
 - 2. Insulation Installed Outdoors: Flame-spread index of 75 or less, and smoke-developed index of 150 or less.

1.06 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.

1.07 COORDINATION

- A. Coordinate sizes and locations of supports, hangers, and insulation 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.

1.08 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.

PART 2 - PRODUCTS

2.01 INSULATION MATERIALS

- A. Comply with requirements in "Piping Insulation Schedule, General," "Indoor Piping Insulation Schedule," "Outdoor, Aboveground Piping Insulation Schedule," and "Outdoor, Underground Piping Insulation Schedule" articles for where insulating materials shall be applied.
- B. Products shall not contain asbestos, lead, mercury, or mercury compounds.
- C. Products that come into contact with stainless-steel shall have a leachable chloride content of less than 50 ppm when tested in accordance with ASTM C 871.
- D. Insulation materials for use on austenitic stainless-steel shall be qualified as acceptable in accordance with ASTM C 795.
- E. Foam insulation materials shall not use CFC or HCFC blowing agents in the manufacturing process.
- F. Flexible Elastomeric: 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 one (1) of the following:
 - a. Aeroflex USA, Inc.; Aerocel
 - b. Armacell LLC; AP Armaflex
 - c. K-Flex USA; Insul-Lock, Insul-Tube, and K-FLEX LS

2.02 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 Adhesive: Comply with MIL-A-24179A, Type II, Class I.
 - 1. Products: Subject to compliance with requirements, provide one (1) of the following:
 - a. Aeroflex USA, Inc.; Aero seal
 - b. Armacell LLC; Armaflex 520 Adhesive
 - c. K-Flex USA; R-373 Contact Adhesive
 - 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).

C. ASJ Adhesive and FSK and PVDC Jacket Adhesive: Comply with MIL-A-3316C, Class 2, Grade A, for bonding insulation jacket lap seams and joints.

1. Products: Subject to compliance with requirements, provide one (1) of the following:
 - a. Childers Brand, Specialty Construction Brands, Inc., a business of H. B. Fuller Company; CP-82
 - b. Eagle Bridges - Marathon Industries; 225
 - c. Foster Brand, Specialty Construction Brands, Inc., a business of H. B. Fuller Company; 85-50
 - d. Mon-Eco Industries, Inc.; 22-25
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).

D. PVC Jacket Adhesive: Compatible with PVC jacket.

1. Products: Subject to compliance with requirements, provide one (1) of the following:
 - a. Dow Corning Corporation; 739
 - b. Johns Manville; Zeston Perma-Weld, CEEL-TITE Solvent Welding Adhesive
 - c. P.I.C. Plastics, Inc.; Welding Adhesive
 - d. Speedline Corporation; Polyco VP Adhesive
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).

2.03 MASTICS

A. Materials shall be compatible with insulation materials, jackets, and substrates; comply with MIL-PRF-19565C, Type II.

1. For indoor applications, use mastics that have a VOC content of 50 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

B. Vapor-Barrier Mastic: Solvent based; suitable for outdoor use on below ambient services.

1. Products: Subject to compliance with requirements, provide one (1) of the following:
 - a. Childers Brand; H. B. Fuller Construction Products; Encacel
 - b. Eagle Bridges - Marathon Industries
 - c. Foster Brand; H. B. Fuller Construction Products; 60-95/60-96

2. Water-Vapor Permeance: ASTM F 1249, 0.05 perm at 30-mil dry film thickness.
3. Service Temperature Range: Minus 50 to plus 220 deg F.
4. Solids Content: ASTM D 1644, thirty-three percent (33%) by volume and forty-six percent (46%) by weight.
5. Color: White.

2.04 SEALANTS

- A. Materials shall be as recommended by the insulation manufacturer and shall be compatible with insulation materials, jackets, and substrates.

B. FSK and Metal Jacket Flashing Sealants:

1. Products: Subject to compliance with requirements, provide one (1) of the following:
 - a. Childers Brand, Specialty Construction Brands, Inc., a business of H. B. Fuller Company; CP-76
 - b. Eagle Bridges - Marathon Industries; 405
 - c. Foster Brand, Specialty Construction Brands, Inc., a business of H. B. Fuller Company; 95-44
 - d. Mon-Eco Industries, Inc.; 44-05
2. Materials shall be compatible with insulation materials, jackets, and substrates.
3. Fire- and water-resistant, flexible, elastomeric sealant.
4. Service Temperature Range: Minus 40 to plus 250 deg F.
5. Color: Aluminum.
6. For indoor applications, sealants shall have a VOC content of 420 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

C. ASJ Flashing Sealants and PVC Jacket Flashing Sealants:

1. Products: Subject to compliance with requirements, provide the following:
 - a. Childers Brand, Specialty Construction Brands, Inc., a business of H. B. Fuller Company; CP-76
2. Materials shall be compatible with insulation materials, jackets, and substrates.
3. Fire- and water-resistant, flexible, elastomeric sealant.
4. Service Temperature Range: Minus 40 to plus 250 deg F.
5. Color: White.
6. For indoor applications, sealants shall have a VOC content of 420 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

2.05 FACTORY-APPLIED JACKETS

- A. Insulation system schedules indicate factory-applied jackets on various applications. When factory-applied jackets are indicated, comply with the following:
1. ASJ: White, kraft-paper, fiberglass-reinforced scrim with aluminum-foil backing; complying with ASTM C 1136, Type I.
 2. ASJ-SSL: ASJ with self-sealing, pressure-sensitive, acrylic-based adhesive covered by a removable protective strip; complying with ASTM C 1136, Type I.
 3. FSK Jacket: Aluminum-foil, fiberglass-reinforced scrim with Kraft-paper backing; complying with ASTM C 1136, Type II.
 4. FSP Jacket: Aluminum-foil, fiberglass-reinforced scrim with polyethylene backing; complying with ASTM C 1136, Type II.
 5. Vinyl Jacket: White vinyl with a permeance of 1.3 perms when tested according to ASTM E 96, Procedure A, and complying with NFPA 90A and NFPA 90B.

2.06 FIELD-APPLIED JACKETS

- A. Field-applied jackets shall comply with ASTM C 1136, 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, provide one (1) of the following:
 - a. Johns Manville; Zeston
 - b. P.I.C. Plastics, Inc.; FG Series
 - c. Proto Corporation; LoSmoke
 - d. Speedline Corporation; SmokeSafe
 2. Adhesive: As recommended by jacket material manufacturer.
 3. Color: Color-code jackets based on system. Color as selected by Architect and Owner from manufacturer's entire range.
 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, mechanical joints, and P-trap and supply covers for lavatories.
- C. Metal Jacket:
1. Products: Subject to compliance with requirements, provide one (1) of the following:

- a. Childers Brand, Specialty Construction Brands, Inc., a business of H. B. Fuller Company; Metal Jacketing Systems
 - b. ITW Insulation Systems; Aluminum and Stainless-Steel Jacketing
 - c. RPR Products, Inc.; Insul-Mate
2. Stainless-Steel Jacket: ASTM A 240.
- a. Factory cut and rolled to size.
 - b. Material, finish, and thickness are indicated in field-applied jacket schedules.
 - c. Moisture Barrier for Indoor Applications: 1-mil- thick, heat-bonded polyethylene and Kraft paper.
 - d. Moisture Barrier for Outdoor Applications: 3-mil- thick, heat-bonded polyethylene and Kraft paper, or 2.5-mil- thick polysurlyn.
 - e. Factory-Fabricated Fitting Covers:
 - 1) Same material, finish, and thickness as jacket.
 - 2) Preformed 2-piece or gore, 45- and 90-degree, short- and long-radius elbows.
 - 3) Tee covers.
 - 4) Flange and union covers.
 - 5) End caps.
 - 6) Beveled collars.
 - 7) Valve covers.
 - 8) Field fabricate fitting covers only if factory-fabricated fitting covers are not available.

2.07 TAPES

- A. FSK Tape: Foil-face, vapor-retarder tape matching factory-applied jacket with acrylic adhesive; complying with ASTM C 1136.
1. Products: Subject to compliance with requirements, provide one (1) of the following:
 - a. ABI, Ideal Tape Division; 491 AWF FSK
 - b. Avery Dennison Corporation, Specialty Tapes Division; Fasson 0827
 - c. Compac Corporation; 110 and 111
 - d. Venture Tape; 1525 CW NT, 1528 CW, and 1528 CW/SQ
 2. Width: 3 inches.
 3. Thickness: 6.5 mils.
 4. Adhesion: 90 ounces force/inch in width.
 5. Elongation: Two percent (2%).
 6. Tensile Strength: 40 lbf/inch in width.
 7. FSK Tape Disks and Squares: Precut disks or squares of FSK tape.

- B. PVC Tape: White vapor-retarder tape matching field-applied PVC jacket with acrylic adhesive; suitable for indoor and outdoor applications.

1. Products: Subject to compliance with requirements, provide one (1) of the following:
 - a. Compac Corporation; 130
 - b. Venture Tape; 1506 CW NS
2. Width: 2 inches.
3. Thickness: 6 mils.
4. Adhesion: 64 ounces force/inch in width.
5. Elongation: Five hundred percent (500%).
6. Tensile Strength: 18 lbf/inch in width.

- C. Aluminum-Foil Tape: Vapor-retarder tape with acrylic adhesive.

1. Products: Subject to compliance with requirements, provide one (1) of the following:
 - a. ABI, Ideal Tape Division; 488 AWF
 - b. Avery Dennison Corporation, Specialty Tapes Division; Fasson 0800
 - c. Compac Corporation; 120
 - d. Venture Tape; 3520 CW
2. Width: 2 inches.
3. Thickness: 3.7 mils.
4. Adhesion: 100 ounces force/inch in width.
5. Elongation: Five percent (5%).
6. Tensile Strength: 34 lbf/inch in width.

2.08 SECUREMENTS

- A. Bands:

1. Products: Subject to compliance with requirements, provide one (1) of the following:
 - a. ITW Insulation Systems; Gerrard Strapping and Seals
 - b. RPR Products, Inc.; Insul-Mate Strapping, Seals, and Springs
2. Stainless-Steel: ASTM A 167 or ASTM A 240, Type 304, ½-inch-wide with wing seal.

- B. Staples: Outward-clinching insulation staples, nominal ¾-inch-wide, stainless-steel or Monel.

- C. Wire: 0.062-inch soft-annealed, stainless-steel.
 - 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. C & F Wire

PART 3 - EXECUTION

3.01 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.

3.02 PREPARATION

- A. Clean and dry surfaces to receive insulation. Remove materials that will adversely affect insulation application.
- B. Clean and prepare surfaces to be insulated. Before insulating, apply a corrosion coating to insulated surfaces as follows:
 - 1. Stainless-Steel: Coat 300 series stainless-steel with an epoxy primer 5 mils thick and an epoxy finish 5 mils thick if operating in a temperature range between 140 and 300 deg F. Consult coating manufacturer for appropriate coating materials and application methods for operating temperature range.
 - 2. Carbon Steel: Coat carbon steel operating at a service temperature of between 32 and 300 deg F with an epoxy coating. Consult coating manufacturer for appropriate coating materials and application methods for operating temperature range.
- C. Coordinate insulation installation with the tradesman installing heat tracing. Comply with requirements for heat tracing that apply to insulation.
- D. Mix insulating cements with clean potable water; if insulating cements are to be in contact with stainless steel surfaces, use demineralized water.

3.03 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 of 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. Install multiple layers of insulation with longitudinal and end seams staggered.
- F. Do not weld brackets, clips, or other attachment devices to piping, fittings, and specialties.
- G. Keep insulation materials dry during storage, application, and finishing. Replace insulation materials that get wet.
- H. Install insulation with tight longitudinal seams and end joints. Bond seams and joints with adhesive recommended by insulation material manufacturer.
- I. Install insulation with least number of joints practical.
- J. Where vapor barrier is indicated, seal joints, seams, and penetrations in insulation at hangers, supports, anchors, and other projections with vapor-barrier mastic.
 - 1. Install insulation continuously through hangers and around anchor attachments.
 - 2. For insulation application where vapor barriers are indicated, extend insulation on anchor legs from point of attachment to supported item to point of attachment to structure. Taper and seal ends attached to structure with vapor-barrier mastic.
 - 3. Install insert materials and insulation to tightly join the insert. Seal insulation to insulation inserts with adhesive or sealing compound recommended by insulation material manufacturer.
 - 4. Cover inserts with jacket material matching adjacent pipe insulation. Install shields over jacket, arranged to protect jacket from tear or puncture by hanger, support, and shield.
- K. Apply adhesives, mastics, and sealants at manufacturer's recommended coverage rate and wet and dry film thicknesses.
- L. Install insulation with factory-applied jackets as follows:
 - 1. Draw jacket tight and smooth.
 - 2. Cover circumferential joints with 3-inch- wide strips, of same material as insulation jacket. Secure strips with adhesive and outward-clinching staples along both edges of strip, spaced 4 inches o.c.

3. Overlap jacket longitudinal seams at least 1½ inches. Install insulation with longitudinal seams at bottom of pipe. Clean and dry surface to receive self-sealing lap. Staple laps with outward-clinching staples along edge at 2 inches o.c.
 - a. For below-ambient services, apply vapor-barrier mastic over staples.
 4. Cover joints and seams with tape, in accordance with insulation material manufacturer's written instructions, to maintain vapor seal.
 5. Where vapor barriers are indicated, apply vapor-barrier mastic on seams and joints and at ends adjacent to pipe flanges and fittings.
- M. Cut insulation in a manner to avoid compressing insulation more than twenty-five percent (25%) of its nominal thickness.
- N. Finish installation with systems at operating conditions. Repair joint separations and cracking due to thermal movement.
- O. 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 in similar fashion to butt joints.
- P. For above-ambient services, do not install insulation to the following:
1. Vibration-control devices.
 2. Testing agency labels and stamps.
 3. Nameplates and data plates.
 4. Manholes.
 5. Handholes.
 6. Cleanouts

3.04 PENETRATIONS

- A. Insulation Installation at Roof Penetrations: Install insulation continuously through roof penetrations.
1. Seal penetrations with flashing sealant.
 2. For applications requiring only indoor insulation, terminate insulation above roof surface and seal with joint sealant. For applications requiring indoor and outdoor insulation, install insulation for outdoor applications tightly joined to indoor insulation ends. Seal joint with joint sealant.
 3. Extend jacket of outdoor insulation outside roof flashing at least 2 inches below top of roof flashing.
 4. Seal jacket to roof flashing with flashing sealant.
- B. Insulation Installation at Underground Exterior Wall Penetrations: Terminate insulation flush with sleeve seal. Seal terminations with flashing sealant.

- C. Insulation Installation at Aboveground Exterior Wall Penetrations: Install insulation continuously through wall penetrations.
 - 1. Seal penetrations with flashing sealant.
 - 2. For applications requiring only indoor insulation, terminate insulation inside wall surface and seal with joint sealant. For applications requiring indoor and outdoor insulation, install insulation for outdoor applications tightly joined to indoor insulation ends. Seal joint with joint sealant.
 - 3. Extend jacket of outdoor insulation outside wall flashing and overlap wall flashing at least 2 inches.
 - 4. Seal jacket to wall flashing with flashing sealant.
- D. Insulation Installation at Interior Wall and Partition Penetrations (That Are Not Fire Rated): Install insulation continuously through walls and partitions.
- E. 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.
- F. 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."

3.05 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, Mechanical Couplings, and Unions:
 - 1. Install insulation over fittings, valves, strainers, flanges, mechanical couplings, 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 that of 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 that 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 valves using preformed fitting insulation of same material, density, and thickness as that used for adjacent pipe. Overlap adjoining pipe insulation by not less than two (2) times the thickness of pipe insulation, or one (1) pipe diameter, whichever is thicker. For valves, insulate up to and including the bonnets, valve stuffing-box studs, bolts, and nuts. Fill joints, seams, and irregular surfaces with insulating cement.
 5. Insulate strainers using preformed fitting insulation of same material, density, and thickness as that used for adjacent pipe. Overlap adjoining pipe insulation by not less than two (2) times the thickness of pipe insulation, or one (1) pipe diameter, whichever is thicker. Fill joints, seams, and irregular surfaces with insulating cement. Insulate strainers, so strainer basket flange or plug can be easily removed and replaced without damaging the insulation and jacket. Provide a removable reusable insulation cover. For below-ambient services, provide a design that maintains vapor barrier.
 6. Insulate flanges, mechanical couplings, and unions using a section of oversized preformed pipe insulation to fit. Overlap adjoining pipe insulation by not less than two (2) times the thickness of pipe insulation, or one (1) pipe diameter, whichever is thicker. Stencil or label the outside insulation jacket of each union with the word "union" matching size and color of pipe labels.
 7. 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.
 8. For services not specified to receive a field-applied jacket, except for flexible elastomeric and polyolefin, install fitted PVC cover over elbows, tees, strainers, valves, flanges, and unions. Terminate ends with PVC end caps. Tape PVC covers to adjoining insulation facing, using PVC tape.
 9. Stencil or label the outside insulation jacket of each union with the word "union." Match size and color of pipe labels.
- 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.
- D. Install removable insulation covers at locations indicated. Installation shall conform to the following:
1. Make removable flange and union insulation from sectional pipe insulation of same thickness as that on adjoining pipe. Install same insulation jacket as that of adjoining pipe insulation.
 2. When flange and union covers are made from sectional pipe insulation, extend insulation from flanges or union at least two (2) times the insulation thickness over adjacent pipe insulation on each side of flange or union. Secure flange cover

in place with stainless-steel or aluminum bands. Select band material compatible with insulation and jacket.

3. Construct removable valve insulation covers in same manner as for flanges, except divide the two-part section on the vertical center line of valve body.
4. When covers are made from block insulation, make two (2) halves, each consisting of mitered blocks wired to stainless-steel fabric. Secure this wire frame, with its attached insulation, to flanges with tie wire. Extend insulation at least 2 inches over adjacent pipe insulation on each side of valve. Fill space between flange or union cover and pipe insulation with insulating cement. Finish cover assembly with insulating cement applied in two (2) coats. After first coat is dry, apply and trowel second coat to a smooth finish.
5. Unless a PVC jacket is indicated in field-applied jacket schedules, finish exposed surfaces with a metal jacket.

3.06 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 that of 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 that of 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.

3.07 FIELD-APPLIED JACKET INSTALLATION

- A. Where glass-cloth jackets are indicated, install directly over bare insulation or insulation with factory-applied jackets.
 1. Draw jacket smooth and tight to surface with 2-inch overlap at seams and joints.
 2. Embed glass cloth between two (2) 0.062-inch- thick coats of lagging adhesive.
 3. Completely encapsulate insulation with coating, leaving no exposed insulation.
- B. Where FSK jackets are indicated, install as follows:
 1. Draw jacket material smooth and tight.
 2. Install lap or joint strips with same material as jacket.
 3. Secure jacket to insulation with manufacturer's recommended adhesive.
 4. Install jacket with 1½-inch laps at longitudinal seams and 3-inch-wide joint strips at end joints.
 5. Seal openings, punctures, and breaks in vapor-retarder jackets and exposed insulation with vapor-barrier mastic.
- C. Where PVC jackets are indicated and for horizontal applications, install with 1-inch overlap at longitudinal seams and end joints. Seal with manufacturer's recommended adhesive.
 1. Apply two (2) continuous beads of adhesive to seams and joints, one (1) bead under lap and the finish bead along seam and joint edge.
- D. Where metal jackets are indicated, install with 2-inch overlap at longitudinal seams and end joints. Overlap longitudinal seams arranged to shed water. Seal end joints with weatherproof sealant recommended by insulation manufacturer. Secure jacket with stainless-steel bands 12 inches o.c. and at end joints.

3.08 FINISHES

- A. Pipe insulation with ASJ, Glass-Cloth, or Other Paintable Jacket Material: Paint jacket with paint system identified below.
 1. Flat Acrylic Finish: Two (2) finish coats over a primer that is compatible with jacket material and finish coat paint. Add fungicidal agent to render fabric mildew proof.
 - a. Finish Coat Material: Interior, flat, latex-emulsion size.

- B. Flexible Elastomeric Thermal Insulation: After adhesive has fully cured, apply two (2) coats of insulation manufacturer's recommended protective coating.
- C. Color: Final color as selected by Architect and Owner from manufacturer's entire range. Vary first and second coats to allow visual inspection of the completed Work.
- D. Do not field paint aluminum or stainless-steel jackets.

3.09 FIELD QUALITY CONTROL

- A. Perform tests and inspections.
- B. Tests and Inspections:
 - 1. Inspect pipe, fittings, strainers, and valves, randomly selected by Architect, by removing field-applied jacket and insulation in layers in reverse order of their installation. Extent of inspection shall be limited to three (3) locations of straight pipe, three (3) locations of threaded fittings, three (3) locations of welded fittings, two (2) locations of threaded strainers, two (2) locations of welded strainers, three (3) locations of threaded valves, and three (3) locations of flanged valves for each pipe service defined in the "Piping Insulation Schedule, General" Article.
- C. All insulation applications will be considered defective Work if sample inspection reveals noncompliance with requirements.

3.10 PIPING INSULATION SCHEDULE, GENERAL

- A. Insulation conductivity and thickness per pipe size shall comply with schedules in this Section or with requirements of authorities having jurisdiction, whichever is more stringent.
- B. Acceptable preformed pipe and tubular insulation materials and thicknesses are identified for each piping system and pipe size range. If more than one (1) material is listed for a piping system, selection from materials listed is Contractor's option.
- C. Items Not Insulated: Unless otherwise indicated, do not install insulation on the following:
 - 1. Underground piping.
 - 2. Chrome-plated pipes and fittings unless there is a potential for personnel injury.

3.11 INDOOR PIPING INSULATION SCHEDULE

- A. Condensate and Equipment Drain Water below 60 Deg F:
 - 1. All Pipe Sizes: Insulation shall be one (1) of the following:
 - a. Flexible Elastomeric: 1-inch-thick.

B. Refrigerant Suction and Hot-Gas Piping:

1. NPS 1 1/2 and Smaller: Insulation shall be one (1) of the following:
 - a. Flexible Elastomeric: 1-inch-thick.

C. Refrigerant Suction and Hot-Gas Flexible Tubing:

1. All Sizes: Insulation shall be the following:
 - a. Flexible Elastomeric: 1-inch-thick.

3.12 OUTDOOR, ABOVEGROUND PIPING INSULATION SCHEDULE

A. Refrigerant Suction and Hot-Gas Piping:

1. All Sizes: Insulation shall be:
 - a. Flexible Elastomeric, 2 inches thick.

B. Refrigerant Suction and Hot-Gas Tubing:

1. All Sizes: Insulation shall be:
 - a. Flexible Elastomeric, 2 inches thick.

3.13 INDOOR, FIELD-APPLIED JACKET SCHEDULE

- A. Install jacket over insulation material. For insulation with factory-applied jacket, install the field-applied jacket over the factory-applied jacket.
- B. If more than one (1) material is listed, selection from materials listed is Contractor's option.
- C. Piping, Concealed:
 1. None.
- D. Piping, Exposed:
 1. PVC: 20 mils thick.

3.14 OUTDOOR, FIELD-APPLIED JACKET SCHEDULE

- A. Install jacket over insulation material. For insulation with factory-applied jacket, install the field-applied jacket over the factory-applied jacket.
- B. If more than one (1) material is listed, selection from materials listed is Contractor's option.

C. Piping, Exposed:

1. Stainless-Steel, Type 304 or 316, Smooth 2B Finish with Z-Shaped Locking Seam: 0.020- or 0.024-inch-thick.

END OF SECTION 23 07 19

SECTION 23 09 26

AUTOMATIC TEMPERATURE CONTROLS

PART 1 – GENERAL

1.01 WORK INCLUDED

- A. Temperature Control for Elevator Machine Rooms

1.02 RELATED SECTIONS

- A. Section 23 05 00 – Common Work Results for HVAC
- B. Section 23 34 23 – Power Ventilators
- C. Section 23 81 26 – Split System Air Conditioning
- D. Section 23 82 39 – Unit Heaters

1.03 SCOPE OF WORK

- A. Scope of work shall include all devices, low and line voltage wiring, transformers, conduit, relays and devices required for installation of a complete system to perform the Sequence of Operation indicated in Part 3 and on the drawings.

1.04 QUALITY ASSURANCE

- A. Materials and equipment shall be the catalogued products of manufacturers regularly engaged in production and installation of Automatic Temperature Control systems and shall be manufacturer's standard design that complies with the specification requirements.
- B. Install system using competent workmen who are directly employed by the controls manufacturer and are fully trained in the installation of the temperature control equipment.
- C. Supplier shall have an in-place support facility within twenty (20) miles of the site with technical staff, spare parts inventory and all necessary test and diagnostic equipment.
- D. All electronic equipment shall conform to the requirements of FCC Regulation, Part 15, Section 15, Governing Radio Frequency Electromagnetic Interference and be so labeled.

1.05 REFERENCES

- A. Reference Standards: The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by the basic designation only.
 - 1. American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE) Publications: 85 Automatic Control Terminology for Heating, Ventilating, Air Conditioning
 - 2. American Society of Mechanical Engineers (ASME) Publications: MC85.1 Terminology for Automatic Control

1.06 SUBMITTALS

- A. Submit under provisions of Section 23 05 00.
- B. Shop Drawings:
 - 1. Trunk cable schematic showing programmable control unit locations and trunk data conductors.
 - 2. List of connected data points, including connected control unit and input device.
 - 3. System configuration with peripheral devices, batteries, power supplies, diagrams and interconnections.
 - 4. Descriptive data and sequence of operation.
- C. Product Data: Provide data for each system component.
- D. Manufacturer's Installation Instructions: Include for all manufactured components.

1.07 PROJECT RECORD DOCUMENTS

- A. Submit under provisions of Division 1 Sections and 230500.
- B. Accurately record actual location of control components, including panels, thermostats and sensors.
- C. Revise Shop Drawings to reflect actual installation and operating sequences.
- D. Include data specified in "Submittals" in final "Record Documents" form.
- E. Provide test report indicating that all system setpoints and schedules have been adjusted and that all systems are working properly.

1.08 OPERATION AND MAINTENANCE DATA

- A. Include instructions to operate all devices specified herein.
- B. Include inspection period, cleaning methods, cleaning materials recommended and calibration tolerances.

1.09 WARRANTY AND MAINTENANCE

- A. General Warranty: Special warranty specified in this Article shall not deprive Owner of warranty coverage under other provisions of Section 230500 and shall be in addition to, and run concurrent with, other warranties made by Contractor under requirements of Section 230500 and the General Conditions.
- B. Special Warranty: Written warranty, executed by manufacturer agreeing to repair, replace and reprogram system and system components that fail in materials or workmanship within specified warranty period.
- C. Provide one (1) year warranty which shall include coverage for field-programmable micro-processor based units and all related devices and components installed as work of this section.
- D. Provide one (1) year maintenance contract which includes complete performance check with report at six (6) months and twelve (12) months.

PART 2 – PRODUCTS

2.01 GENERAL SYSTEM DESCRIPTION

- A. Controls Contractor shall coordinate with equipment manufacturer for all manufacturer provided controllers.
- B. Controls Contractor shall provide all additional sensors, controllers, relays, transformers, devices, wiring and programming as required to achieve the Sequence of Operation.

PART 3 – EXECUTION

3.01 INSTALLATION

- A. Install in accordance with manufacturer's instructions.

- B. Install electrical work in accordance with appropriate requirements of Division 26. Run all wiring (low and line voltage) in conduit.
- C. Furnish and install control transformers.
- D. Furnish and install all equipment, components, devices, transformers, low and line voltage wiring and conduit required for complete operational system of automatic temperature controls capable of the Sequence of Operation. Coordinate control interface requirements with equipment manufacturers.
- E. Provide interlock with fire alarm system relay to accomplish shut down of exhaust fans on general alarm.
- F. Test each system for proper operation and instruct Owner's personnel on operation of system.

3.02 SEQUENCE OF OPERATION

- A. General:
 - 1. All setpoints shall be adjustable unless specifically noted otherwise.
 - 2. The systems shall operate in accordance with the manufacturer's sequence of operation, providing the system safeties are satisfied.
- B. Temple Medical Garage Elevator Machine Room (EMR):
 - 1. The temple Medical Garage EMR shall be provided with the following equipment:
 - a. Ductless Split System
 - b. Propeller Electric Unit heater
 - c. Ventilation system consisting of exhaust fan and outside air damper.
 - 2. Ductless Split System
 - a. This system consists of wall mounted interconnected to a remote outdoor unit.
 - b. This system shall be provided with manufacturer standalone control and wired wall mounted remote controller
 - c. The system shall provide cooling to the EMR. The system shall be provided with wind baffle for cooling operation down to outdoor temperature of 0 deg F. The system heating operation shall be locked out.
 - d. The microprocessor located in the indoor unit shall have the capability of sensing return air temperature and indoor coil

temperature, receiving and processing commands from the wired controller, providing emergency operation and controlling the outdoor unit.

- e. The system shall be programmed for cooling operation. When the indoor ambient temperature is greater than 85 deg F (adj), the system shall operate and shall continue to run until the indoor ambient temperature reaches 80 deg F (adj).
- f. During cooling operation, when frost starts forming on the indoor coil, the outdoor unit compressor shall stop to protect the system.
- g. The system shall resume programmed operation after power outage.

3. Propeller Electric Unit Heater

- a. The electric unit heater shall provide heating to the space.
- a. The heater shall cycle to maintain space temperature of 55 deg F (adj).

4. Exhaust Fan and Outside Air Operation for first stage cooling.

- a. Controllers for exhaust fan operation shall be provided with the fan. Refer to Schedule and 23 34 23 Section.
- b. Additional sensors to perform the sequence of operation shall be provided by Controls Contractor.
- c. The exhaust fan shall be interlocked with the outside air damper. The outdoor air damper and the exhaust air damper shall be provided with two (2) position actuators with end switch.
- d. First stage cooling shall be provided when outside air temperature is below 65 deg F (adj) and outside air enthalpy is below 22 Btu/lb (adj).
 - 1. On a rise in space temperature above 80 F (adj.) as sensed by a wall mounted temperature sensor, the outside air damper shall open and the exhaust air damper shall open, once dampers are proven open the exhaust fan shall run. Once the space temperature drops below 75 F (adj), the exhaust fan shall cycle off, the exhaust air and outside air dampers shall close.

C. Temple Street Garage Elevator Machine Room (EMR): Typical of 3

- 1. The Temple Street Garage EMR shall be provided with the following equipment:
 - a. Ductless Split System
 - b. Propeller Electric Unit heater
 - c. Ventilation system consisting of exhaust fan and outside air damper.

2. Ductless Split System

- a. This system consists of wall mounted interconnected to a remote outdoor unit.
- b. This system shall be provided with manufacturer standalone control and wired wall mounted remote controller
- c. The system shall provide cooling to the EMR. The system shall be provided with wind baffle for cooling operation down to outdoor temperature of 0 deg F. The system heating operation shall be locked out.
- d. The microprocessor located in the indoor unit shall have the capability of sensing return air temperature and indoor coil temperature, receiving and processing commands from the wired controller, providing emergency operation and controlling the outdoor unit.
- e. The system shall be programmed for cooling operation. When the indoor ambient temperature is greater than 85 deg F (adj), the system shall operate and shall continue to run until the indoor ambient temperature reaches 80 deg F (adj).
- f. During cooling operation, when frost starts forming on the indoor coil, the outdoor unit compressor shall stop to protect the system.
- g. The system shall resume programmed operation after power outage.

3. Propeller Electric Unit Heater

- a. The electric unit heater shall provide heating to the space.
- b. The heater shall cycle to maintain space temperature of 55 deg F (adj).

4. Exhaust Fan and Outside Air Operation for first stage cooling.

- a. Controllers for exhaust fan operation shall be provided with the fan. Refer to Schedule and 23 34 23 Section.
- b. Additional sensors to perform the sequence of operation shall be provided by Controls Contractor.
- c. The exhaust fan shall be interlocked with the outside air damper. The outdoor air damper and the exhaust air damper shall be provided with two (2) position actuators with end switch.
- d. First stage cooling shall be provided when outside air temperature is below 65 deg F (adj) and outside air enthalpy is below 22 Btu/lb (adj).
 - 1) On a rise in space temperature above 80 F (adj.) as sensed by a wall mounted temperature sensor, the outside air damper shall open and the exhaust air damper shall open, once dampers are proven open the exhaust fan shall run. Once the space temperature drops below 75 F (adj), the exhaust fan shall cycle off, the exhaust air and outside air dampers shall close.

D. Air Rights Garage Elevator Machine Room (EMR): Typical of 2

1. The Air Rights Garage EMR shall be provided with the following equipment:
 - a. Ductless Split System
 - b. Electric Cabinet Unit heater
 - c. Ventilation system consisting of exhaust fan and outside air damper.
2. Ductless Split System
 - a. This system consists of wall mounted interconnected to a remote outdoor unit.
 - b. This system shall be provided with manufacturer standalone control and wired wall mounted remote controller
 - c. The system shall provide cooling to the EMR. The system shall be provided with wind baffle for cooling operation down to outdoor temperature of 0 deg F. The system heating operation shall be locked out.
 - d. The microprocessor located in the indoor unit shall have the capability of sensing return air temperature and indoor coil temperature, receiving and processing commands from the wired controller, providing emergency operation and controlling the outdoor unit.
 - e. The system shall be programmed for cooling operation. When the indoor ambient temperature is greater than 85 deg F (adj), the system shall operate and shall continue to run until the indoor ambient temperature reaches 80 deg F (adj).
 - f. During cooling operation, when frost starts forming on the indoor coil, the outdoor unit compressor shall stop to protect the system.
 - g. The system shall resume programmed operation after power outage.
3. Electric Cabinet Unit Heater
 - a. The electric unit heater shall provide heating to the space.
 - b. The heater shall cycle to maintain space temperature of 55 deg F (adj).
4. Exhaust Fan and Outside Air Operation for first stage cooling.
 - a. Controllers for exhaust fan operation shall be provided with the fan. Refer to Schedule and 23 34 23 Section.
 - b. Additional sensors to perform the sequence of operation shall be provided by Controls Contractor.
 - c. The exhaust fan shall be interlocked with the outside air damper. The outdoor air damper and the exhaust air damper shall be provided with two (2) position actuators with end switch.
 - d. First stage cooling shall be provided when outside air temperature is below 65 deg F (adj) and outside air enthalpy is below 22 Btu/lb (adj).

- 1) On a rise in space temperature above 80 F (adj.) as sensed by a wall mounted temperature sensor, the outside air damper shall open and the exhaust air damper shall open, once dampers are proven open the exhaust fan shall run. Once the space temperature drops below 75 F (adj), the exhaust fan shall cycle off, the exhaust air and outside air dampers shall close.

E. Temple Street Garage Elevator Machine Room (EMR): Typical of 2

1. The Temple Street Garage EMR shall be provided with the following equipment:
 - d. Ductless Split System
 - e. Propeller Electric Unit heater
 - f. Ventilation system consisting of exhaust fan and outside air damper.
2. Ductless Split System
 - b. This system consists of wall mounted interconnected to a remote outdoor unit.
 - b. This system shall be provided with manufacturer standalone control and wired wall mounted remote controller
 - c. The system shall provide cooling to the EMR. The system shall be provided with wind baffle for cooling operation down to outdoor temperature of 0 deg F. The system heating operation shall be locked out.
 - d. The microprocessor located in the indoor unit shall have the capability of sensing return air temperature and indoor coil temperature, receiving and processing commands from the wired controller, providing emergency operation and controlling the outdoor unit.
 - e. The system shall be programmed for cooling operation. When the indoor ambient temperature is greater than 85 deg F (adj), the system shall operate and shall continue to run until the indoor ambient temperature reaches 80 deg F (adj).
 - f. During cooling operation, when frost starts forming on the indoor coil, the outdoor unit compressor shall stop to protect the system.
 - g. The system shall resume programmed operation after power outage.
3. Propeller Electric Unit Heater
 - a. The electric unit heater shall provide heating to the space.
 - b. The heater shall cycle to maintain space temperature of 55 deg F (adj).
4. Exhaust Fan and Outside Air Operation for first stage cooling.
 - a. Controllers for exhaust fan operation shall be provided with the fan. Refer to Schedule and 23 34 23 Section.

- b. Additional sensors to perform the sequence of operation shall be provided by Controls Contractor.
- c. The exhaust fan shall be interlocked with the outside air damper. The outdoor air damper and the exhaust air damper shall be provided with two (2) position actuators with end switch.
- d. First stage cooling shall be provided when outside air temperature is below 65 deg F (adj) and outside air enthalpy is below 22 Btu/lb (adj).
 - 1) On a rise in space temperature above 80 F (adj.) as sensed by a wall mounted temperature sensor, the outside air damper shall open and the exhaust air damper shall open, once dampers are proven open the exhaust fan shall run. Once the space temperature drops below 75 F (adj), the exhaust fan shall cycle off, the exhaust air and outside air dampers shall close.

END OF SECTION 23 09 26

SECTION 23 23 00

REFRIGERANT PIPING

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SUMMARY

A. Section Includes:

- 1. Refrigerant pipes and fittings.
- 2. Refrigerant piping valves and specialties.
- 3. Refrigerants.

B. Related Sections include the following:

- 1. Section 230719 "HVAC Piping Insulation".
- 2. Section 238126 "Split-System Air-Conditioners".
- 3. Section 238129 "Variable-Refrigerant-Flow HVAC Systems".

1.03 ACTION SUBMITTALS

A. Product Data: For each type of valve, refrigerant piping, and piping specialty.

- 1. Include pressure drop, based on manufacturer's test data, for the following:
 - a. Thermostatic expansion valves.
 - b. Solenoid valves.
 - c. Hot-gas bypass valves.
 - d. Filter dryers.
 - e. Strainers.
 - f. Pressure-regulating valves.

B. Shop Drawings:

- 1. Show layout of refrigerant piping and specialties, including pipe, tube, and fitting sizes; flow capacities; valve arrangements and locations; slopes of horizontal runs; oil traps; double risers; wall and floor penetrations; and equipment connection details.

2. Show piping size and piping layout, including oil traps, double risers, specialties, and pipe and tube sizes to accommodate, as a minimum, equipment provided, elevation difference between compressor and evaporator, and length of piping to ensure proper operation and compliance with warranties of connected equipment.
3. Show interface and spatial relationships between piping and equipment.
4. Shop Drawing Scale: 1/4-inch equals 1 foot.

1.04 INFORMATIONAL SUBMITTALS

- A. Welding certificates.
- B. Field quality-control reports.

1.05 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data: For refrigerant valves and piping specialties to include in maintenance manuals.

1.06 QUALITY ASSURANCE

- A. Welding Qualifications: Qualify procedures and personnel according to 2010 ASME Boiler and Pressure Vessel Code: Section IX, "Welding and Brazing Qualifications."
- B. Comply with ASHRAE 15, "Safety Code for Refrigeration Systems."
- C. Comply with ASME B31.5, "Refrigeration Piping and Heat Transfer Components."

1.07 PRODUCT STORAGE AND HANDLING

- A. Store piping with end caps in place to ensure that piping interior and exterior are clean when installed.

PART 2 - PRODUCTS

2.01 PERFORMANCE REQUIREMENTS

- A. Line Test Pressure for Refrigerant R-410A:
 1. Suction Lines for Air-Conditioning Applications: 300 psig.
 2. Suction Lines for Heat-Pump Applications: 535 psig.
 3. Hot-Gas and Liquid Lines: 535 psig.

2.02 COPPER TUBE AND FITTINGS

- A. Copper Tube: ASTM B 280, Type ACR.
- B. Wrought-Copper Fittings: ASME B16.22.

- C. Wrought-Copper Unions: ASME B16.22.
- D. Brazing Filler Metals: AWS A5.8.
- E. Flexible Connectors:
 - 1. Body: Tin-bronze bellows with woven, flexible, tinned-bronze-wire-reinforced protective jacket.
 - 2. End Connections: Socket ends.
 - 3. Offset Performance: Capable of minimum $\frac{3}{4}$ -inch misalignment in minimum 7-inch-long assembly.
 - 4. Working Pressure Rating: Factory test at minimum 500 psig.
 - 5. Maximum Operating Temperature: 250 deg F.

2.03 VALVES AND SPECIALTIES

- A. Manufacturers: Subject to compliance with requirements, provide products by one (1) of the following:
 - 1. Danfoss Inc.
 - 2. Heldon Products; Henry Technologies
 - 3. Parker Hannifin Corp.
 - 4. Paul Mueller Company
- B. Diaphragm Valves:
 - 1. Body and Bonnet: Forged brass or cast bronze; globe design with straight-through or angle pattern.
 - 2. Diaphragm: Phosphor bronze and stainless-steel with stainless-steel spring.
 - 3. Operator: Rising stem and hand wheel.
 - 4. Seat: Nylon.
 - 5. End Connections: Socket, union, or flanged.
 - 6. Working Pressure Rating: 500 psig.
 - 7. Maximum Operating Temperature: 275 deg F.
- C. Packed-Angle Valves:
 - 1. Body and Bonnet: Forged brass or cast bronze.
 - 2. Packing: Molded stem, back seating, and replaceable under pressure.
 - 3. Operator: Rising stem.
 - 4. Seat: Nonrotating, self-aligning polytetrafluoroethylene.
 - 5. Seal Cap: Forged-brass or valox hex cap.
 - 6. End Connections: Socket, union, threaded, or flanged.
 - 7. Working Pressure Rating: 500 psig.
 - 8. Maximum Operating Temperature: 275 deg F.
- D. Check Valves:

1. Body: Ductile iron, forged brass, or cast bronze; globe pattern.
 2. Bonnet: Bolted ductile iron, forged brass, or cast bronze; or brass hex plug.
 3. Piston: Removable polytetrafluoroethylene seat.
 4. Closing Spring: Stainless-steel.
 5. Manual Opening Stem: Seal cap, plated-steel stem, and graphite seal.
 6. End Connections: Socket, union, threaded, or flanged.
 7. Maximum Opening Pressure: 0.50 psig.
 8. Working Pressure Rating: 500 psig.
 9. Maximum Operating Temperature: 275 deg F.
- E. Service Valves:
1. Body: Forged brass with brass cap including key end to remove core.
 2. Core: Removable ball-type check valve with stainless-steel spring.
 3. Seat: Polytetrafluoroethylene.
 4. End Connections: Copper spring.
 5. Working Pressure Rating: 500 psig.
- F. Solenoid Valves: Comply with AHRI 760 and UL 429; listed and labeled by a National Recognized Testing Laboratory (NRTL).
1. Body and Bonnet: Plated steel.
 2. Solenoid Tube, Plunger, Closing Spring, and Seat Orifice: Stainless-steel.
 3. Seat: Polytetrafluoroethylene.
 4. End Connections: Threaded.
 5. Electrical: Molded, watertight coil in NEMA 250 enclosure of type required by location with ½-inch conduit adapter, and appropriate voltage ac coil.
 6. Working Pressure Rating: 400 psig.
 7. Maximum Operating Temperature: 240 deg F.
- G. Safety Relief Valves: Comply with 2010 ASME Boiler and Pressure Vessel Code; listed and labeled by an NRTL.
1. Body and Bonnet: Ductile iron and steel, with neoprene O-ring seal.
 2. Piston, Closing Spring, and Seat Insert: Stainless-steel.
 3. Seat: Polytetrafluoroethylene.
 4. End Connections: Threaded.
 5. Working Pressure Rating: 400 psig.
 6. Maximum Operating Temperature: 240 deg F.
- H. Thermostatic Expansion Valves: Comply with AHRI 750.
1. Body, Bonnet, and Seal Cap: Forged brass or steel.
 2. Diaphragm, Piston, Closing Spring, and Seat Insert: Stainless-steel.
 3. Packing and Gaskets: Non-asbestos.
 4. Capillary and Bulb: Copper tubing filled with refrigerant charge.
 5. Suction Temperature: 40 deg F.
 6. Superheat: Adjustable.

7. Reverse-flow option (for heat-pump applications).
8. End Connections: Socket, flare, or threaded union.
9. Working Pressure Rating: 700 psig.

I. Angle-Type Strainers:

1. Body: Forged brass or cast bronze.
2. Drain Plug: Brass hex plug.
3. Screen: 100-mesh monel.
4. End Connections: Socket or flare.
5. Working Pressure Rating: 500 psig.
6. Maximum Operating Temperature: 275 deg F.

J. Moisture/Liquid Indicators:

1. Body: Forged brass.
2. Window: Replaceable, clear, fused glass window with indicating element protected by filter screen.
3. Indicator: Color coded to show moisture content in parts per million (ppm).
4. Minimum Moisture Indicator Sensitivity: Indicate moisture above 60 ppm.
5. End Connections: Socket or flare.
6. Working Pressure Rating: 500 psig.
7. Maximum Operating Temperature: 240 deg F.

K. Replaceable-Core Filter Dryers: Comply with AHRI 730.

1. Body and Cover: Painted-steel shell with ductile-iron cover, stainless-steel screws, and neoprene gaskets.
2. Filter Media: 10 micron, pleated with integral end rings; stainless-steel support.
3. Desiccant Media: Activated alumina or charcoal.
4. Designed for reverse flow (for heat-pump applications).
5. End Connections: Socket.
6. Access Ports: NPS 1/4 connections at entering and leaving sides for pressure differential measurement.
7. Maximum Pressure Loss: 2 psig.
8. Working Pressure Rating: 500 psig.
9. Maximum Operating Temperature: 240 deg F.

L. Permanent Filter Dryers: Comply with AHRI 730.

1. Body and Cover: Painted-steel shell.
2. Filter Media: 10 micron, pleated with integral end rings; stainless-steel support.
3. Desiccant Media: Activated alumina.
4. Designed for reverse flow (for heat-pump applications).
5. End Connections: Socket.
6. Access Ports: NPS 1/4 connections at entering and leaving sides for pressure differential measurement.

7. Maximum Pressure Loss: 2 psig.
8. Working Pressure Rating: 500 psig.
9. Maximum Operating Temperature: 240 deg F.

M. Receivers: Comply with AHRI 495.

1. Comply with 2010 ASME Boiler and Pressure Vessel Code; listed and labeled by an NRTL.
2. Comply with UL 207; listed and labeled by an NRTL.
3. Body: Welded steel with corrosion-resistant coating.
4. Tappings: Inlet, outlet, liquid level indicator, and safety relief valve.
5. End Connections: Socket or threaded.
6. Working Pressure Rating: 500 psig.
7. Maximum Operating Temperature: 275 deg F.

N. Liquid Accumulators: Comply with AHRI 495.

1. Body: Welded steel with corrosion-resistant coating.
2. End Connections: Socket or threaded.
3. Working Pressure Rating: 500 psig.
4. Maximum Operating Temperature: 275 deg F.

2.04 REFRIGERANTS

A. ASHRAE 34, R-410A: Pentafluoroethane/Difluoromethane.

B. Manufacturers: Subject to compliance with requirements, provide products by one (1) of the following:

1. Atofina Chemicals, Inc.
2. DuPont Company; Fluorochemicals Div.
3. Honeywell, Inc.; Genetron Refrigerants
4. INEOS Fluor Americas LLC

PART 3 - EXECUTION

3.01 PIPING APPLICATIONS FOR REFRIGERANT R-410A

- A. Suction Lines NPS 1-1/2 and Smaller for Conventional Air-Conditioning Applications: Copper, Type ACR, annealed-temper tubing and wrought-copper fittings with brazed joints.
- B. Hot-Gas and Liquid Lines: Copper, Type ACR annealed- or drawn-temper tubing and wrought-copper fittings with brazed joints.

- C. Safety-Relief-Valve Discharge Piping: Copper, Type ACR, annealed- or drawn-temper tubing and wrought-copper fittings with brazed joints.

3.02 VALVE AND SPECIALTY APPLICATIONS

- A. Install diaphragm packless valves in suction and discharge lines of compressor.
- B. Install service valves for gage taps at inlet and outlet of hot-gas bypass valves and strainers if they are not an integral part of valves and strainers.
- C. Install a check valve at the compressor discharge and a liquid accumulator at the compressor suction connection.
- D. Except as otherwise indicated, install diaphragm packless valves on inlet and outlet side of filter dryers.
- E. Install a full-size, three-valve bypass around filter dryers.
- F. Install solenoid valves upstream from each expansion valve and hot-gas bypass valve. Install solenoid valves in horizontal lines with coil at top.
- G. Install thermostatic expansion valves as close as possible to distributors on evaporators.
 - 1. Install valve so diaphragm case is warmer than bulb.
 - 2. Secure bulb to clean, straight, horizontal section of suction line using two (2) bulb straps. Do not mount bulb in a trap or at bottom of the line.
 - 3. If external equalizer lines are required, make connection where it will reflect suction-line pressure at bulb location.
- H. Install safety relief valves where required by 2010 ASME Boiler and Pressure Vessel Code. Pipe safety-relief-valve discharge line to outside according to ASHRAE 15.
- I. Install moisture/liquid indicators in liquid line at the inlet of the thermostatic expansion valve or at the inlet of the evaporator coil capillary tube.
- J. Install strainers upstream from and adjacent to the following unless they are furnished as an integral assembly for the device being protected:
 - 1. Solenoid valves.
 - 2. Thermostatic expansion valves.
 - 3. Hot-gas bypass valves.
 - 4. Compressor.
- K. Install filter dryers in liquid line between compressor and thermostatic expansion valve, and in the suction line at the compressor.
- L. Install receivers sized to accommodate pump-down charge.

- M. Install flexible connectors at compressors.

3.04 PIPING INSTALLATION

- 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.
- E. Install piping above accessible ceilings to allow sufficient space for ceiling panel removal.
- F. Install piping adjacent to machines 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. Refer to Section 230923 "Direct Digital Control (DDC) System for HVAC" and Section 230993 "Sequence of Operations for HVAC DDC" for solenoid valve controllers, control wiring, and sequence of operation.
- K. Install piping as short and direct as possible, with a minimum number of joints, elbows, and fittings.
- L. 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 if valves or equipment requiring maintenance is concealed behind finished surfaces.
- M. Install refrigerant piping in protective conduit where installed belowground.
- N. Install refrigerant piping in rigid or flexible conduit in locations where exposed to mechanical injury.
- O. 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.
- P. When brazing, 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.
- Q. Install piping with adequate clearance between pipe and adjacent walls and hangers or between pipes for insulation installation.
- R. Identify refrigerant piping and valves according to Section 230553 "Identification for HVAC Piping and Equipment."
- S. Install sleeves for piping penetrations of walls, ceilings, and floors. Comply with requirements for sleeves specified in Section 230517 "Sleeves and Sleeve Seals for HVAC Piping."
- T. Install sleeve seals for piping penetrations of concrete walls and slabs. Comply with requirements for sleeve seals specified in Section 230517 "Sleeves and Sleeve Seals for HVAC Piping."
- U. Install escutcheons for piping penetrations of walls, ceilings, and floors. Comply with requirements for escutcheons specified in Section 230518 "Escutcheons for HVAC Piping."

3.05 PIPE JOINT CONSTRUCTION

- A. Ream ends of pipes and tubes and remove burrs. Bevel plain ends of steel pipe.
- B. Remove scale, slag, dirt, and debris from inside and outside of pipe and fittings before assembly.
- C. Fill pipe and fittings with an inert gas (nitrogen or carbon dioxide), during brazing or welding, to prevent scale formation.
- D. Soldered Joints: Construct joints according to ASTM B 828 or CDA's "Copper Tube Handbook."
- E. Brazed Joints: Construct joints according to AWS's "Brazing Handbook," Chapter "Pipe and Tube."
1. Use Type BCuP (copper-phosphorus) alloy for joining copper socket fittings with copper pipe.

2. Use Type BAg (cadmium-free silver) alloy for joining copper with bronze or steel.
- F. Threaded Joints: Thread steel pipe with tapered pipe threads according to ASME B1.20.1. Cut threads full and clean using sharp dies. Ream threaded pipe ends to remove burrs and to restore full ID. Join pipe fittings and valves as follows:
1. Apply appropriate tape or thread compound to external pipe threads unless dry-seal threading is specified.
 2. Damaged Threads: Do not use pipe or pipe fittings with threads that are corroded or damaged. Do not use pipe sections that have cracked or open welds.
- G. Welded Joints: Construct joints according to AWS D10.12.
- H. Flanged Joints: Select appropriate gasket material, size, type, and thickness for service application. Install gasket concentrically positioned. Use suitable lubricants on bolt threads.
- 3.06 INSTALLATION OF HANGERS AND SUPPORTS
- A. Comply with requirements for seismic restraints in Section 230548 "Vibration and Seismic Controls for HVAC."
- B. Comply with Section 230529 "Hangers and Supports for HVAC Piping and Equipment" for hangers, supports, and anchor devices.
- C. Install the following pipe attachments:
1. Adjustable steel clevis hangers for individual horizontal runs less than 20 feet long.
 2. Roller hangers and spring hangers for individual horizontal runs 20 feet or longer.
 3. Pipe Roller: MSS SP-58, Type 44 for multiple horizontal piping 20 feet 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.
- D. Install hangers for copper tubing, with maximum horizontal spacing and minimum rod diameters, to comply with MSS-58, locally enforced codes, and authorities having jurisdiction requirements, whichever are most stringent.
- E. Support horizontal piping within 12 inches of each fitting.
- F. Support vertical runs of copper tubing to comply with MSS-58, locally enforced codes, and authorities having jurisdiction requirements, whichever are most stringent.

3.07 FIELD QUALITY CONTROL

- A. Perform the following tests and inspections:
 - 1. Comply with ASME B31.5, Chapter VI.
 - 2. Test refrigerant piping, specialties, and receivers. Isolate compressor, condenser, evaporator, and safety devices from test pressure if they are not rated above the test pressure.
 - 3. Test high- and low-pressure side piping of each system separately at not less than the pressures indicated in "Performance Requirements" Article.
 - a. Leak testing shall be in accordance with the associated equipment manufacturer's requirements.
 - b. If leak is detected, remake leaking joints using new materials and retest in accordance with the associated equipment manufacturer's requirements.
- B. Prepare test and inspection reports.

3.08 SYSTEM CHARGING

- A. Charge system using the following procedures:
 - 1. Install core in filter dryers after leak test but before evacuation.
 - 2. Evacuate entire refrigerant system with a vacuum pump to 500 micrometers. 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.
 - 4. Charge system with a new filter-dryer core in charging line.

3.09 ADJUSTING

- A. Adjust thermostatic expansion valve to obtain proper evaporator superheat.
- B. Adjust high- and low-pressure switch settings to avoid short cycling in response to fluctuating suction pressure.
- C. Adjust set-point temperature of air-conditioning or chilled-water controllers to the system design temperature.
- D. Perform the following adjustments before operating the refrigeration system, according to manufacturer's written instructions:
 - 1. Open shutoff valves in condenser water circuit.
 - 2. Verify that compressor oil level is correct.
 - 3. Open compressor suction and discharge valves.
 - 4. Open refrigerant valves except bypass valves that are used for other purposes.
 - 5. Check open compressor-motor alignment and verify lubrication for motors and bearings.

- E. Replace core of replaceable filter dryer after system has been adjusted and after design flow rates and pressures are established.

END OF SECTION 23 23 00

SECTION 23 31 13

METAL DUCTS

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SUMMARY

A. Section Includes:

- 1. Single-wall rectangular ducts and fittings.
- 2. Single-wall round ducts and fittings.
- 3. Sheet metal materials.
- 4. Sealant and gaskets.
- 5. Hangers and supports.

B. Related Sections:

- 1. Section 230593 "Testing, Adjusting, and Balancing for HVAC" for testing, adjusting, and balancing requirements for metal ducts.
- 2. Section 233300 "Air Duct Accessories" for dampers, sound-control devices, duct-mounting access doors and panels, turning vanes, and flexible ducts.

1.03 PERFORMANCE REQUIREMENTS

- A. Delegated Duct Design: Duct construction, including sheet metal thicknesses, seam and joint construction, reinforcements, and hangers and supports, shall comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" and performance requirements and design criteria indicated in "Duct Schedule" Article.
- B. Structural Performance: Duct hangers and supports shall withstand the effects of gravity loads and stresses within limits and under conditions described in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible".
- C. Airstream Surfaces: Surfaces in contact with the airstream shall comply with requirements in ASHRAE 62.1.
- D. Shop Drawings:

1. Fabrication, assembly, and installation, including plans, elevations, sections, components, and attachments to other work.
2. Factory- and shop-fabricated ducts and fittings.
3. Duct layout indicating sizes, configuration, liner material, and static-pressure classes.
4. Elevation of top of ducts.
5. Dimensions of main duct runs from building grid lines.
6. Fittings.
7. Reinforcement and spacing.
8. Seam and joint construction.
9. Penetrations through fire-rated and other partitions.
10. Equipment installation based on equipment being used on Project.
11. Locations for duct accessories, including dampers, turning vanes, and access doors and panels.
12. Hangers and supports, including methods for duct and building attachment and vibration isolation.

1.04 INFORMATIONAL SUBMITTALS

- A. Coordination Drawings: Plans, drawn to scale, on which the following items are shown and coordinated with each other, using input from installers of the items involved:
 1. Duct installation in congested spaces, indicating coordination with general construction, building components, and other building services. Indicate proposed changes to duct layout.
 2. Suspended ceiling components.
 3. Size and location of initial access modules for acoustical tile.
 4. Penetrations of smoke barriers and fire-rated construction.
 5. Items penetrating finished ceiling including the following:
 - a. Lighting fixtures.
 - b. Air outlets and inlets.
 - c. Speakers.
 - d. Sprinklers.
 - e. Emergency Fixtures and Signage
- B. Welding certificates.
- C. Field quality-control reports.

1.05 QUALITY ASSURANCE

- A. Welding Qualifications: Qualify procedures and personnel according to AWS D1.1/D1.1M, "Structural Welding Code - Steel," for hangers and supports.

- B. ASHRAE Compliance: Applicable requirements in ASHRAE 62.1, Section 5 - "Systems and Equipment" and Section 7 - "Construction and System Start-up."
- C. ASHRAE/IESNA Compliance: Applicable requirements in ASHRAE/IESNA 90.1, Section 6.4.4 - "HVAC System Construction and Insulation."

PART 2 - PRODUCTS

2.01 SINGLE-WALL RECTANGULAR DUCTS AND FITTINGS

- A. General Fabrication Requirements: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" based on indicated static-pressure class unless otherwise indicated.
- B. Transverse Joints: Select joint types and fabricate according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 2-1, "Rectangular Duct/Transverse Joints," for static-pressure class, applicable sealing requirements, materials involved, duct-support intervals, and other provisions in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."
- C. Longitudinal Seams: Select seam types and fabricate according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 2-2, "Rectangular Duct/Longitudinal Seams," for static-pressure class, applicable sealing requirements, materials involved, duct-support intervals, and other provisions in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."
- D. Elbows, Transitions, Offsets, Branch Connections, and Other Duct Construction: Select types and fabricate according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Chapter 4, "Fittings and Other Construction," for static-pressure class, applicable sealing requirements, materials involved, duct-support intervals, and other provisions in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."

2.02 SINGLE-WALL ROUND DUCTS AND FITTINGS

- A. General Fabrication Requirements: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Chapter 3, "Round, Oval, and Flexible Duct," based on indicated static-pressure class unless otherwise indicated.
- B. Transverse Joints: Select joint types and fabricate according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 3-1, "Round Duct Transverse Joints," for static-pressure class, applicable sealing requirements, materials involved, duct-support intervals, and other provisions in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."

- C. Longitudinal Seams: Select seam types and fabricate according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 3-2, "Round Duct Longitudinal Seams," for static-pressure class, applicable sealing requirements, materials involved, duct-support intervals, and other provisions in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."
- D. Tees and Laterals: Select types and fabricate according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 3-5, "90 Degree Tees and Laterals," and Figure 3-6, "Conical Tees," for static-pressure class, applicable sealing requirements, materials involved, duct-support intervals, and other provisions in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."

2.03 SHEET METAL MATERIALS

- A. General Material Requirements: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" for acceptable materials, material thicknesses, and duct construction methods unless otherwise indicated. Sheet metal materials shall be free of pitting, seam marks, roller marks, stains, discolorations, and other imperfections.
- B. Galvanized Sheet Steel: Comply with ASTM A 653/A 653M.
 - 1. Galvanized Coating Designation: G90.
 - 2. Finishes for Surfaces Exposed to View: Mill phosphatized.
- C. Stainless-Steel Sheets: Comply with ASTM A 480/A 480M, Type 304 or 316, as indicated in the "Duct Schedule" Article; cold rolled, annealed, sheet. Exposed surface finish shall be No. 2B, No. 2D, No. 3, or No. 4 as indicated in the "Duct Schedule" Article.
- D. Reinforcement Shapes and Plates: ASTM A 36/A 36M, steel plates, shapes, and bars; black and galvanized.
- E. Tie Rods: Galvanized steel, 1/4-inch minimum diameter for lengths 36 inches or less; 3/8-inch) minimum diameter for lengths longer than 36 inches.

2.04 SEALANT AND GASKETS

- A. General Sealant and Gasket Requirements: Surface-burning characteristics for sealants and gaskets shall be a maximum flame-spread index of 25 and a maximum smoke-developed index of 50 when tested according to UL 723; certified by an NRTL.
- B. Two-Part Tape Sealing System:
 - 1. Tape: Woven cotton fiber impregnated with mineral gypsum and modified acrylic/silicone activator to react exothermically with tape to form hard, durable, airtight seal.

2. Tape Width: 4 inches.
3. Sealant: Modified styrene acrylic.
4. Water resistant.
5. Mold and mildew resistant.
6. Maximum Static-Pressure Class: 10-inch wg, positive and negative.
7. Service: Indoor and outdoor.
8. Service Temperature: Minus 40 to plus 200 deg F.
9. Substrate: Compatible with galvanized sheet steel, stainless steel, or aluminum.
10. For indoor applications, sealant shall have a VOC content of 250 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

C. Water-Based Joint and Seam Sealant:

1. Application Method: Brush on.
2. Solids Content: Minimum 65 percent.
3. Shore A Hardness: Minimum 20.
4. Water resistant.
5. Mold and mildew resistant.
6. VOC: Maximum 75 g/L (less water).
7. Maximum Static-Pressure Class: 10-inch wg, positive and negative.
8. Service: Indoor or outdoor.
9. Substrate: Compatible with galvanized sheet steel (both PVC coated and bare), stainless steel, or aluminum sheets.

D. Flanged Joint Sealant: Comply with ASTM C 920.

1. General: Single-component, acid-curing, silicone, elastomeric.
2. Type: S.
3. Grade: NS.
4. Class: 25.
5. Use: O.
6. For indoor applications, sealant shall have a VOC content of 250 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

E. Flange Gaskets: Butyl rubber, neoprene, or EPDM polymer with polyisobutylene plasticizer.

F. Round Duct Joint O-Ring Seals:

1. Seal shall provide maximum leakage class of 3 cfm/100 sq. ft. at 1-inch wg and shall be rated for 10-inch wg static-pressure class, positive or negative.
2. EPDM O-ring to seal in concave bead in coupling or fitting spigot.
3. Double-lipped, EPDM O-ring seal, mechanically fastened to factory-fabricated couplings and fitting spigots.

2.05 HANGERS AND SUPPORTS

- A. Hanger Rods for Noncorrosive Environments: Cadmium-plated steel rods and nuts.
- B. Hanger Rods for Corrosive Environments: Electrogalvanized, all-thread rods or galvanized rods with threads painted with zinc-chromate primer after installation.
- C. Strap and Rod Sizes: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Table 5-1, "Rectangular Duct Hangers Minimum Size," and Table 5-2, "Minimum Hanger Sizes for Round Duct."
- D. Steel Cables for Galvanized-Steel Ducts: Galvanized steel complying with ASTM A 603.
- E. Steel Cables for Stainless-Steel Ducts: Stainless steel complying with ASTM A 492.
- F. Steel Cable End Connections: Cadmium-plated steel assemblies with brackets, swivel, and bolts designed for duct hanger service; with an automatic-locking and clamping device.
- G. Duct Attachments: Sheet metal screws, blind rivets, or self-tapping metal screws; compatible with duct materials.
- H. Trapeze and Riser Supports:
 - 1. Supports for Galvanized-Steel Ducts: Galvanized-steel shapes and plates.
 - 2. Supports for Stainless-Steel Ducts: Stainless-steel shapes and plates.

PART 3 - EXECUTION

3.01 DUCT INSTALLATION

- A. Drawing plans, schematics, and diagrams indicate general location and arrangement of duct system. Indicated duct locations, configurations, and arrangements were used to size ducts and calculate friction loss for air-handling equipment sizing and for other design considerations. Install duct systems as indicated unless deviations to layout are approved on Shop Drawings and Coordination Drawings.
- B. Install ducts according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" unless otherwise indicated.
- C. Install round ducts in maximum practical lengths.
- D. Install ducts with fewest possible joints.
- E. Install factory- or shop-fabricated fittings for changes in direction, size, and shape and for branch connections.

- F. Unless otherwise indicated, install ducts vertically and horizontally, and parallel and perpendicular to building lines.
- G. Install ducts close to walls, overhead construction, columns, and other structural and permanent enclosure elements of building.
- H. Install ducts with a clearance of 1 inch, plus allowance for insulation thickness.
- I. Route ducts to avoid passing through transformer vaults and electrical equipment rooms and enclosures.
- J. Where ducts pass through non-fire-rated interior partitions and exterior walls and are exposed to view, cover the opening between the partition and duct or duct insulation with sheet metal flanges of same metal thickness as the duct. Overlap openings on four sides by at least 1-1/2 inches.
- K. Where ducts pass through fire-rated interior partitions and exterior walls, install fire dampers. Comply with requirements in Section 233300 "Air Duct Accessories" for fire and smoke dampers.
- L. Protect duct interiors from moisture, construction debris and dust, and other foreign materials.

3.02 INSTALLATION OF EXPOSED DUCTWORK

- A. Protect ducts exposed in finished spaces from being dented, scratched, or damaged.
- B. Trim duct sealants flush with metal. Create a smooth and uniform exposed bead. Do not use two-part tape sealing system.
- C. Grind welds to provide smooth surface free of burrs, sharp edges, and weld splatter. When welding stainless steel with a No. 3 or 4 finish, grind the welds flush, polish the exposed welds, and treat the welds to remove discoloration caused by welding.
- D. Maintain consistency, symmetry, and uniformity in the arrangement and fabrication of fittings, hangers and supports, duct accessories, and air outlets.
- E. Repair or replace damaged sections and finished work that does not comply with these requirements.

3.03 DUCT SEALING

- A. Seal ducts for duct static-pressure, seal classes, and leakage classes specified in "Duct Schedule" Article according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."

- B. Seal ducts to the following seal classes according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible":
1. Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."
 2. Outdoor, Supply-Air Ducts: Seal Class A.
 3. Outdoor, Exhaust Ducts: Seal Class C.
 4. Outdoor, Return-Air Ducts: Seal Class C.
 5. Unconditioned Space, Supply-Air Ducts in Pressure Classes 2-Inch wg and Lower: Seal Class B.
 6. Unconditioned Space, Supply-Air Ducts in Pressure Classes Higher Than 2-Inch wg: Seal Class A.
 7. Unconditioned Space, Exhaust Ducts: Seal Class C.
 8. Unconditioned Space, Return-Air Ducts: Seal Class B.
 9. Conditioned Space, Supply-Air Ducts in Pressure Classes 2-Inch wg and Lower: Seal Class C.
 10. Conditioned Space, Supply-Air Ducts in Pressure Classes Higher Than 2-Inch wg: Seal Class B.
 11. Conditioned Space, Exhaust Ducts: Seal Class B.
 12. Conditioned Space, Return-Air Ducts: Seal Class C.

3.04 HANGER AND SUPPORT INSTALLATION

- A. Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Chapter 5, "Hangers and Supports."
- B. Building Attachments: Concrete inserts, powder-actuated fasteners, or structural-steel fasteners appropriate for construction materials to which hangers are being attached.
1. Where practical, install concrete inserts before placing concrete.
 2. Install powder-actuated concrete fasteners after concrete is placed and completely cured.
 3. Use powder-actuated concrete fasteners for standard-weight aggregate concretes or for slabs more than 4 inches thick.
 4. Do not use powder-actuated concrete fasteners for lightweight-aggregate concretes or for slabs less than 4 inches thick.
 5. Do not use powder-actuated concrete fasteners for seismic restraints.
- C. Hanger Spacing: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Table 5-1, "Rectangular Duct Hangers Minimum Size," and Table 5-2, "Minimum Hanger Sizes for Round Duct," for maximum hanger spacing; install hangers and supports within 24 inches of each elbow and within 48 inches of each branch intersection.
- D. Hangers Exposed to View: Threaded rod and angle or channel supports.

- E. Support vertical ducts with steel angles or channel secured to the sides of the duct with welds, bolts, sheet metal screws, or blind rivets; support at each floor and at a maximum interval of 16 feet.
- F. Install upper attachments to structures. Select and size upper attachments with pull-out, tension, and shear capacities appropriate for supported loads and building materials where used.

3.05 CONNECTIONS

- A. Make connections to equipment with flexible connectors complying with Section 233300 "Air Duct Accessories."
- B. Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" for branch, outlet and inlet, and terminal unit connections.

3.06 PAINTING

- A. Paint interior of metal ducts that are visible through registers and grilles and that do not have duct liner. Apply one coat of flat, black, latex paint over a compatible galvanized-steel primer.

3.07 FIELD QUALITY CONTROL

- A. Perform tests and inspections.

3.08 START UP

- A. Air Balance: Comply with requirements in Section 230593 "Testing, Adjusting, and Balancing for HVAC."

3.09 DUCT SCHEDULE

- A. Fabricate ducts with galvanized sheet steel.
- B. Supply Ducts:
 - 1. Ducts Connected to Fan Units:
 - a. Pressure Class: Positive 1-inch wg.
- C. Return Ducts:
 - 1. Ducts Connected to Fan Units:

- a. Pressure Class: Negative 1-inch wg.
- D. Exhaust Ducts:
 - 1. Ducts Connected to Fans Exhausting (ASHRAE 62.1, Class 1 and 2) Air:
 - a. Pressure Class: Negative 1-inch wg.
- E. Outdoor-Air (Not Filtered, Heated, or Cooled) Ducts:
 - a. Pressure Class: Positive or negative 1-inch wg.
- F. Intermediate Reinforcement:
 - 1. Galvanized-Steel Ducts: Galvanized steel.
- G. Elbow Configuration:
 - 1. Rectangular Duct: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 4-2, "Rectangular Elbows."
 - a. Radius Type RE 1 with minimum 1.5 radius-to-diameter ratio.
 - b. Radius Type RE 3 with minimum 1.5 radius-to-diameter ratio and two vanes.
 - c. Mitered Type RE 2 with vanes complying with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 4-3, "Vanes and Vane Runners," and Figure 4-4, "Vane Support in Elbows."
 - 2. Round Duct: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 3-4, "Round Duct Elbows."
 - a. Minimum Radius-to-Diameter Ratio and Elbow Segments: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Table 3-1, "Mitered Elbows." Elbows with less than 90-degree change of direction have proportionately fewer segments.
 - 1) Velocity 1000 fpm or Lower: 0.5 radius-to-diameter ratio and three segments for 90-degree elbow.
 - 2) Velocity 1000 to 1500 fpm: 1.5 radius-to-diameter ratio and four segments for 90-degree elbow.
 - 3) Velocity 1500 fpm or Higher: 1.5 radius-to-diameter ratio and five segments for 90-degree elbow.
 - 4) Radius-to Diameter Ratio: 1.5.
 - b. Round Elbows, 12 Inches and Smaller in Diameter: Stamped or pleated.
 - c. Round Elbows, 14 Inches and Larger in Diameter: Standing seam or welded.

H. Branch Configuration:

1. Rectangular Duct: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 4-6, "Branch Connection."
 - a. Rectangular Main to Rectangular Branch: 45-degree entry.
 - b. Rectangular Main to Round Branch: 45-degree entry and transition.
2. Round and Flat Oval: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 3-5, "90 Degree Tees and Laterals," and Figure 3-6, "Conical Tees." Saddle taps are permitted in existing duct.
 - a. Velocity 1000 fpm or Lower: 90-degree tap.
 - b. Velocity 1000 to 1500 fpm: Conical tap.
 - c. Velocity 1500 fpm or Higher: 45-degree lateral.

END OF SECTION 23 31 13

SECTION 23 33 00

DUCT ACCESSORIES

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SUMMARY

- A. Section Includes:
 - 1. Control dampers.
 - 2. Fire dampers.
 - 3. Duct-mounted access door.
 - 4. Flange connectors.
 - 5. Duct accessory hardware.

1.03 SUBMITTALS

- A. Product Data: For each type of product indicated.
 - 1. For duct silencers, include pressure drop and dynamic insertion loss data. Include breakout noise calculations for high transmission loss casings.
- B. Shop Drawings: For duct accessories. Include plans, elevations, sections, details and attachments to other work.
 - 1. Detail duct accessories fabrication and installation in ducts and other construction. Include dimensions, weights, loads, and required clearances; and method of field assembly into duct systems and other construction. Include the following:
 - a. Special fittings.
 - b. Manual volume damper installations.
 - c. Control damper installations.
 - d. Fire-damper, smoke-damper, combination fire- and smoke-damper, ceiling, and corridor damper installations, including sleeves; and duct-mounted access doors and remote damper operators.
 - e. Wiring Diagrams: For power, signal, and control wiring.

- C. Operation and Maintenance Data: For air duct accessories to include in operation and maintenance manuals.

1.04 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. Fusible Links: Furnish quantity equal to ten percent (10%) of amount installed.

PART 2 - PRODUCTS

2.01 ASSEMBLY DESCRIPTION

- A. Comply with NFPA 90A, "Installation of Air Conditioning and Ventilating Systems," and with NFPA 90B, "Installation of Warm Air Heating and Air Conditioning Systems."
- B. Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" for acceptable materials, material thicknesses, and duct construction methods unless otherwise indicated. Sheet metal materials shall be free of pitting, seam marks, roller marks, stains, discolorations, and other imperfections.

2.02 MATERIALS

- A. Galvanized Sheet Steel: Comply with ASTM A 653.
 - 1. Galvanized Coating Designation: G90.
 - 2. Exposed-Surface Finish: Mill phosphatized.
- B. Aluminum Sheets: Comply with ASTM B 209, Alloy 3003, Temper H14; with mill finish for concealed ducts and standard, one (1) side bright finish for exposed ducts.
- C. Extruded Aluminum: Comply with ASTM B 221, Alloy 6063, Temper T6.
- D. Reinforcement Shapes and Plates: Galvanized-steel reinforcement where installed on galvanized sheet metal ducts; compatible materials for aluminum and stainless-steel ducts.
- E. Tie Rods: Galvanized steel, 1/4-inch minimum diameter for lengths 36 inches or less; 3/8-inch minimum diameter for lengths longer than 36 inches.

2.03 CONTROL DAMPERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one (1) of the following:
 - 1. Ruskin Company
 - 2. Greenheck Fan Corporation
 - 3. Nailor Industries Inc.
 - 4. Pottorff
 - 5. .
- B. Low-leakage rating, with linkage outside airstream, and bearing AMCA's Certified Ratings Seal for both air performance and air leakage.
- C. Frames:
 - 1. Hat-shaped.
 - 2. Galvanized-steel channels, 0.094 inch thick.
 - 3. Mitered and welded corners.
- D. Blades:
 - 1. Multiple blade with maximum blade width of 8 inches.
 - 2. Parallel- and opposed blade design.
 - 3. Galvanized steel.
 - 4. 0.064-inch-thick single skin or 0.0747-inch-thick dual skin.
 - 5. Blade Edging: Closed-cell neoprene.
 - 6. Blade Edging: Inflatable seal blade edging, or replaceable rubber seals.
- E. Blade Axles: ½-inch-diameter; galvanized steel blade-linkage hardware of zinc-plated steel and brass; ends sealed against blade bearings.
 - 1. Operating Temperature Range: From minus 40 to plus 200 deg F (minus 40 to plus 93 deg C).
- F. Bearings:
 - 1. Stainless-steel sleeve.
 - 2. Dampers in ducts with pressure classes of 3-inch wg or less shall have axles full length of damper blades and bearings at both ends of operating shaft.
 - 3. Thrust bearings at each end of every blade.

2.04 FIRE DAMPERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one (1) of the following:

1. Greenheck Fan Corporation
 2. Pottorff
 3. Ruskin Company
- B. Type: Static; rated and labeled according to UL 555 by an NRTL.
- C. Fire Rating: 1½ and 3 hours.
- D. Frame: Curtain type with blades outside airstream except when located behind grille where blades may be inside airstream; fabricated with roll-formed, 0.034-inch-thick galvanized steel; with mitered and interlocking corners.
- E. Mounting Sleeve: Factory- or field-installed, galvanized sheet steel.
1. Minimum Thickness: 0.138-inch-thick and of length to suit application.
 2. Exception: Omit sleeve where damper-frame width permits direct attachment of perimeter mounting angles on each side of wall or floor; thickness of damper frame must comply with sleeve requirements.
- F. Mounting Orientation: Vertical or horizontal as indicated.
- G. Blades: Roll-formed, interlocking, 0.024-inch-thick, galvanized sheet steel. In place of interlocking blades, use full-length, 0.034-inch-thick, galvanized-steel blade connectors.
- H. Horizontal Dampers: Include blade lock and stainless-steel closure spring.
- I. Heat-Responsive Device: Replaceable, 165 deg F rated, fusible links.

2.05 FLANGE CONNECTORS

- A. Manufacturers: Subject to compliance with requirements, provide products by one (1) of the following:
1. Ductmate Industries, Inc.
 2. Nexus PDQ; Division of Shilco Holdings Inc.
 3. Ward Industries, Inc.; a division of Hart & Cooley, Inc.
- B. Description: Roll-formed, factory-fabricated, slide-on transverse flange connectors, gaskets, and components.
- C. Material: Galvanized steel.
- D. Gage and Shape: Match connecting ductwork.

2.06 DUCT-MOUNTED ACCESS DOORS

- A. Manufacturers: Subject to compliance with requirements, provide products by one (1) of the following:
1. Aire Technologies
 2. CL WARD & Family Inc.
 3. Ductmate Industries, Inc.
- B. Duct-Mounted Access Doors: Fabricate access panels according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible"; Figures 7-2, "Duct Access Doors and Panels," and 7-3, "Access Doors - Round Duct."
1. Door:
 - a. Double wall, rectangular.
 - b. Galvanized sheet metal with insulation fill and thickness as indicated for duct pressure class.
 - c. Vision panel.
 - d. Hinges and Latches: 1-by-1-inch butt or piano hinge and cam latches.
 - e. Fabricate doors airtight and suitable for duct pressure class.
 2. Frame: Galvanized sheet steel, with bend-over tabs and foam gaskets.
 3. Number of Hinges and Locks:
 - a. Access Doors Less Than 12 Inches Square: No hinges and two (2) sash locks.
 - b. Access Doors up to 18 Inches Square: Two (2) hinges and two (2) sash locks.
 - c. Access Doors up to 24 by 48 Inches: Three (3) hinges and two (2) compression latches with outside and inside handles.
 - d. Access Doors Larger Than 24 by 48 Inches: Four (4) hinges and two (2) compression latches with outside and inside handles.

2.07 DUCT ACCESSORY HARDWARE

- A. Instrument Test Holes: Cast iron or cast aluminum to suit duct material, including screw cap and gasket. Size to allow insertion of pitot tube and other testing instruments and of length to suit duct-insulation thickness.
- B. Adhesives: High strength, quick setting, neoprene based, waterproof, and resistant to gasoline and grease.

PART 3 - EXECUTION

3.01 INSTALLATION

- A. Install duct accessories according to applicable details in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" for metal ducts and in NAIMA AH116, "Fibrous Glass Duct Construction Standards," for fibrous-glass ducts.
- B. Install duct accessories of materials suited to duct materials; use galvanized-steel accessories in galvanized-steel and fibrous-glass ducts, stainless-steel accessories in stainless-steel ducts, and aluminum accessories in aluminum ducts.
- C. Compliance with ASHRAE/IESNA 90.1-2004 includes Section 6.4.3.3.3 - "Shutoff Damper Controls," restricts the use of backdraft dampers, and requires control dampers for certain applications. Install backdraft or control dampers at inlet of exhaust fans or exhaust ducts as close as possible to exhaust fan unless otherwise indicated.
- D. Set dampers to fully open position before testing, adjusting, and balancing.
- E. Install test holes at fan inlets and outlets and elsewhere as indicated.
- F. Install fire dampers according to UL listing.
- G. Install duct access doors on sides of ducts to allow for inspecting, adjusting, and maintaining accessories and equipment at the following locations:
 - 1. On both sides of duct coils.
 - 2. Upstream and downstream from duct filters.
 - 3. At outdoor-air intakes and mixed-air plenums.
 - 4. At drain pans and seals.
 - 5. Downstream from manual volume dampers, control dampers, backdraft dampers, and equipment.
 - 6. Adjacent to and close enough to fire or smoke dampers, to reset or reinstall fusible links. Access doors for access to fire or smoke dampers having fusible links shall be pressure relief access doors and shall be outward operation for access doors installed upstream from dampers and inward operation for access doors installed downstream from dampers.
 - 7. At each change in direction and at maximum 50-foot spacing.
 - 8. Upstream and downstream from turning vanes.
 - 9. Upstream or downstream from duct silencers.
 - 10. Control devices requiring inspection.
 - 11. Elsewhere as indicated.
- H. Install access doors with swing against duct static pressure.

- I. For fans developing static pressures of 5-inch wg and more, cover flexible connectors with loaded vinyl sheet held in place with metal straps.
- J. Install duct test holes where required for testing and balancing purposes.
- K. Install thrust limits at centerline of thrust, symmetrical on both sides of equipment. Attach thrust limits at centerline of thrust and adjust to a maximum of ¼ inch movement during start and stop of fans.

3.02 FIELD QUALITY CONTROL

- A. Tests and Inspections:
 - 1. Operate dampers to verify full range of movement.
 - 2. Inspect locations of access doors and verify that purpose of access door can be performed.
 - 3. Operate fire dampers to verify full range of movement and verify that proper heat-response device is installed.
 - 4. Operate remote damper operators to verify full range of movement of operator and damper.

END OF SECTION 23 33 00

SECTION 23 34 23

HVAC POWER VENTILATORS

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SUMMARY

- A. Section Includes:

- 1. In-line Centrifugal Fans
- 2. Sidewall Propeller Fans

1.03 PERFORMANCE REQUIREMENTS

- A. Project Altitude: Base fan-performance ratings on actual Project site elevations.
- B. Operating Limits: Classify according to AMCA 99.

1.04 SUBMITTALS

- A. Product Data: For each type of product indicated. Include rated capacities, operating characteristics, and furnished specialties and accessories. Also include the following:
 - 1. Certified fan performance curves with system operating conditions indicated.
 - 2. Certified fan sound-power ratings.
 - 3. Motor ratings and electrical characteristics, plus motor and electrical accessories.
 - 4. Material thickness and finishes, including color charts.
 - 5. Dampers, including housings, linkages, and operators.
 - 6. Roof curbs.
 - 7. Fan speed controllers.
- 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.
 3. Vibration Isolation Base Details: Detail fabrication including anchorages and attachments to structure and to supported equipment. Include adjustable motor bases, rails, and frames for equipment mounting.
- C. Coordination Drawings: Reflected ceiling plans 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. Support members relative to duct penetrations.
 2. Ceiling suspension assembly members.
 3. Size and location of initial access modules for acoustical tile.
- D. Field quality-control reports.
- 1.05 CLOSEOUT SUBMITTALS
- A. Operation and Maintenance Data: For power ventilators to include in emergency, operation, and maintenance manuals.
- 1.06 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. AMCA Compliance: Fans shall have AMCA-Certified performance ratings and shall bear the AMCA-Certified Ratings Seal.
- C. UL Standards: Power ventilators shall comply with UL 705. Power ventilators for use for restaurant kitchen exhaust shall also comply with UL 762.
- 1.07 COORDINATION
- A. Coordinate size and location of structural-steel support members.
- B. Coordinate sizes and locations of concrete bases with actual equipment provided.
- C. Coordinate sizes and locations of equipment supports, and wall penetrations with actual equipment provided.

1.08 DELIVERY, STORAGE AND HANDLING

- A. Deliver fans as factory-assembled unit, to the extent allowable by shipping limitations, with protective crating and covering.
- B. Disassemble and reassemble units, as required for moving to final location, according to manufacturer's written instructions.
- C. Lift and support units with manufacturer's designated lifting or supporting points.

PART 2 - PRODUCTS

2.01 IN-LINE CENTRIFUGAL FANS

- A. Manufacturers: Subject to compliance with requirements, provide products by one (1) of the following:
 - 1. Cook, Loren Company
 - 2. Greenheck Fan Corp
- B. Housing: Split, spun aluminum with aluminum straightening vanes, inlet and outlet flanges, and support bracket adaptable to floor, side wall, or ceiling mounting.
- C. Direct-Drive Units:
 - 1. Motor mounted in airstream, factory wired to disconnect switch located on outside of fan housing; with wheel, inlet cone, and motor on swing-out service door.
 - 2. Motor shall be an electronic commutation (EC) motor. Motor shall be permanently lubricated with heavy duty ball bearings to match fan load and prewired to the specific voltage and phase. Internal motor circuitry shall convert AC power supplied to the fan to DC power to operate the motor.
 - 3. Motor shall be speed controllable down to twenty percent (20%) of full speed. Speed shall be controlled by a 0-10VDC signal.
 - 4. Motor shall be a minimum of eighty-five percent (85%) efficient at all speeds.
- D. Fan Wheels: Aluminum, airfoil blades welded to aluminum hub.
- E. Controls:
 - 1. Wall Mounted Temperature Controller
 - a. Provide 0-10VDC output signal to electronically commutated motor.
 - 2. Air Balance Kit
 - a. An interface which integrates and simplifies the interconnection of ECM and controls.
 - b. Include:
 - 1) Integral 24V control transformer.

- 2) Terminals for ECM , controls and auxiliary control for motor operated dampers.

F. Accessories:

1. Companion Flanges: For inlet and outlet duct connections.
2. Isolation: Spring isolators.
3. Motorized Dampers: Duct mounted with line voltage actuator. Coordinate actuator voltage in field.
 - a. Frame: 5" X 1" x 16 gauge hot dipped galvanized steel hat channel reinforced with corner blades.
 - b. Parallel-blade dampers with electric actuator in air stream, power open/spring close.
 - c. Seals: Neoprene blade edge seals mechanically fastened to blades.
 - d. Bearings: Oil impregnated self lubricating, stainless steel sleeve.
 - e. Linkage: Concealed outside air stream.
 - f. Axles: ½" plated steel hex.
 - g. Temperature limits: -72 deg F and +275 deg F.

G. Capacities and Characteristics: See Schedule.

2.02 SIDEWALL PROPELLER FANS

- A. Manufacturers: Subject to compliance with requirements, provide products by one (1) of the following:
 1. Cook, Loren Company.
 2. Greenheck Fan Corp
- B. Construction: Fan shall be of bolted and welded construction utilizing corrosion resistant fasteners. The motor shall be mounted on a 12 gauge steel wire guard. The wire guard shall be bolted to a minimum 14 gauge wall panel with continuously welded corners and an integral venturi. Unit shall bear an engraved aluminum nameplate. Nameplate shall indicate design CFM and static pressure. Unit shall be shipped in ISTA certified transit tested packaging.
- C. Coating: All steel fan components shall be Lorenized™ with an electrostatically applied, baked polyester powder coating. Each component shall be subject to a five stage environmentally friendly wash system, followed by a 1.5 to 2.5 mil thick baked powder finish. Paint must exceed 1,000 hour salt spray under ASTM B117 test method.
- D. Propeller: Propeller shall have aluminum blades riveted to a painted steel hub. The hub shall be securely fastened to the motor shaft utilizing two setscrews. Propeller shall be balanced in accordance with AMCA Standard 204-05, Balance Quality and Vibration Levels for Fans.
Aluminum, airfoil blades fastened to cast-aluminum hub; factory set pitch angle of blades.

- E. Fan Drive, Direct: Direct-drive motor mounted in airstream, factory wired to disconnect switch located on outside of fan housing.
- F. Motor:
 - 1. Motor shall be an electronically commutated motor rated for continuous duty and furnished with leads for connection to 0-10 VDC external controller.
- G. Controls:
 - 1. Wall Mounted Temperature Controller
 - a. Provide 0-10VDC output signal to electronically commutated motor.
 - 2. Air Balance Kit
 - a. An interface which integrates and simplifies the interconnection of ECM and controls.
 - b. Include:
 - 1) Integral 24V control transformer.
 - 2) Terminals for ECM , controls and auxiliary control for motor operated dampers.
- H. Accessories:
 - 1. Disconnect Switch: Nonfusible type, with thermal-overload protection mounted inside fan housing, factory wired through an internal aluminum conduit.
 - 2. Motorized Shutters: Motorized open- spring return.
 - a. Frame: Extruded aluminum.
 - b. Blades: rolled formed aluminum with vinyl edge gasket.
 - c. Extruded aluminum link blade bar connects each blade for uniform blade positioning. Blades pivot on full width extruded aluminum hanger.
 - 3. Motor-Side Back Guard: Galvanized steel, complying with OSHA specifications, removable for maintenance.
 - 4. Wall Collar: Galvanized steel to match fan and accessory size.
 - 5. Weathershield Hood: Galvanized steel to match fan and accessory size, securely fastened and sealed to the wall.
 - a. ½” mesh bird screen
 - 6. Extended Mounting Flange: Galvanized steel to match fan size.
- I. Capacities and Characteristics: See Schedule.

2.03 SOURCE QUALITY CONTROL

- A. Certify sound-power level ratings according to AMCA 301, "Methods for Calculating Fan Sound Ratings from Laboratory Test Data." Factory test fans according to AMCA 300, "Reverberant Room Method for Sound Testing of Fans." Label fans with the AMCA-Certified Ratings Seal.

- B. Certify fan performance ratings, including flow rate, pressure, power, air density, speed of rotation, and efficiency by factory tests according to AMCA 210, "Laboratory Methods of Testing Fans for Aerodynamic Performance Rating." Label fans with the AMCA-Certified Ratings Seal.

PART 3 - EXECUTION

3.01 INSTALLATION

- A. Install power ventilators level and plumb.
- B. Support units using restrained isolators. Refer to Vibration- and seismic-control devices are specified in Division 23 Section "Vibration and Seismic Controls for HVAC Piping and Equipment."
- C. Install units with clearances for service and maintenance.
- D. Label units according to requirements specified in Division 23 Section "Identification for HVAC Piping and Equipment."

3.02 DUCTWORK CONNECTIONS

- A. Drawings indicate general arrangement of ducts and duct accessories. Make final duct connections with flexible connectors. Flexible connectors are specified in Section 233300 "Air Duct Accessories."

3.03 ELECTRICAL CONNECTIONS

- A. Ground equipment according to Division 26 Section "Grounding and Bonding for Electrical Systems."
- B. Connect wiring according to Division 26 Section "Low-Voltage Electrical Power Conductors and Cables."

3.04 CONTROL CONNECTIONS

- A. Install control and electrical power wiring to field-mounted control devices.
- B. Connect control wiring according to Section 260523 "Control-Voltage Electrical Power Cables."

3.05 FIELD QUALITY CONTROL

- A. 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.
- B. Tests and Inspections:
 - 1. Verify that shipping, blocking, and bracing are removed.
 - 2. Verify that unit is secure on mountings and supporting devices and that connections to ducts and electrical components are complete. Verify that proper thermal-overload protection is installed in motors, starters, and disconnect switches.
 - 3. Verify that cleaning and adjusting are complete.
 - 4. Disconnect fan drive from motor, verify proper motor rotation direction, and verify fan wheel free rotation and smooth bearing operation. Reconnect fan drive system, align and adjust belts, and install belt guards.
 - 5. Adjust belt tension.
 - 6. Verify lubrication for bearings and other moving parts.
 - 7. Verify that manual and automatic volume control and fire and smoke dampers in connected ductwork systems are in fully open position.
 - 8. Disable automatic temperature-control operators, energize motor and adjust fan to indicated rpm, and measure and record motor voltage and amperage.
 - 9. Shut unit down and reconnect automatic temperature-control operators.
 - 10. Remove and replace malfunctioning units and retest as specified above.
- C. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.
- D. Prepare test and inspection reports.

3.06 ADJUSTING

- E. Adjust damper linkages for proper damper operation.
- F. Lubricate bearings.
- G. Comply with requirements in Section 230593 "Testing, Adjusting, and Balancing for HVAC."

END OF SECTION 23 34 23

SECTION 23 81 26

SPLIT SYSTEM AIR CONDITIONER

PART 1 - GENERAL

1.01 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.

1.02 SUMMARY

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

1.03 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. Field quality-control reports.
- D. Operation and Maintenance Data: For split-system air-conditioning units to include in emergency, operation, and maintenance manuals.
- E. Warranty: Sample of special warranty.

1.04 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."
 2. ASHRAE Compliance: Applicable requirements in ASHRAE 62.1-2004, Section 4 - "Outdoor Air Quality," Section 5 - "Systems and Equipment," Section 6 - "Procedures," and Section 7 - "Construction and System Start-Up."
- C. ASHRAE/IESNA Compliance: Applicable requirements in ASHRAE/IESNA 90.1.
- D. The units shall be tested by a Nationally Recognized Testing Laboratory (NRTL) and shall bear the ETL label.
- E. All wiring shall be in accordance with the National Electrical Code (N.E.C.) and local codes as required.
- F. The units shall be rated in accordance with Air-conditioning, Heating, and Refrigeration Institute's (AHRI) Standard 210/240 and bear the ARI Certification label.

1.05 COORDINATION

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

1.06 DELIVERY, STORAGE AND HANDLING

- A. Unit shall be stored and handled according to the manufacturer's recommendations.
- B. The controller shall be shipped separately and shall be able to withstand 105°F storage temperatures and 95% relative humidity without adverse effect.

1.07 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 Units: one (1) year from date of substantial completion.
 - b. For Compressor Five (5) years from date of Substantial Completion.

1.08 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. Filters: One (1) set for indoor unit.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
1. Trane/Mitsubishi Electric & Electronics USA, Inc.; HVAC Advanced Products Division.
 2. Daikin AC
 3. Carrier Corporation; Home Comfort and HVAC Building & Industrial Systems.

2.02 DESCRIPTION

- A. The Heat Pump system shall have a Variable Speed Inverter Compressor technology.
- B. The system shall consist of a horizontal discharge, single phase outdoor unit, a matched capacity indoor section that shall be equipped with a wired wall-mounted controller.

2.03 INDOOR UNIT: WALL MOUNTED TYPE:

- A. General:
1. The wall-mounted indoor unit shall be factory assembled, wired and run tested. Contained within the unit shall be all factory wiring, piping, control circuit board and fan motor. The unit shall have a self-diagnostic function, 3-minute time delay mechanism, an auto restart function, and a test run switch. Indoor unit and refrigerant pipes shall be charged with dehydrated air before shipment from the factory.
- B. Cabinet:
1. All casings, regardless of model size, shall have the same white finish
 2. Multi directional drain and refrigerant piping offering four (4) directions for refrigerant piping and two (2) directions for draining are required.
 3. There shall be a separate back plate which secures the unit firmly to the wall.
- C. Fan
1. The indoor fan shall be statically and dynamically balanced to run on a single motor with permanently lubricated bearings.
 2. A manual adjustable guide vane shall be provided with the ability to change the airflow from side to side (left to right).
 3. A motorized air sweep louver shall provide an automatic change in airflow by directing the air up and down to provide uniform air distribution.
- D. Filter:
1. Return air shall be filtered by means of an easily removable, washable filter.
- E. Coil:

1. The indoor coil shall be of nonferrous construction with smooth plate fins on copper tubing. The tubing shall have inner grooves for high efficiency heat exchange. All tube joints shall be brazed with phos-copper or silver alloy.
2. The coils shall be pressure tested at the factory.

F. Electrical:

1. The power to the indoor unit shall be supplied from the outdoor unit. A three (3) conductor AWG-14/16 wire with ground shall provide power feed and bi-directional control transmission between the outdoor and indoor units.

2.04 INDOOR UNIT: CEILING SUSPENDED TYPE:

A. General:

1. The indoor unit shall be factory assembled, wired and run tested. Contained within the unit shall be all factory wiring, piping, electronic modulating linear expansion device, control circuit board and fan motor. The unit shall have a self-diagnostic function, 3-minute time delay mechanism, an auto restart function, and a test run switch. The unit shall have an auto-swing function for the horizontal vane. Indoor unit and refrigerant pipes shall be charged with dehydrated air before shipment from the factory.

B. Cabinet

1. The casing shall have a white finish.

C. Fan

1. The indoor unit fan shall be an assembly with two, three, or four Sirocco fan(s) direct driven by a single motor.
2. The indoor fan shall be statically and dynamically balanced to run on a motor with permanently lubricated bearings.
3. An integral, motorized, multi-position, horizontal air sweep flow louver shall provide for uniform air distribution, up and down from the upper air outlet. Five (5) positions plus Auto and Swing shall be provided, controlled from the remote controller.
4. The indoor unit shall include an AUTO fan setting capable of maximizing energy efficiency by adjusting the fan speed based on the difference between controller set-point and space temperature. The indoor fan shall be capable of five (5) speed settings, Low, Med1, Med2, High and Auto.

D. Filter

1. Return air shall be filtered by means of an easily removable, washable filter.

E. Coil

1. The indoor coil shall be of nonferrous construction with smooth plate fins on copper tubing. The tubing shall have inner grooves for high efficiency heat exchange. All tube joints shall be brazed with phos-copper or silver alloy.
2. The coils shall be pressure tested at the factory.

F. Electrical

1. The unit electrical power shall be 208/230 volts, 1 phase, 60 hertz.

2. The system shall be equipped with A-Control – a system directing that the indoor unit be powered directly from the outdoor unit using a 3-wire, 14 gauge AWG connections plus ground.

G. Controls

1. Control board shall include contacts for control of external heat source. External heat may be energized as second stage when the space temperature is 1.8°F from set point.
2. The drain pan sensor shall provide protection against drain pan overflow by sensing a high condensate level in the drain pan.

2.05 OUTDOOR UNITS

A. General

1. The outdoor unit shall be equipped with an electronic control board that interfaces with the indoor unit to perform all necessary operation functions.
2. The outdoor unit shall be provided with a manufacturer supplied 20 gauge hot dipped galvanized wind baffle. The wind baffle shall allow for continuous cooling to 0°F without any additional modifications to the unit.
3. The outdoor unit shall be able to operate with a maximum height difference of 100 feet between indoor and outdoor units.
4. The outdoor unit shall be completely factory assembled, piped, and wired. Each unit must be test run at the factory.

B. Cabinet

1. The casing shall be constructed from galvanized steel plate, finished with an electrostatically applied, thermally fused acrylic or polyester powder coating for corrosion protection and have a factory standard finish. Assembly hardware shall be cadmium plated for weather resistance.
2. Mounting feet shall be provided and shall be welded to the base of the cabinet and be of sufficient size to afford reliable equipment mount and stability.
3. Easy access shall be afforded to all serviceable parts by means of removable panel sections.
4. The fan grill shall be of ABS plastic.
5. Cabinet mounting and construction shall be sufficient to withstand 155 MPH wind speed conditions.

C. Fan

1. 2 and 2.5 ton units shall be furnished with a single direct drive propeller type fan. 3, 3.5 ton units shall be furnished with a two (2) direct drive propeller type fans.
2. The fan blade(s) shall be of aerodynamic design for quiet operation, and the fan motor bearings shall be permanently lubricated.
3. The outdoor unit shall have horizontal discharge airflow. The fan shall be mounted in front of the coil, pulling air across it from the rear and dispelling it through the front. The fan shall be provided with a raised guard to prevent external contact with moving parts.

D. Coil

1. The condenser coil shall be of copper tubing with flat aluminum fins to reduce debris build up and allow maximum airflow. The coil shall be protected with an integral metal guard.

2. Refrigerant flow from the condenser shall be controlled by means of an electronic linear expansion valve (LEV) metering device. The LEV shall be control by a microprocessor controlled step motor.
3. All refrigerant lines between outdoor and indoor units shall be of annealed, refrigeration grade copper tubing, ACR Type, meeting ASTM B280 requirements, individually insulated in twin-tube, flexible, closed-cell, CFC-free (ozone depletion potential of zero), elastomeric material for the insulation of refrigerant pipes and tubes with thermal conductivity equal to or better than 0.27 BTU-inch/hour per Sq Ft / °F, a water vapor transmission equal to or better than 0.08 Perm-inch and superior fire ratings such that insulation will not contribute significantly to fire and up to 1" thick insulation shall have a - Flame-Spread Index of less than 25 and a Smoke-development Index of less than 50 as tested by ASTM E 84 and CAN / ULC S-102.
4. All refrigerant connections between outdoor and indoor units shall be flare type.

E. Compressor:

1. The compressor shall be a DC twin-rotor rotary compressor with Variable Speed Inverter Drive Technology.
2. The compressor shall be driven by inverter circuit to control compressor speed. The compressor speed shall dynamically vary to match the room load for significantly increasing the efficiency of the system which shall result in significant energy savings.
3. To prevent liquid from accumulating in the compressor during the off cycle, a minimal amount of current shall be automatically, intermittently applied to the compressor motor windings to maintain sufficient heat to vaporize any refrigerant. No crankcase heater is to be used.
4. The outdoor unit shall have an accumulator and high pressure safety switch.
5. The compressor shall be mounted to avoid the transmission of vibration.

F. Electrical

1. Power for the indoor unit shall be supplied from the outdoor unit using three (3) fourteen (14/16) gauge AWG conductors plus ground wire connecting the units.
2. The outdoor unit shall be controlled by the microprocessor located in the indoor unit.
3. The control signal between the indoor unit and the outdoor unit shall be pulse signal 24 volts DC.
4. The unit shall have Pulse Amplitude Modulation circuit to utilize 98% of input power supply.

2.06 SYSTEM CONTROL

A. System Control:

1. The control system shall consist of a minimum of two (2) microprocessors, one on each indoor and outdoor unit, interconnected by a single non-polar two-wire cable. The microprocessor located in the indoor unit shall have the capability of monitoring return air temperature and indoor coil temperature, receiving and processing commands from a wireless or wired controller, providing emergency operation and controlling the outdoor unit. The control signal between the indoor and outdoor unit shall be pulse signal 24 volts DC.

2. A three (3) conductor 14 gauge AWG wire with ground shall provide power feed and bi-directional control transmission between the outdoor and indoor units.
3. Provide 3-Pole Disconnect s to interrupt all three conductors.
4. The system shall be capable of automatic restart when power is restored after power interruption. The system shall have self-diagnostics ability, including total hours of compressor run time. Diagnostics codes for indoor and outdoor units shall be displayed on the wired controller panel.

B. Wired Wall mounted Controller

1. The Wired MA Remote Controller shall be capable of controlling up to 16 indoor units

C. The microprocessor located in the indoor unit shall have the capability of sensing return air temperature and indoor coil temperature, receiving and processing commands from the wired controller, providing emergency operation and controlling the outdoor unit.

2.07 ACCESSORIES

A. Refrigerant Line Sweat Adapter Kit

1. Provide a sweat adapter kit to permit field brazing of refrigerant line connections.

2.08 CAPACITIES AND CHARACTERISTICS

A. Cooling Capacity: See Schedule.

PART 3 - EXECUTION

3.01 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 roof-mounted, compressor-condenser components on equipment supports specified in Division 07 Section "Roof Accessories." Anchor units to supports with removable, cadmium-plated fasteners.
- D. Install seismic restraints.
- E. Install compressor-condenser components on restrained isolators. See Division 23 Section "Vibration and Seismic Controls for HVAC Piping and Equipment."
- F. Install and connect precharged refrigerant tubing to component's quick-connect fittings. Install tubing to allow access to unit.

3.02 CONNECTIONS

- A. Piping installation requirements are specified in other Division 23 Sections. Drawings indicate general arrangement of piping, fittings, and specialties.
- B. Connect refrigerant piping to indoor and outdoor units.
- C. Where piping is installed adjacent to unit, allow space for service and maintenance of unit.
- D. Install condensate drains to nearest suitable floor or deck drain.

3.03 FIELD QUALITY CONTROL

- A. 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.
- B. 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.
- C. Remove and replace malfunctioning units and retest as specified above.
- D. Prepare test and inspection reports.

3.04 STARTUP SERVICE

- A. Engage a factory-authorized service representative to perform startup service.
 - 1. Complete installation and startup checks according to manufacturer's written instructions.

3.05 DEMONSTRATION

- A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain units.

END OF SECTION 23 81 26

SECTION 23 82 39.13

CABINET UNIT HEATERS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section includes cabinet unit heaters with centrifugal fans and electric-resistance heating coils.

1.3 DEFINITIONS

- A. CWP: Cold working pressure.
- B. DDC: Direct digital control.
- C. PTFE: Polytetrafluoroethylene plastic.
- D. TFE: Tetrafluoroethylene plastic.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product.
 - 1. Include rated capacities, operating characteristics, furnished specialties, and accessories.
- B. HPB Submittals:
 - 1. Product Data: For ventilation equipment, indicating compliance with ASHRAE 62.1, Section 5 - "Systems and Equipment."
- C. Shop Drawings:
 - 1. Include plans, elevations, sections, and details.
 - 2. Include details of equipment assemblies. Indicate dimensions, weights, loads, required clearances, method of field assembly, components, and location and size of each field connection.
 - 3. Include location and size of each field connection.
 - 4. Include details of anchorages and attachments to structure and to supported equipment.
 - 5. Include equipment schedules to indicate rated capacities, operating characteristics, furnished specialties, and accessories.

6. Indicate location and arrangement of piping valves and specialties.
7. Indicate location and arrangement of integral controls.
8. Wiring Diagrams: Power, signal, and control wiring.

D. Samples for Initial Selection: Finish colors for units with factory-applied color finishes.

1.5 INFORMATIONAL SUBMITTALS

- A. Coordination Drawings: Floor plans, reflected ceiling plans, 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. Suspended ceiling components.
 2. Structural members to which cabinet unit heaters will be attached.
 3. Method of attaching hangers to building structure.
 4. Size and location of initial access modules for acoustical tile.
 5. Perimeter moldings for exposed or partially exposed cabinets.
- B. Field quality-control reports.

1.6 CLOSEOUT SUBMITTALS

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

1.7 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish extra materials described below that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
 1. Cabinet Unit-Heater Filters: Furnish one(1) spare filter for each filter installed.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Electric Cabinet Unit Heater
 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Indeeco
 - b. QMark

2.2 DESCRIPTION:

- A. A factory-assembled and -tested unit complying with ARI 440.
- B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- C. Comply with UL 2021.

2.3 PERFORMANCE REQUIREMENTS

- A. ASHRAE Compliance: Applicable requirements in ASHRAE 62.1, Section 5 - "Systems and Equipment" and Section 7 - "Construction and Startup."
- B. ASHRAE/IESNA 90.1 Compliance: Applicable requirements in ASHRAE/IESNA 90.1, Section 6 - "Heating, Ventilating, and Air-Conditioning."
- C. Seismic Performance: Cabinet unit heaters shall withstand the effects of earthquake motions determined according to ASCE/SEI 7.
 - 1. The term "withstand" means "the unit will remain in place without separation of any parts when subjected to the seismic forces specified and the unit will be fully operational after the seismic event."

2.4 CABINETS

- A. Material: Steel with baked-enamel finish with manufacturer's standard paint, in color selected by Architect.
 - 1. Wall models shall have cabinets with stamped louvers. The entire bottom of unit must be enclosed. Access to controls shall be through the easy 16-gauge front panels.
 - 2. Two(2) 9-inch wide cabinet end pockets for piping and electrical wiring.
 - 3. Sound dampening insulation on all front panels.
 - 4. Access Door: Tilt type for floor models. Safety hinged access panels for wall and ceiling models.
 - 5. False Back: Minimum 16- gauge sheet steel, finished to match cabinet.

2.5 FILTERS

- A. Filters: Minimum arrestance according to ASHRAE 52.1 and a minimum efficiency reporting value (MERV) according to ASHRAE 52.2.
 - 1. Pleated: 90 percent arrestance and 7 MERV.

2.6 COILS

- A. Electric-Resistance Heating Coil: Nickel-chromium heating wire, free from expansion noise and hum, mounted in ceramic inserts in galvanized-steel housing; with fuses in terminal box for

overcurrent protection and limit controls for high-temperature protection. Terminate elements in stainless-steel machine-staked terminals secured with stainless-steel hardware.

2.7 CONTROLS

A. Fan and Motor Board: Removable.

1. Fan: Forward curved, high static, double width, centrifugal; directly connected to motor. Thermoplastic or painted-steel wheels, and aluminum, painted-steel, or galvanized-steel fan scrolls.
2. Motor: Permanently lubricated, multispeed; resiliently mounted on motor board. Comply with requirements in Division 23 Section "Common Motor Requirements for HVAC Equipment."
3. Wiring Terminations: Connect motor to chassis wiring with plug connection.

B. Control devices and operational sequences are specified in Division 23 Sections "Instrumentation and Control for HVAC" and "Sequence of Operations for HVAC Controls."

C. Basic Unit Controls:

1. Control voltage transformer.
2. Unit-mounted thermostat with the following features:
 - a. Heat-off switch.
 - b. Fan on-auto switch.
 - c. Manual fan-speed switch.
 - d. Adjustable deadband.
 - e. Concealed set point.
 - f. Concealed] indication.
 - g. Deg F indication.
3. Heating-Coil Operations:
 - a. Electric Resistance Coil:
 - 1) Occupied Periods: Start fan and energize electric-resistance coil to provide heating if room temperature falls below thermostat set point.
 - 2) Unoccupied Periods: Start fan and energize electric-resistance coil if room temperature falls below setback temperature.

D. Electrical Connection: Factory wire motors and controls for a single field connection.

E. Capacities and Characteristics: Refer to Schedule.

PART 3 - EXECUTION

3.1 EXAMINATION

- ### A. Examine areas to receive cabinet unit heaters for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

- B. Examine roughing-in for piping and electrical connections to verify actual locations before unit-heater installation.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Install wall boxes in finished wall assembly; seal and weatherproof. Joint-sealant materials and applications are specified in Section 079200 "Joint Sealants."
- B. Install cabinet unit heaters to comply with NFPA 90A.
- C. Install wall-mounted thermostats and switch controls in electrical outlet boxes at heights to match lighting controls. Verify location of thermostats and other exposed control sensors with Drawings and room details before installation.
- D. Install new filters in each fan-coil unit within two weeks of Substantial Completion.

3.3 CONNECTIONS

- A. Comply with safety requirements in UL 1995.
- B. Ground equipment according to Section 260526 "Grounding and Bonding for Electrical Systems."
- C. Connect wiring according to Section 260519 "Low-Voltage Electrical Power Conductors and Cables."

3.4 FIELD QUALITY CONTROL

- A. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect, test, and adjust field-assembled components and equipment installation, including connections, and to assist in field testing. Report results in writing.
- B. Perform the following tests and inspections and prepare test reports:
 - 1. Operational Test: After electrical circuitry has been energized, start units to confirm proper motor rotation and unit operation.
 - 2. Operate electric heating elements through each stage to verify proper operation and electrical connections.
 - 3. Test and adjust controls and safety devices. Replace damaged and malfunctioning controls and equipment.
- C. Units will be considered defective if they do not pass tests and inspections.
- D. Remove and replace malfunctioning units and retest as specified above.

3.5 ADJUSTING

- A. Adjust initial temperature set points.
- B. Occupancy Adjustments: When requested within 12 months of date of Substantial Completion, provide on-site assistance in adjusting system to suit actual occupied conditions. Provide up to two visits to Project during other-than-normal occupancy hours for this purpose.

3.6 DEMONSTRATION

- A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain cabinet unit heaters.

END OF SECTION 23 82 39.13

SECTION 23 82 39

UNIT HEATERS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section includes wall unit heaters with propeller fans.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
 - 1. Include rated capacities, operating characteristics, furnished specialties, and accessories.
- B. Shop Drawings:
 - 1. Include plans, elevations, sections, and details.
 - 2. Include details of equipment assemblies. Indicate dimensions, weights, loads, required clearances, method of field assembly, components, and location and size of each field connection.
 - 3. Include details of anchorages and attachments to structure and to supported equipment.
 - 4. Include equipment schedules to indicate rated capacities, operating characteristics, furnished specialties, and accessories.
 - 5. Wiring Diagrams: Power, signal, and control wiring.
- C. Samples: For each exposed product and for each color and texture specified.

1.4 CLOSEOUT SUBMITTALS

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

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 indicated on Drawings or comparable product by one of the following:
 - 1. QMark
 - 2. Marley Engineered Products.
 - 3. Indeeco.

2.2 DESCRIPTION

- A. Assembly including chassis, electric heating coil, fan, motor, and controls. Comply with UL 2021.
- 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.

2.3 CABINET

- A. Front Panel: Stamped-steel louver, with removable panels fastened with tamperproof fasteners.
- B. Finish: Baked enamel over baked-on primer with manufacturer's standard color selected by Architect, applied to factory-assembled and -tested wall and ceiling heaters before shipping.
- C. Airstream Surfaces: Surfaces in contact with the airstream shall comply with requirements in ASHRAE 62.1.
- D. Surface-Mounted Cabinet Enclosure: Steel with finish to match cabinet.

2.4 COIL

- A. Electric-Resistance Heating Coil: Nickel-chromium heating wire, free from expansion noise and 60-Hz hum, embedded in magnesium oxide refractory and sealed in corrosion-resistant metallic sheath. Terminate elements in stainless-steel, machine-staked terminals secured with stainless-steel hardware, and limit controls for high-temperature protection. Provide integral circuit breaker for overcurrent protection.

2.5 FAN AND MOTOR

- A. Fan: Aluminum propeller directly connected to motor.

- B. Motor: Permanently lubricated. Comply with requirements in Section 230513 "Common Motor Requirements for HVAC Equipment."

2.6 CONTROLS

- A. Controls: Unit-mounted thermostat. Low-voltage relay with transformer kit.
- B. Electrical Connection: Factory wire motors and controls for a single field connection with disconnect switch.

2.7 CAPACITIES AND CHARACTERISTICS

- A. See schedule on drawings.

PART 3 - EXECUTION

3.1 EXAMINATION

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

3.2 INSTALLATION

- A. Install heaters to comply with NFPA 90A.
- B. Install unit heaters level and plumb.
- C. Install wall-mounted thermostats and switch controls in electrical outlet boxes at heights to match lighting controls. Verify location of thermostats and other exposed control sensors with Drawings and room details before installation.
- D. Ground equipment according to Section 26 05 26 "Grounding and Bonding for Electrical Systems."
- E. Connect wiring according to Section 26 05 19 "Low-Voltage Electrical Power Conductors and Cables."

END OF SECTION 23 82 39

DIVISION 26

ELECTRICAL

SECTION 26 05 00

COMMON WORK RESULTS FOR ELECTRICAL

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section Includes:

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

1.3 DEFINITIONS

- A. EPDM: Ethylene-propylene-diene terpolymer rubber.
- B. NBR: Acrylonitrile-butadiene rubber.

1.4 SUBMITTALS

- A. Product Data: For sleeve seals.

1.5 COORDINATION

- A. Coordinate arrangement, mounting, and support of electrical equipment:
 1. To allow maximum possible headroom unless specific mounting heights that reduce headroom are indicated.
 2. To provide for ease of disconnecting the equipment with minimum interference to other installations.
 3. To allow right of way for piping and conduit installed at required slope.
 4. So connecting raceways, cables, wireways, cable trays, and busways will be clear of obstructions and of the working and access space of other equipment.

- B. Coordinate installation of required supporting devices and set sleeves in cast-in-place concrete, masonry walls, and other structural components as they are constructed.
- C. Coordinate sleeve selection and application with selection and application of firestopping specified in Division 07 Section "Penetration Firestopping."

1.6 REGULATORY REQUIREMENTS

- A. Conform to applicable provisions of the 2018 Connecticut State Building Code which include the following:
 - 1. International Building Code/2015.
 - 2. National Electric Code/2017 of the National Fire Protection Association (NFPA 70/2017).
 - 3. International Energy Conservation Code/2015 with Connecticut Amendments.
 - 4. Amendments, alterations, deletions and additions of certain provisions to the above as indicated in the Connecticut Amendments.
- B. Conform to applicable provisions of the 2018 Connecticut State Fire Safety Code which include the following:
 - 1. International Fire Code/2015.
 - 2. Code for Safety to Life from Fire in Buildings, National Fire Protection Association, Inc., Standard 101 (NFPA 101), 2015 Edition.
 - 3. Amendments, alterations, deletions and additions of certain provisions to the above as indicated in the Connecticut Amendments.
- C. Conform to applicable State of Connecticut requirements.
- D. Conform to applicable City of New Haven requirements.
- E. Conform to applicable New Haven Parking Authority requirements.
- F. Obtain and pay for permits and inspections from authorities having jurisdiction.

1.7 WARRANTY

- A. Contractor shall provide a One (1) Year Labor & Material Warranty that all materials and equipment furnished shall be new and of good quality, free from faults and defects and in conformance with the Contract Documents. Any defects due to faulty workmanship or materials which appear during the first year shall be corrected by the subcontractor at no additional cost to the Owner.
- B. For all major pieces of equipment, the Warranty will commence after the equipment has been put into permanent operating mode, equipment and components have been accepted by the Engineer, and the Operating & Maintenance Manuals have been submitted and approved.
- C. Submit written warranties covering work specified in Division 26.
- D. Refer to individual sections for special warranty requirements.

PART 2 - PRODUCTS

2.1 SLEEVES FOR RACEWAYS AND CABLES

- A. Steel Pipe Sleeves: ASTM A 53/A 53M, Type E, Grade B, Schedule 40, galvanized steel, plain ends.
- B. Cast-Iron Pipe Sleeves: Cast or fabricated "wall pipe," equivalent to ductile-iron pressure pipe, with plain ends and integral waterstop, unless otherwise indicated.
- C. Non-Metallic Sleeves: Schedule 40 PVC sleeves, with waterproof sealant, shall be used for all concrete penetrations of non-rated floors.
- D. Sleeves for Rectangular Openings: Galvanized sheet steel.
 - 1. Minimum Metal Thickness:
 - a. For sleeve cross-section rectangle perimeter less than 50 inches and no side more than 16 inches, thickness shall be 0.052 inch.
 - b. For sleeve cross-section rectangle perimeter equal to, or more than, 50 inches and 1 or more sides equal to, or more than, 16 inches, thickness shall be 0.138 inch.

2.2 SLEEVE SEALS

- A. Description: Modular sealing device, designed for field assembly, to fill annular space between sleeve and raceway or cable.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following into the Work include, but are not limited to, the following:
 - 2. Basis-of-Design Product: Subject to compliance with requirements, provide product indicated on Drawings or comparable product by one of the following:
 - a. Advance Products & Systems, Inc.
 - b. Calpico, Inc.
 - c. Metraflex Co.
 - d. Pipeline Seal and Insulator, Inc.
 - 3. Sealing Elements: EPDM or NBR interlocking links shaped to fit surface of cable or conduit. Include type and number required for material and size of raceway or cable.
 - 4. Pressure Plates: Plastic, Carbon steel, Stainless steel. Include two for each sealing element.
 - 5. Connecting Bolts and Nuts: Carbon steel with corrosion-resistant coating, of length required to secure pressure plates to sealing elements. Include one for each sealing element.

2.3 GROUT

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

PART 3 - EXECUTION

3.1 COMMON REQUIREMENTS FOR ELECTRICAL INSTALLATION

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

3.2 SLEEVE INSTALLATION FOR ELECTRICAL PENETRATIONS

- A. Electrical penetrations occur when raceways, cables, wireways, cable trays, or busways penetrate concrete slabs, concrete or masonry walls, or fire-rated floor and wall assemblies.
- B. Concrete Slabs and Walls: Install sleeves for penetrations unless core-drilled holes or formed openings are used. Install sleeves during erection of slabs and walls.
- C. Use pipe sleeves unless penetration arrangement requires rectangular sleeved opening.
- D. Fire-Rated Assemblies: Install sleeves for penetrations of fire-rated floor and wall assemblies unless openings compatible with firestop system used are fabricated during construction of floor or wall.
- E. Cut sleeves to length for mounting flush with both surfaces of walls.
- F. Extend sleeves installed in floors 2 inches above finished floor level.
- G. Size pipe sleeves to provide 1/2-inch annular clear space between sleeve and raceway or cable, unless indicated otherwise.
- H. Seal space outside of sleeves with grout for penetrations of concrete and masonry

1. Promptly pack grout solidly between sleeve and wall so no voids remain. Tool exposed surfaces smooth; protect grout while curing.
- I. Interior Penetrations of Non-Fire-Rated Walls and Floors: Seal annular space between sleeve and raceway or cable, using joint sealant appropriate for size, depth, and location of joint. Comply with requirements in Division 07 Section "Joint Sealants".
- J. Fire-Rated-Assembly Penetrations: Maintain indicated fire rating of walls, partitions, ceilings, and floors at raceway and cable penetrations. Install sleeves and seal raceway and cable penetration sleeves with firestop materials. Comply with requirements in Division 07 Section "Penetration Firestopping".
- K. Roof-Penetration Sleeves: Seal penetration of individual raceways and cables with flexible boot-type flashing units applied in coordination with roofing work.
- L. Aboveground, Exterior-Wall Penetrations: Seal penetrations using steel pipe sleeves and mechanical sleeve seals. Select sleeve size to allow for 1-inch annular clear space between pipe and sleeve for installing mechanical sleeve seals.
- M. Underground, Exterior-Wall Penetrations: Install cast-iron pipe sleeves. Size sleeves to allow for 1-inch annular clear space between raceway or cable and sleeve for installing mechanical sleeve seals.

3.3 SLEEVE-SEAL INSTALLATION

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

3.4 FIRESTOPPING

- A. Apply firestopping to penetrations of fire-rated floor and wall assemblies for electrical installations to restore original fire-resistance rating of assembly. Firestopping materials and installation requirements are specified in Division 07 Section "Penetration Firestopping."

END OF SECTION 260500

SECTION 26 05 26

GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section Includes: Grounding systems and equipment.
- B. Section includes grounding systems and equipment, plus the following special applications:
 - 1. Underground distribution grounding.
 - 2. Ground bonding common with lightning protection system.

1.3 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Field quality-control reports.
- C. Operation and Maintenance Data: For grounding to include in emergency, operation, and maintenance manuals. In addition to items specified in Division 01 Section "Operation and Maintenance Data," include the following:
 - 1. Instructions for periodic testing and inspection of grounding features at test wells, ground rings, and grounding connections for separately derived systems based on NETA MTS and NFPA 70B.
 - a. Tests shall determine if ground-resistance or impedance values remain within specified maximums, and instructions shall recommend corrective action if values do not.
 - b. Include recommended testing intervals.

1.4 QUALITY ASSURANCE

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

- B. Comply with UL 467 for grounding and bonding materials and equipment.

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 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 wide and 1/16 inch thick.
 - 7. Tinned Bonding Jumper: Tinned-copper tape, braided conductors terminated with copper ferrules; 1-5/8 inches wide and 1/16 inch thick.

2.2 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. Water Heater, Heat-Tracing, and Antifrost Heating Cables: Install a separate insulated equipment grounding conductor to each electric water heater and heat-tracing cable. Bond conductor to heater units, piping, connected equipment, and components.
- 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.
 2. Service and Central Equipment Locations and Wiring Closets: Terminate grounding conductor on a 1/4-by-4-by-12-inch grounding bus.
 3. Terminal Cabinets: Terminate grounding conductor on cabinet grounding terminal.
- D. Metal and Wood Poles Supporting Outdoor Lighting Fixtures: Install grounding electrode and a separate insulated equipment grounding conductor in addition to grounding conductor installed with branch-circuit conductors.

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. Ground Bonding Common with Lightning Protection System: Comply with NFPA 780 and UL 96 when interconnecting with lightning protection system. Bond electrical power system ground directly to lightning protection system grounding conductor at closest point to electrical service grounding electrode. Use bonding conductor sized same as system grounding electrode conductor, and install in conduit.
- C. 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.

D. Grounding and Bonding for Piping:

1. Metal Water Service Pipe: Install insulated copper grounding conductors, in conduit, from building's main service equipment, or grounding bus, to main metal water service entrances to building. Connect grounding conductors to main metal water service pipes; use a bolted clamp connector or bolt a lug-type connector to a pipe flange by using one of the lug bolts of the flange. Where a dielectric main water fitting is installed, connect grounding conductor on street side of fitting. Bond metal grounding conductor conduit or sleeve to conductor at each end.
2. Water Meter Piping: Use braided-type bonding jumpers to electrically bypass water meters. Connect to pipe with a bolted connector.
3. Bond each aboveground portion of gas piping system downstream from equipment shutoff valve.

E. Under Ground (Concrete-Encased Grounding Electrode): Fabricate according to NFPA 70; use a minimum of 20 feet of bare copper conductor not smaller than No. 4 AWG.

1. If concrete foundation is less than 20 feet long, coil excess conductor within base of foundation.
2. Bond grounding conductor to reinforcing steel in at least four locations and to anchor bolts. Extend grounding conductor below grade and connect to building's grounding grid or to grounding electrode external to concrete.

3.4 LABELING

- A. Comply with requirements in Division 26 Section "Identification for Electrical Systems" Article 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. 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.
- B. Tests and Inspections:
1. After installing grounding system but before permanent electrical circuits have been energized, test for compliance with requirements.

2. Inspect physical and mechanical condition. Verify tightness of accessible, bolted, electrical connections with a calibrated torque wrench according to manufacturer's written instructions.
 3. Test completed grounding system at each location where a maximum ground-resistance level is specified, at service disconnect enclosure grounding terminal, at ground test wells, and at individual ground rods. Make tests at ground rods before any conductors are connected.
 - a. Measure ground resistance no fewer than two full days after last trace of precipitation and without soil being moistened by any means other than natural drainage or seepage and without chemical treatment or other artificial means of reducing natural ground resistance.
 - b. Perform tests by fall-of-potential method according to IEEE 81.
 4. Prepare dimensioned Drawings locating each test well, ground rod and ground-rod assembly, and other grounding electrodes. Identify each by letter in alphabetical order, and key to the record of tests and observations. Include the number of rods driven and their depth at each location, and include observations of weather and other phenomena that may affect test results. Describe measures taken to improve test results.
- C. Grounding system will be considered defective if it does not pass tests and inspections.
- D. Prepare test and inspection reports.
- E. Report measured ground resistances that exceed the following values:
1. Power and Lighting Equipment or System with Capacity of 500 kVA and Less: 10 ohms.
 2. Power and Lighting Equipment or System with Capacity of 500 to 1000 kVA: 5 ohms.
 3. Power and Lighting Equipment or System with Capacity More Than 1000 kVA: 3 ohms.
 4. Power Distribution Units or Panelboards Serving Electronic Equipment: 1 ohm(s).
 5. Substations and Pad-Mounted Equipment: 5 ohms.
 6. Manhole Grounds: 10 ohms.
- F. Excessive Ground Resistance: If resistance to ground exceeds specified values, notify Architect promptly and include recommendations to reduce ground resistance.

END OF SECTION 26 05 26

SECTION 26 05 29

HANGERS AND SUPPORTS FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes the following:
 - 1. Hangers and supports for electrical equipment and systems.
- B. Related Sections include the following:
 - 1. Division 26 Section "Vibration and Seismic Controls for Electrical Systems" for products and installation requirements necessary for compliance with seismic criteria.

1.3 DEFINITIONS

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

1.4 PERFORMANCE REQUIREMENTS

- A. Delegated Design: Design supports for multiple raceways using performance requirements and design criteria indicated.
- B. Design supports for multiple raceways capable of supporting combined weight of supported systems and its contents.
- C. Design equipment supports capable of supporting combined operating weight of supported equipment and connected systems and components.
- D. Rated Strength: Adequate in tension, shear, and pullout force to resist maximum loads calculated or imposed for this Project, with a minimum structural safety factor of five times the applied force.

1.5 SUBMITTALS

- A. Product Data: For the following:
 - 1. Steel slotted support systems.
 - 2. Nonmetallic slotted support systems.
- B. Shop Drawings: Show fabrication and installation details and include calculations for the following:
 - 1. Trapeze hangers. Include Product Data for components.
 - 2. Steel slotted channel systems. Include Product Data for components.
 - 3. Nonmetallic slotted channel systems. Include Product Data for components.
 - 4. Equipment supports.
- C. Welding certificates.

1.6 QUALITY ASSURANCE

- A. Welding: Qualify procedures and personnel according to AWS D1.1/D1.1M, "Structural Welding Code - Steel."
- B. Comply with NFPA 70.

1.7 COORDINATION

- A. Coordinate size and location of concrete bases. Cast anchor-bolt inserts into bases. Concrete, reinforcement, and formwork requirements are specified in Division 03.
- B. Coordinate installation of roof curbs, equipment supports, and roof penetrations. These items are specified in Division 07 Section "Roof Accessories."

PART 2 - PRODUCTS

2.1 SUPPORT, ANCHORAGE, AND ATTACHMENT COMPONENTS

- A. Steel Slotted Support Systems: Comply with MFMA-4, factory-fabricated components for field assembly.
 - 1. 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:
 - a. Allied Tube & Conduit.
 - b. Cooper B-Line, Inc.; a division of Cooper Industries.
 - c. ERICO International Corporation.
 - d. GS Metals Corp.

- e. Thomas & Betts Corporation.
 - f. Unistrut; Tyco International, Ltd.
 - g. Wesanco, Inc.
 - 2. Metallic Coatings: Hot-dip galvanized after fabrication and applied according to MFMA-4.
 - 3. Nonmetallic Coatings: Manufacturer's standard PVC, polyurethane, or polyester coating applied according to MFMA-4.
 - 4. Painted Coatings: Manufacturer's standard painted coating applied according to MFMA-4.
 - 5. Channel Dimensions: Selected for applicable load criteria.
- B. Nonmetallic Slotted Support Systems: Structural-grade, factory-formed, glass-fiber-resin channels and angles with 9/16-inch diameter holes at a maximum of 8 inches o.c., in at least 1 surface.
- 1. 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:
 - a. Allied Tube & Conduit.
 - b. Cooper B-Line, Inc.; a division of Cooper Industries.
 - c. Fabco Plastics Wholesale Limited.
 - d. Seasafe, Inc.
 - 2. Fittings and Accessories: Products of channel and angle manufacturer and designed for use with those items.
 - 3. Fitting and Accessory Materials: Same as channels and angles, except metal items may be stainless steel.
 - 4. Rated Strength: Selected to suit applicable load criteria.
- C. Raceway and Cable Supports: As described in NECA 1 and NECA 101.
- D. Conduit and Cable Support Devices: Steel and malleable-iron hangers, clamps, and associated fittings, designed for types and sizes of raceway or cable to be supported. Use only malleable-iron clamps with clamp backs in all Garage areas.
- E. Support for Conductors in Vertical Conduit: Factory-fabricated assembly consisting of threaded body and insulating wedging plug or plugs for non-armored electrical conductors or cables in riser conduits. Plugs shall have number, size, and shape of conductor gripping pieces as required to suit individual conductors or cables supported. Body shall be malleable iron.
- F. Mounting, Anchoring, and Attachment Components: Items for fastening electrical items or their supports to building surfaces include the following:
- 1. Powder-Actuated Fasteners: Threaded-steel stud, for use in hardened Portland cement concrete, steel, or wood, with tension, shear, and pullout capacities appropriate for supported loads and building materials where used.

- a. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - 1) Hilti Inc.
 - 2) ITW Ramset/Red Head; a division of Illinois Tool Works, Inc.
 - 3) MKT Fastening, LLC.
 - 4) Simpson Strong-Tie Co., Inc.; Masterset Fastening Systems Unit.
2. Mechanical-Expansion Anchors: Insert-wedge-type, zinc-coated and stainless steel, for use in hardened Portland cement concrete with tension, shear, and pullout capacities appropriate for supported loads and building materials in which used.
 - a. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - 1) Cooper B-Line, Inc.; a division of Cooper Industries.
 - 2) Empire Tool and Manufacturing Co., Inc.
 - 3) Hilti Inc.
 - 4) ITW Ramset/Red Head; a division of Illinois Tool Works, Inc.
 - 5) MKT Fastening, LLC.
3. Concrete Inserts: Steel or malleable-iron, slotted support system units similar to MSS Type 18; complying with MFMA-4 or MSS SP-58.
4. Clamps for Attachment to Steel Structural Elements: MSS SP-58, type suitable for attached structural element.
5. Through Bolts: Structural type, hex head, and high strength. Comply with ASTM A 325.
6. Toggle Bolts: All-steel springhead type.
7. Hanger Rods: Threaded steel.

2.2 FABRICATED METAL EQUIPMENT SUPPORT ASSEMBLIES

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

PART 3 - EXECUTION

3.1 APPLICATION

- A. Comply with NECA 1 and NECA 101 for application of hangers and supports for electrical equipment and systems except if requirements in this Section are stricter.

- B. Maximum Support Spacing and Minimum Hanger Rod Size for Raceway: Space supports for EMT, IMC, and RMC as required by scheduled in NECA 1, where its Table 1 lists maximum spacings less than stated in NFPA 70. Minimum rod size shall be 1/4 inch in diameter.
- C. Multiple Raceways or Cables: Install trapeze-type supports fabricated with steel slotted support system, sized so capacity can be increased by at least 25 percent in future without exceeding specified design load limits.
 - 1. Secure raceways and cables to these supports with two-bolt conduit clamps single-bolt conduit clamps single-bolt conduit clamps using spring friction action for retention in support channel.
- D. Spring-steel clamps designed for supporting single conduits without bolts may be used for 1-1/2-inch and smaller raceways serving branch circuits and communication systems above suspended ceilings and for fastening raceways to trapeze supports.

3.2 SUPPORT INSTALLATION

- A. Comply with NECA 1 and NECA 101 for installation requirements except as specified in this Article.
- B. Raceway Support Methods: In addition to methods described in NECA 1, EMT, IMC, and RMC may be supported by openings through structure members, as permitted in NFPA 70.
- C. Strength of Support Assemblies: Where not indicated, select sizes of components so strength will be adequate to carry present and future static loads within specified loading limits. Minimum static design load used for strength determination shall be weight of supported components plus 200 lb.
- D. Mounting and Anchorage of Surface-Mounted Equipment and Components: Anchor and fasten electrical items and their supports to building structural elements by the following methods unless otherwise indicated by code:
 - 1. To Wood: Fasten with lag screws or through bolts.
 - 2. To New Concrete: Bolt to concrete inserts.
 - 3. To Masonry: Approved toggle-type bolts on hollow masonry units and expansion anchor fasteners on solid masonry units.
 - 4. To Existing Concrete: Expansion anchor fasteners.
 - 5. Instead of expansion anchors, powder-actuated driven threaded studs provided with lock washers and nuts may be used in existing standard-weight concrete 4 inches thick or greater. Do not use for anchorage to lightweight-aggregate concrete or for slabs less than 4 inches thick.
- E. Drill holes for expansion anchors in concrete at locations and to depths that avoid reinforcing bars.

3.3 INSTALLATION OF FABRICATED METAL SUPPORTS

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

3.4 PAINTING

- A. Touchup: Clean field welds and abraded areas of shop paint. Paint exposed areas immediately after erecting hangers and supports. Use same materials as used for shop painting. Comply with SSPC-PA 1 requirements for touching up field-painted surfaces.
 - 1. Apply paint by brush or spray to provide minimum dry film thickness of 2.0 mils.
- B. Touchup: Comply with requirements in Division 09 painting Sections and Section "High-Performance Coatings" for cleaning and touchup painting of field welds, bolted connections, and abraded areas of shop paint on miscellaneous metal.
- C. Galvanized Surfaces: Clean welds, bolted connections, and abraded areas and apply galvanizing-repair paint to comply with ASTM A 780.

END OF SECTION 26 05 29

SECTION 26 05 33

RACEWAY 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. This Section includes raceways, fittings, boxes, enclosures, and cabinets for electrical wiring.

1.3 DEFINITIONS

- A. EMT: Electrical metallic tubing.
- B. ENT: Electrical nonmetallic tubing.
- C. EPDM: Ethylene propylene diene monomer rubber.
- D. FMC: Flexible metal conduit.
- E. IMC: Intermediate metal conduit.
- F. LFMC: Liquidtight flexible metal conduit.
- G. LFNC: Liquidtight flexible nonmetallic conduit.
- H. NBR: Acrylonitrile-butadiene rubber.
- I. RNC: Rigid nonmetallic conduit.

1.4 SUBMITTALS

- A. Product Data: For surface raceways, wireways and fittings, floor boxes, hinged-cover enclosures, and cabinets.
- B. Coordination Drawings (where required on Drawings): Conduit routing plans, drawn to scale, on which the following items are shown and coordinated with each other, based on input from installers of the items involved:
 - 1. Structural members in the paths of conduit groups with common supports.

2. HVAC and plumbing items and architectural features in the paths of conduit groups with common supports.
- C. Manufacturer Seismic Qualification Certification: Submit certification that enclosures and cabinets and their mounting provisions, including those for internal components, will withstand seismic forces defined in Division 26 Section "Vibration and Seismic Controls for Electrical Systems." Include the following:
 1. Basis for Certification: Indicate whether withstand certification is based on actual test of assembled components or on calculation.
 - a. The term "withstand" means "the cabinet or enclosure will remain in place without separation of any parts when subjected to the seismic forces specified and the unit will retain its enclosure characteristics, including its interior accessibility, after the seismic event."
 2. Dimensioned Outline Drawings of Equipment Unit: Identify center of gravity and locate and describe mounting and anchorage provisions.
 3. Detailed description of equipment anchorage devices on which the certification is based and their installation requirements.
- D. Source quality-control test reports.

1.5 QUALITY ASSURANCE

- A. 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.
- B. Comply with NFPA 70.

PART 2 - PRODUCTS

2.1 METAL CONDUIT AND TUBING

- 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. AFC Cable Systems, Inc.
 2. Alfex Inc.
 3. Allied Tube & Conduit; a Tyco International Ltd. Co.
 4. Anamet Electrical, Inc.; Anaconda Metal Hose.
 5. Electri-Flex Co.
 6. Manhattan/CDT/Cole-Flex.
 7. Maverick Tube Corporation.
 8. O-Z Gedney; a unit of General Signal.
 9. Wheatland Tube Company.

- B. Rigid Steel Conduit: ANSI C80.1.
- C. IMC: ANSI C80.6.
- D. PVC-Coated Steel Conduit: PVC-coated rigid steel conduit and IMC.
 - 1. Comply with NEMA RN 1.
 - 2. Coating Thickness: 0.040 inch, minimum.
- E. LFMC: Flexible steel conduit with PVC jacket.
- F. Fittings for Conduit (Including all Types and Flexible and Liquidtight), EMT, and Cable: NEMA FB 1; listed for type and size raceway with which used, and for application and environment in which installed.
 - 1. Conduit Fittings for Hazardous (Classified) Locations: Comply with UL 886.
 - 2. Fittings for EMT: Steel or die-cast and compression type.
 - 3. Coating for Fittings for PVC-Coated Conduit: Minimum thickness, 0.040 inch, with overlapping sleeves protecting threaded joints.
- G. Joint Compound for Rigid Steel Conduit or IMC: Listed for use in cable connector assemblies, and compounded for use to lubricate and protect threaded raceway joints from corrosion and enhance their conductivity.

2.2 METAL WIREWAYS

- 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. Cooper B-Line, Inc.
 - 2. Hoffman.
 - 3. Square D; Schneider Electric.
- B. Description: Sheet metal sized and shaped as indicated, NEMA 250, Type 3R, unless otherwise indicated.
- C. Fittings and Accessories: Include couplings, offsets, elbows, expansion joints, adapters, hold-down straps, end caps, and other fittings to match and mate with wireways as required for complete system.
- D. Wireway Covers: Hinged type, Screw-cover type, Flanged-and-gasketed type, or as indicated.
- E. Finish: Manufacturer's standard enamel finish.

2.3 BOXES, ENCLOSURES, AND CABINETS

- 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. Cooper Crouse-Hinds; Div. of Cooper Industries, Inc.
 2. EGS/Appleton Electric.
 3. Erickson Electrical Equipment Company.
 4. Hoffman.
 5. Hubbell Incorporated; Killark Electric Manufacturing Co. Division.
 6. O-Z/Gedney; a unit of General Signal.
 7. RACO; a Hubbell Company.
 8. Robroy Industries, Inc.; Enclosure Division.
 9. Scott Fetzer Co.; Adalet Division.
 10. Spring City Electrical Manufacturing Company.
 11. Thomas & Betts Corporation.
 12. Walker Systems, Inc.; Wiremold Company (The).
 13. Woodhead, Daniel Company; Woodhead Industries, Inc. Subsidiary.
- B. Cast-Metal Outlet and Device Boxes: NEMA FB 1, cast fer alloy, Type FD, with gasketed cover.
- C. Cast-Metal Access, Pull, and Junction Boxes: NEMA FB 1, galvanized cast iron with gasketed cover.
- D. Hinged-Cover Enclosures: NEMA 250, Type 3R, with continuous-hinge cover with flush latch, unless otherwise indicated.
1. Metal Enclosures: Steel, finished inside and out with manufacturer's standard enamel.
- E. Cabinets:
1. NEMA 250, Type 3R, galvanized-steel box with removable interior panel and removable front, finished inside and out with manufacturer's standard enamel.
 2. Hinged door in front cover with flush latch and concealed hinge.
 3. Key latch to match panelboards.
 4. Metal barriers to separate wiring of different systems and voltage.
 5. Accessory feet where required for freestanding equipment.

2.4 SLEEVES FOR RACEWAYS

- A. Steel Pipe Sleeves: ASTM A 53/A 53M, Type E, Grade B, Schedule 40, galvanized steel, plain ends.
- B. Cast-Iron Pipe Sleeves: Cast or fabricated "wall pipe," equivalent to ductile-iron pressure pipe, with plain ends and integral waterstop, unless otherwise indicated.
- C. Sleeves for Rectangular Openings: Galvanized sheet steel with minimum 0.052- or 0.138-inch thickness as indicated and of length to suit application.
- D. Coordinate sleeve selection and application with selection and application of firestopping specified in Division 07 Section "Penetration Firestopping."

2.5 SLEEVE SEALS

- A. Basis-of-Design Product: Subject to compliance with requirements, provide the product indicated on Drawings or a comparable product by one of the following:
1. Advance Products & Systems, Inc.
 2. Calpico, Inc.
 3. Metraflex Co.
 4. Pipeline Seal and Insulator, Inc.
- B. Description: Modular sealing device, designed for field assembly, to fill annular space between sleeve and cable.
1. Sealing Elements: EPDM interlocking links shaped to fit surface of cable or conduit. Include type and number required for material and size of raceway or cable.
 2. Pressure Plates: Stainless steel. Include two for each sealing element.
 3. Connecting Bolts and Nuts: Stainless steel of length required to secure pressure plates to sealing elements. Include one for each sealing element.

PART 3 - EXECUTION

3.1 RACEWAY APPLICATION

- A. Outdoors: Apply raceway products as specified below, unless otherwise indicated:
1. Exposed Conduit: Rigid steel conduit, IMC.
 2. Concealed Conduit, Aboveground: Rigid steel conduit, IMC.
 3. Underground Conduit: Rigid steel conduit, Type EPC-40-PVC, direct buried unless concrete encasement is indicated on Drawings.
 4. Connection to Vibrating Equipment (Including Transformers and Hydraulic, Pneumatic, Electric Solenoid, or Motor-Driven Equipment): LFMC (maximum length 5').
 5. Boxes and Enclosures, Aboveground: NEMA 250, Type 4.
- B. Comply with the following indoor applications, unless otherwise indicated. All Garage areas shall be treated as Outdoor locations.
1. Exposed, Not Subject to Severe Physical Damage: Rigid steel conduit, IMC.
 2. Exposed and Subject to Severe Physical Damage: Rigid steel conduit. Includes raceways in the following locations:
 - a. Loading dock.
 - b. Corridors used for traffic of mechanized carts, forklifts, and pallet-handling units.
 3. Concealed in Ceilings and Interior Walls and Partitions: Rigid steel conduit, IMC.
 4. Connection to Vibrating Equipment (Including Transformers and Hydraulic, Pneumatic, Electric Solenoid, or Motor-Driven Equipment): FMC, except use LFMC in damp or wet locations (maximum length 5').
 5. Damp or Wet Locations: Rigid steel conduit, IMC.

6. Boxes and Enclosures: NEMA 250, Type 1, except use NEMA 250, Type 4, stainless steel or nonmetallic in damp or wet locations.

C. Minimum Raceway Size: 3/4-inch trade size.

D. Raceway Fittings: Compatible with raceways and suitable for use and location.

1. Rigid and Intermediate Steel Conduit: Use threaded rigid steel conduit fittings, unless otherwise indicated.
2. PVC Externally Coated, Rigid Steel Conduits: Use only fittings listed for use with that material. Patch and seal all joints, nicks, and scrapes in PVC coating after installing conduits and fittings. Use sealant recommended by fitting manufacturer.

3.2 INSTALLATION

A. Comply with NECA 1 for installation requirements applicable to products specified in Part 2 except where requirements on Drawings or in this Article are stricter.

B. Keep raceways at least 6 inches away from parallel runs of flues and steam or hot-water pipes. Install horizontal raceway runs above water and steam piping.

C. Complete raceway installation before starting conductor installation.

D. Support raceways as specified in Division 26 Section "Hangers and Supports for Electrical Systems." All conduit attached to concrete surfaces shall be supported using malleable iron straps with clamp-backs.

E. Arrange stub-ups so curved portions of bends are not visible above the finished slab.

F. Install no more than the equivalent of three 90-degree bends in any conduit run except for communications conduits, for which fewer bends are allowed.

G. Raceways Embedded in Slabs:

1. Run conduit larger than 1-inch trade size, parallel or at right angles to main reinforcement. Where at right angles to reinforcement, place conduit close to slab support.
2. Arrange raceways to cross building expansion joints at right angles with expansion fittings.
3. Provide non-metallic listed sleeves for all concrete wall & floor penetrations.

H. Threaded Conduit Joints, Exposed to Wet, Damp, Corrosive, or Outdoor Conditions: Apply listed compound to threads of raceway and fittings before making up joints. Follow compound manufacturer's written instructions.

I. Raceway Terminations at Locations Subject to Moisture or Vibration: Use insulating bushings to protect conductors, including conductors smaller than No. 4 AWG.

J. Install pull wires in empty raceways. Use polypropylene or monofilament plastic line with not less than 200-lb tensile strength. Leave at least 12 inches of slack at each end of pull wire.

- K. Install raceway sealing fittings at suitable, approved, and accessible locations and fill them with listed sealing compound. For concealed raceways, install each fitting in a flush steel box with a blank cover plate having a finish similar to that of adjacent plates or surfaces. Install raceway sealing fittings at the following points:
 - 1. Where conduits pass from warm to cold locations, such as boundaries of refrigerated spaces.
 - 2. Where otherwise required by NFPA 70.
- L. Expansion-Joint Fittings for RMC and IMC: Install in each run of aboveground conduit at structural expansion joints and where otherwise required by NFPA 70. Materials shall comply with UL Standard 5148. Furnish with grounding strap and clamps. Use Crouse-Hinds Model XJ_81 or equal.
- M. Flexible Conduit Connections: Use maximum of 60 inches of flexible conduit for recessed and semi-recessed lighting fixtures, equipment subject to vibration, noise transmission, or movement; and for transformers and motors.
 - 1. Use LFMC in damp or wet locations.

3.3 SLEEVE INSTALLATION FOR ELECTRICAL PENETRATIONS

- A. Coordinate sleeve selection and application with selection and application of firestopping specified in Division 07 Section "Penetration Firestopping."
- B. Concrete Slabs and Walls: Install sleeves for penetrations unless core-drilled holes or formed openings are used. Install sleeves during erection of slabs and walls.
- C. Use pipe sleeves unless penetration arrangement requires rectangular sleeved opening.
- D. Rectangular Sleeve Minimum Metal Thickness:
 - 1. For sleeve cross-section rectangle perimeter less than 50 inches and no side greater than 16 inches, thickness shall be 0.052 inch.
 - 2. For sleeve cross-section rectangle perimeter equal to, or greater than, 50 inches and 1 or more sides equal to, or greater than, 16 inches, thickness shall be 0.138 inch.
- E. Fire-Rated Assemblies: Install sleeves for penetrations of fire-rated floor and wall assemblies unless openings compatible with firestop system used are fabricated during construction of floor or wall.
- F. Cut sleeves to length for mounting flush with both surfaces of walls.
- G. Extend sleeves installed in floors 2 inches above finished floor level.
- H. Size pipe sleeves to provide 1/4-inch annular clear space between sleeve and raceway unless sleeve seal is to be installed or unless seismic criteria require different clearance.
- I. Seal space outside of sleeves with grout for penetrations of concrete and masonry and with approved joint compound for gypsum board assemblies.

- J. Interior Penetrations of Non-Fire-Rated Walls and Floors: Seal annular space between sleeve and raceway, using joint sealant appropriate for size, depth, and location of joint. Refer to Division 07 Section "Joint Sealants" for materials and installation.
- K. Fire-Rated-Assembly Penetrations: Maintain indicated fire rating of walls, partitions, ceilings, and floors at raceway penetrations. Install sleeves and seal with firestop materials. Comply with Division 07 Section "Penetration Firestopping."
- L. Roof-Penetration Sleeves: Seal penetration of individual raceways with flexible, boot-type flashing units applied in coordination with roofing work.
- M. Aboveground, Exterior-Wall Penetrations: Seal penetrations using sleeves and mechanical sleeve seals. Select sleeve size to allow for 1-inch annular clear space between pipe and sleeve for installing mechanical sleeve seals.
- N. Underground, Exterior-Wall Penetrations: Install cast-iron "wall pipes" for sleeves. Size sleeves to allow for 1-inch annular clear space between raceway and sleeve for installing mechanical sleeve seals.

3.4 SLEEVE-SEAL INSTALLATION

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

3.5 FIRESTOPPING

- A. Apply firestopping to electrical penetrations of fire-rated floor and wall assemblies to restore original fire-resistance rating of assembly. Firestopping materials and installation requirements are specified in Division 07 Section "Penetration Firestopping."

3.6 PROTECTION

- A. Provide final protection and maintain conditions that ensure coatings, finishes, and cabinets are without damage or deterioration at time of Substantial Completion.
 - 1. Repair damage to galvanized finishes with zinc-rich paint recommended by manufacturer.
 - 2. Repair damage to PVC or paint finishes with matching touchup coating recommended by manufacturer.

END OF SECTION 260533

SECTION 26 05 48

VIBRATION AND SEISMIC CONTROLS FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes the following:
 - 1. Isolation pads.
 - 2. Spring isolators.
 - 3. Restrained spring isolators.
 - 4. Channel support systems.
 - 5. Restraint cables.
 - 6. Hanger rod stiffeners.
 - 7. Anchorage bushings and washers.
- B. Related Sections include the following:
 - 1. Section 260529 "Hangers and Supports for Electrical Systems" for commonly used electrical supports and installation requirements.

1.3 DEFINITIONS

- A. The IBC: International Building Code.
- B. ICC-ES: ICC-Evaluation Service.
- C. OSHPD: Office of Statewide Health Planning and Development for the State of California.

1.4 PERFORMANCE REQUIREMENTS

- A. Seismic-Restraint Loading:
 - 1. Site Class as Defined in the IBC: E.
 - 2. Assigned Seismic Use Group or Building Category as Defined in the IBC: III.
 - a. Component Importance Factor: 1.5.
 - b. Component Response Modification Factor: 5.5.

- c. Component Amplification Factor: 1.0.
- 3. Design Spectral Response Acceleration at Short Periods (0.2 Second).

1.5 ACTION SUBMITTALS

A. Product Data: For the following:

- 1. Include rated load, rated deflection, and overload capacity for each vibration isolation device.
- 2. Illustrate and indicate style, material, strength, fastening provision, and finish for each type and size of seismic-restraint component used.
 - a. Tabulate types and sizes of seismic restraints, complete with report numbers and rated strength in tension and shear as evaluated by an agency acceptable to authorities having jurisdiction.
 - b. Annotate to indicate application of each product submitted and compliance with requirements.
- 3. Restrained-Isolation Devices: Include ratings for horizontal, vertical, and combined loads.

B. Delegated-Design Submittal: For vibration isolation and seismic-restraint details indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

- 1. Design Calculations: Calculate static and dynamic loading due to equipment weight and operation, seismic forces required to select vibration isolators and seismic restraints.
 - a. Coordinate design calculations with wind-load calculations required for equipment mounted outdoors. Comply with requirements in other electrical Sections for equipment mounted outdoors.
- 2. Indicate materials and dimensions and identify hardware, including attachment and anchorage devices.
- 3. Field-fabricated supports.
- 4. Seismic-Restraint Details:
 - a. Design Analysis: To support selection and arrangement of seismic restraints. Include calculations of combined tensile and shear loads.
 - b. Details: Indicate fabrication and arrangement. Detail attachments of restraints to the restrained items and to the structure. Show attachment locations, methods, and spacings. Identify components, list their strengths, and indicate directions and values of forces transmitted to the structure during seismic events. Indicate association with vibration isolation devices.
 - c. Preapproval and Evaluation Documentation: By an agency acceptable to authorities having jurisdiction, showing maximum ratings of restraint items and the basis for approval (tests or calculations).

1.6 INFORMATIONAL SUBMITTALS

- A. Coordination Drawings: Show coordination of seismic bracing for electrical components with other systems and equipment in the vicinity, including other supports and seismic restraints.
- B. Qualification Data: For professional engineer and testing agency.
- C. Welding certificates.
- D. Field quality-control test reports.

1.7 QUALITY ASSURANCE

- A. Testing Agency Qualifications: An independent agency, with the experience and capability to conduct the testing indicated, that is a nationally recognized testing laboratory (NRTL) as defined by OSHA in 29 CFR 1910.7, and that is acceptable to authorities having jurisdiction.
- B. Comply with seismic-restraint requirements in the IBC unless requirements in this Section are more stringent.
- C. Welding: Qualify procedures and personnel according to AWS D1.1/D1.1M, "Structural Welding Code - Steel."
- D. Seismic-restraint devices shall have horizontal and vertical load testing and analysis and shall bear anchorage preapproval OPA number from OSHPD, preapproval by ICC-ES, or preapproval by another agency acceptable to authorities having jurisdiction, showing maximum seismic-restraint ratings. Ratings based on independent testing are preferred to ratings based on calculations. If preapproved ratings are not available, submittals based on independent testing are preferred. Calculations (including combining shear and tensile loads) to support seismic-restraint designs must be signed and sealed by a qualified professional engineer.
- E. Comply with NFPA 70.

PART 2 - PRODUCTS

2.1 VIBRATION ISOLATORS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Ace Mountings Co., Inc.
 - 2. Amber/Booth Company, Inc.
 - 3. California Dynamics Corporation.
 - 4. Isolation Technology, Inc.
 - 5. Kinetics Noise Control.
 - 6. Mason Industries.
 - 7. Vibration Eliminator Co., Inc.
 - 8. Vibration Isolation.

9. Vibration Mountings & Controls, Inc.

- B. Pads: Arrange 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 neoprene.

- C. Spring Isolators: Freestanding, laterally stable, open-spring isolators.

1. Outside Spring Diameter: Not less than 80 percent of the compressed height of the spring at rated load.
2. Minimum Additional Travel: 50 percent of the required deflection at rated load.
3. Lateral Stiffness: More than 80 percent of rated vertical stiffness.
4. Overload Capacity: Support 200 percent of rated load, fully compressed, without deformation or failure.
5. Baseplates: Factory drilled for bolting to structure and bonded to 1/4-inch thick, rubber isolator pad attached to baseplate underside. Baseplates shall limit floor load to 500 psig.
6. Top Plate and Adjustment Bolt: Threaded top plate with adjustment bolt and cap screw to fasten and level equipment.

- D. Restrained Spring Isolators: Freestanding, steel, open-spring isolators with seismic or limit-stop restraint.

1. Housing: Steel with resilient vertical-limit stops to prevent spring extension due to weight being removed; factory-drilled baseplate bonded to 1/4-inch thick, neoprene or rubber isolator pad attached to baseplate underside; and adjustable equipment mounting and leveling bolt that acts as blocking during installation.
2. Restraint: Seismic or limit-stop as required for equipment and authorities having jurisdiction.
3. Outside Spring Diameter: Not less than 80 percent of the compressed height of the spring at rated load.
4. Minimum Additional Travel: 50 percent of the required deflection at rated load.
5. Lateral Stiffness: More than 80 percent of rated vertical stiffness.
6. Overload Capacity: Support 200 percent of rated load, fully compressed, without deformation or failure.

2.2 SEISMIC-RESTRAINT DEVICES

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Amber/Booth Company, Inc.
2. California Dynamics Corporation.
3. Cooper B-Line, Inc.; a division of Cooper Industries.
4. Hilti Inc.
5. Loos & Co.; Seismic Earthquake Division.
6. Mason Industries.
7. TOLCO Incorporated; a brand of NIBCO INC.

8. Unistrut; Tyco International, Ltd.

- B. General Requirements for Restraint Components: Rated strengths, features, and application requirements shall be as defined in reports by an agency acceptable to authorities having jurisdiction.
 - 1. Structural Safety Factor: Allowable strength in tension, shear, and pullout force of components shall be at least four times the maximum seismic forces to which they will be subjected.
- C. Channel Support System: MFMA-3, shop- or field-fabricated support assembly made of slotted steel channels with accessories for attachment to braced component at one end and to building structure at the other end and other matching components and with corrosion-resistant coating; and rated in tension, compression, and torsion forces.
- D. Restraint Cables: ASTM A 603 galvanized-steel cables with end connections made of steel assemblies with thimbles, brackets, swivels, and bolts designed for restraining cable service; and with a minimum of two clamping bolts for cable engagement.
- E. Hanger Rod Stiffener: Steel tube or steel slotted-support-system sleeve with internally bolted connections to hanger rod. Do not weld stiffeners to rods.
- F. Bushings for Floor-Mounted Equipment Anchor: Neoprene bushings designed for rigid equipment mountings, and matched to type and size of anchors and studs.
- G. Bushing Assemblies for Wall-Mounted Equipment Anchorage: Assemblies of neoprene elements and steel sleeves designed for rigid equipment mountings, and matched to type and size of attachment devices.
- H. Resilient Isolation Washers and Bushings: One-piece, molded, oil- and water-resistant neoprene, with a flat washer face.
- I. Mechanical Anchor: Drilled-in and stud-wedge or female-wedge type in zinc-coated steel for interior applications and stainless steel for exterior applications. Select anchors with strength required for anchor and as tested according to ASTM E 488. Minimum length of eight times diameter.
- J. Adhesive Anchor: Drilled-in and capsule anchor system containing polyvinyl or urethane methacrylate-based resin and accelerator, or injected polymer or hybrid mortar adhesive. Provide anchor bolts and hardware with zinc-coated steel for interior applications and stainless steel for exterior applications. Select anchor bolts with strength required for anchor and as tested according to ASTM E 488.

2.3 FACTORY FINISHES

- A. Finish: Manufacturer's standard paint applied to factory-assembled and -tested equipment before shipping.
 - 1. Powder coating on springs and housings.
 - 2. All hardware shall be galvanized. Hot-dip galvanize metal components for exterior use.

3. Baked enamel or powder coat for metal components on isolators for interior use.
4. Color-code or otherwise mark vibration isolation and seismic-control devices to indicate capacity range.

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. Examine roughing-in of reinforcement and cast-in-place anchors to verify actual locations before installation.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 APPLICATIONS

- A. Multiple Raceways or Cables: Secure raceways and cables to trapeze member with clamps approved for application by an agency acceptable to authorities having jurisdiction.
- B. Hanger Rod Stiffeners: Install hanger rod stiffeners where indicated or scheduled on Drawings to receive them and where required to prevent buckling of hanger rods due to seismic forces.
- C. Strength of Support and Seismic-Restraint Assemblies: Where not indicated, select sizes of components so strength will be adequate to carry present and future static and seismic loads within specified loading limits.

3.3 SEISMIC-RESTRAINT DEVICE INSTALLATION

- A. Equipment and Hanger Restraints:
 1. Install restrained isolators on electrical equipment.
 2. Install resilient, bolt-isolation washers on equipment anchor bolts where clearance between anchor and adjacent surface exceeds 0.125 inch.
 3. Install seismic-restraint devices using methods approved by an agency acceptable to authorities having jurisdiction providing required submittals for component.
- B. Install bushing assemblies for mounting bolts for wall-mounted equipment, arranged to provide resilient media where equipment or equipment-mounting channels are attached to wall.
- C. Attachment to Structure: If specific attachment is not indicated, anchor bracing to structure at flanges of beams, at upper truss chords of bar joists, or at concrete members.
- D. Drilled-in Anchors:

1. Identify position of reinforcing steel and other embedded items prior to drilling holes for anchors. Do not damage existing reinforcing or embedded items during coring or drilling. Notify the structural engineer if reinforcing steel or other embedded items are encountered during drilling. Locate and avoid prestressed tendons, electrical and telecommunications conduit, and gas lines.
2. Do not drill holes in concrete or masonry until concrete, mortar, or grout has achieved full design strength.
3. Wedge Anchors: Protect threads from damage during anchor installation. Heavy-duty sleeve anchors shall be installed with sleeve fully engaged in the structural element to which anchor is to be fastened.
4. Adhesive Anchors: Clean holes to remove loose material and drilling dust prior to installation of adhesive. Place adhesive in holes proceeding from the bottom of the hole and progressing toward the surface in such a manner as to avoid introduction of air pockets in the adhesive.
5. Set anchors to manufacturer's recommended torque, using a torque wrench.
6. Install zinc-coated steel anchors for interior and stainless-steel anchors for exterior applications.

3.4 ACCOMMODATION OF DIFFERENTIAL SEISMIC MOTION

- A. Install flexible connections in runs of raceways, cables, wireways, cable trays, and busways where they cross seismic joints, where adjacent sections or branches are supported by different structural elements, and where they terminate with connection to equipment that is anchored to a different structural element from the one supporting them as they approach equipment.

3.5 FIELD QUALITY CONTROL

- A. Testing Agency: Engage a qualified testing agency to perform tests and inspections and prepare test reports.
- B. Perform tests and inspections.
- C. Tests and Inspections:
 1. Provide evidence of recent calibration of test equipment by a testing agency acceptable to authorities having jurisdiction.
 2. Schedule test with Owner, through Architect, before connecting anchorage device to restrained component (unless post connection testing has been approved), and with at least seven days' advance notice.
 3. Obtain Architect's approval before transmitting test loads to structure. Provide temporary load-spreading members.
 4. Test at least four of each type and size of installed anchors and fasteners selected by Architect.
 5. Test to 90 percent of rated proof load of device.
 6. Measure isolator restraint clearance.
 7. Measure isolator deflection.
 8. Verify snubber minimum clearances.

9. If a device fails test, modify all installations of same type and retest until satisfactory results are achieved.

D. Remove and replace malfunctioning units and retest as specified above.

E. Prepare test and inspection reports.

3.6 ADJUSTING

A. Adjust isolators after isolated equipment is at operating weight.

B. Adjust limit stops on restrained spring isolators to mount equipment at normal operating height. After equipment installation is complete, adjust limit stops so they are out of contact during normal operation.

C. Adjust active height of spring isolators.

D. Adjust restraints to permit free movement of equipment within normal mode of operation.

END OF SECTION 26 05 48

SECTION 26 05 53

IDENTIFICATION FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section Includes:
 - 1. Identification for raceways.
 - 2. Identification of power and control cables.
 - 3. Identification for conductors.
 - 4. Underground-line warning tape.
 - 5. Warning labels and signs.
 - 6. Instruction signs.
 - 7. Equipment identification labels.
 - 8. Miscellaneous identification products.

1.3 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.

PART 2 - PRODUCTS

2.1 POWER 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.
 - 2. Green field with no letters for tagging generator circuits.
 - 3. White field with no letters for tagging perimeter controlled circuits.
 - 4. Legend: Indicate voltage and system or service type.
- C. Self-Adhesive 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 adhesive tape for securing ends of legend label.
- D. Snap-Around Labels for Raceways Carrying Circuits at 600 V or Less: Slit, pretensioned, flexible, preprinted, color-coded acrylic sleeve, with diameter sized to suit diameter of raceway or cable it identifies and to stay in place by gripping action.
- E. Metal Tags: Brass or aluminum, 2 by 2 by 0.05 inch, with stamped legend, punched for use with self-locking cable tie fastener.
- F. Write-On Tags: Polyester tag, 0.015 inch thick, with corrosion-resistant grommet and cable tie for attachment to conductor or cable.
 - 1. Marker for Tags: Permanent, waterproof, black ink marker recommended by tag manufacturer.
 - 2. Marker for Tags: Machine-printed, permanent, waterproof, black ink marker recommended by printer manufacturer.

2.2 POWER AND CONTROL CABLE IDENTIFICATION MATERIALS

- A. Comply with ANSI A13.1 for minimum size of letters for legend and for minimum length of color field for each raceway and cable size.
- B. Self-Adhesive Vinyl Labels: Preprinted, flexible label laminated with a clear, weather- and chemical-resistant coating and matching wraparound adhesive tape for securing ends of legend label.
- C. Metal Tags: Brass or aluminum, 2 by 2 by 0.05 inch, with stamped legend, punched for use with self-locking cable tie fastener.
- D. Write-On Tags: Polyester tag, 0.015 inch thick, with corrosion-resistant grommet and cable tie for attachment to conductor or cable.
 - 1. Marker for Tags: Permanent, waterproof, black ink marker recommended by tag manufacturer.
 - 2. Marker for Tags: Machine-printed, permanent, waterproof, black ink marker recommended by printer manufacturer.
- E. Snap-Around Labels: Slit, pretensioned, flexible, preprinted, color-coded acrylic sleeve, with diameter sized to suit diameter of raceway or cable it identifies and to stay in place by gripping action.

2.3 CONDUCTOR IDENTIFICATION MATERIALS

- A. Color-Coding Conductor Tape: Colored, self-adhesive vinyl tape not less than 3 mils thick by 1 to 2 inches wide.
- B. Self-Adhesive Vinyl Labels: Preprinted, flexible label laminated with a clear, weather- and chemical-resistant coating and matching wraparound adhesive tape for securing ends of legend label.
- C. Snap-Around Labels: Slit, pretensioned, flexible, preprinted, color-coded acrylic sleeve, with diameter sized to suit diameter of raceway or cable it identifies and to stay in place by gripping action.
- D. Marker Tapes: Vinyl or vinyl-cloth, self-adhesive wraparound type, with circuit identification legend machine printed by thermal transfer or equivalent process.
- E. Write-On Tags: Polyester tag, 0.015 inch thick, with corrosion-resistant grommet and cable tie for attachment to conductor or cable.
 - 1. Marker for Tags: Permanent, waterproof, black ink marker recommended by tag manufacturer.
 - 2. Marker for Tags: Machine-printed, permanent, waterproof, black ink marker recommended by printer manufacturer.

2.4 FLOOR MARKING TAPE

- A. 2-inch wide, 5-mil pressure-sensitive vinyl tape, with black and white stripes and clear vinyl overlay.

2.5 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:

1. Detectable three-layer laminate, consisting of a printed pigmented polyolefin film, 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: 5 mils.
3. Foil Core Thickness: 0.35 mil.
4. Weight: 28 lb/1000 sq. ft.
5. 3-Inch Tensile According to ASTM D 882: 70 lbf, and 4600 psi.

2.6 WARNING LABELS AND SIGNS

- A. Comply with NFPA 70 and 29 CFR 1910.145.

- B. Self-Adhesive Warning Labels: Factory-printed, multicolor, pressure-sensitive adhesive labels, configured for display on front cover, door, or other access to equipment unless otherwise indicated.

C. 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 grommets in corners for mounting.
3. Nominal size, 7 by 10 inches.

- D. Metal-Backed, Butyrate Warning Signs:

1. Weather-resistant, nonfading, preprinted, cellulose-acetate butyrate signs with 0.0396-inch galvanized-steel backing; and with colors, legend, and size required for application.
2. 1/4-inch grommets in corners for mounting.
3. Nominal size, 10 by 14 inches.

E. 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 "

2.7 INSTRUCTION SIGNS

- A. Engraved, laminated acrylic or melamine plastic, minimum 1/16 inch thick for signs up to 20 sq. inches and 1/8 inch 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.
- B. Adhesive Film Label: Machine printed, in black, by thermal transfer or equivalent process. Minimum letter height shall be 3/8 inch.
- C. Adhesive Film Label with Clear Protective Overlay: Machine printed, in black, by thermal transfer or equivalent process. Minimum letter height shall be 3/8 inch. Overlay shall provide a weatherproof and UV-resistant seal for label.

2.8 EQUIPMENT IDENTIFICATION LABELS

- A. Adhesive Film Label: Machine printed, in black, by thermal transfer or equivalent process. Minimum letter height shall be 3/8 inch.
- B. Adhesive Film Label with Clear Protective Overlay: Machine printed, in black, by thermal transfer or equivalent process. Minimum letter height shall be 3/8 inch. Overlay shall provide a weatherproof and UV-resistant seal for label.
- C. Self-Adhesive, Engraved, Laminated Acrylic or Melamine Label: Adhesive backed, with white letters on a dark-gray background. Minimum letter height shall be 3/8 inch.
- D. 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.
- E. Stenciled Legend: In nonfading, waterproof, black ink or paint. Minimum letter height shall be 1 inch.

2.9 CABLE TIES

- A. General-Purpose Cable Ties: Fungus inert, self extinguishing, one piece, self locking, Type 6/6 nylon.
 - 1. Minimum Width: 3/16 inch.
 - 2. Tensile Strength at 73 deg F, According to ASTM D 638: 12,000 psi.
 - 3. Temperature Range: Minus 40 to plus 185 deg F.
 - 4. Color: Black except where used for color-coding.
- B. UV-Stabilized Cable Ties: Fungus inert, designed for continuous exposure to exterior sunlight, self extinguishing, one piece, self locking, Type 6/6 nylon.
 - 1. Minimum Width: 3/16 inch.
 - 2. Tensile Strength at 73 deg F, According to ASTM D 638: 12,000 psi.
 - 3. Temperature Range: Minus 40 to plus 185 deg F.
 - 4. Color: Black.
- C. Plenum-Rated Cable Ties: Self extinguishing, UV stabilized, one piece, self locking.
 - 1. Minimum Width: 3/16 inch.
 - 2. Tensile Strength at 73 deg F, According to ASTM D 638: 7000 psi.
 - 3. UL 94 Flame Rating: 94V-0.
 - 4. Temperature Range: Minus 50 to plus 284 deg F.
 - 5. Color: Black.

2.10 MISCELLANEOUS IDENTIFICATION PRODUCTS

- A. Paint: Comply with requirements in Division 09 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 that are not self-adhesive type with mechanical fasteners appropriate to the location and substrate.
- F. 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 maximum intervals in straight runs, and at 25-foot maximum intervals in congested areas. Locate bands for garage fixture circuit identification adjacent to the fixture and visible from the deck.
- G. Aluminum Wraparound Marker Labels and Metal Tags: Secure tight to surface of conductor or cable at a location with high visibility and accessibility.
- H. Cable Ties: For attaching tags. Use general-purpose type, except as listed below:
 - 1. Outdoors: UV-stabilized nylon.
- I. Underground-Line Warning Tape: During backfilling of trenches install continuous underground-line warning tape directly above line at 6 to 8 inches below finished grade. Use multiple tapes where width of multiple lines installed in a common trench or concrete envelope exceeds 16 inches overall.
- J. Painted Identification: Comply with requirements in Division 09 painting Sections for surface preparation and paint application.

3.2 IDENTIFICATION SCHEDULE

- A. Auxiliary Electrical Systems Conductor Identification: Identify the covers of each junction and pull box of the following systems with self-adhesive vinyl labels with the system name:
 - 1. Fire Alarm.
 - 2. Optical Fiber.
- B. Power-Circuit Conductor Identification, 600 V or Less: For conductors in vaults, pull and junction boxes, manholes, and handholes, 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.
 - c. Colors for 480/277-V Circuits:
 - 1) Phase A: Brown.

- 2) Phase B: Orange.
 - 3) Phase C: Yellow.
- d. Field-Applied, Color-Coding Conductor Tape: Apply in half-lapped turns for a minimum distance of 6 inches 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. Conductors to Be Extended in the Future: Attach marker tape to conductors and list source.
- E. Auxiliary Electrical Systems Conductor Identification: Identify field-installed alarm, control, and signal connections.
1. Identify conductors, cables, and terminals in enclosures and at junctions, terminals, and pull points. Identify by system and circuit designation.
 2. Use system of marker tape designations that is uniform and consistent with system used by manufacturer for factory-installed connections.
 3. Coordinate identification with Project Drawings, manufacturer's wiring diagrams, and the Operation and Maintenance Manual.
- F. 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 direct-buried cables, ductbanks and cables in raceway.
- G. Workspace Indication: Install floor marking tape to show working clearances in the direction of access to live parts. Workspace shall be as required by NFPA 70 and 29 CFR 1926.403 unless otherwise indicated. Do not install at panelboards and similar equipment in finished spaces.
- H. Warning Labels for Indoor Cabinets, Boxes, and Enclosures for Power and Lighting: Self-adhesive warning labels.
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. Power transfer switches.
 - b. Controls with external control power connections.
- I. 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.
- J. 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: Adhesive film label. Unless otherwise indicated, provide a single line of text with 1/2-inch high letters on 1-1/2-inch high label; where two lines of text are required, use labels 2 inches high.
- b. Outdoor Equipment: Engraved, laminated acrylic or melamine label 4 inches high.
- 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. Transformers: Label that includes tag designation shown on Drawings for the transformer, feeder, and panelboards or equipment supplied by the secondary.
- e. Emergency system boxes and enclosures.
- f. Motor-control centers.
- g. Enclosed switches.
- h. Contactors.
- i. Battery-inverter units.

END OF SECTION 26 05 53

SECTION 26 28 16

ENCLOSED SWITCHES AND CIRCUIT BREAKERS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

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

1.3 DEFINITIONS

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

1.4 PERFORMANCE REQUIREMENTS

- A. Seismic Performance: Enclosed switches and circuit breakers shall withstand the effects of earthquake motions determined according to ASCE/SEI 7.
 - 1. The term "withstand" means "the unit will remain in place without separation of any parts from the device when subjected to the seismic forces specified and the unit will be fully operational after the seismic event."

1.5 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. Include plans, elevations, sections, details, and attachments to other work.
- C. Seismic Qualification Certificates: For enclosed switches and circuit breakers, accessories, and components, from manufacturer.
1. Basis for Certification: Indicate whether withstand certification is based on actual test of assembled components or on calculation.
 2. Dimensioned Outline Drawings of Equipment Unit: Identify center of gravity and locate and describe mounting and anchorage provisions.
 3. Detailed description of equipment anchorage devices on which the certification is based and their installation requirements.
- D. 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.
- E. Operation and Maintenance Data: For enclosed switches and circuit breakers to include in emergency, operation, and maintenance manuals. In addition to items specified in Division 01 Section "Operation and Maintenance Data," include the following:
1. Manufacturer's written instructions for testing and adjusting enclosed switches and circuit breakers.

1.6 QUALITY ASSURANCE

- A. Source Limitations: Obtain enclosed switches and circuit breakers, overcurrent protective devices, components, and accessories, within same product category, from single source from single manufacturer.
- B. Product Selection for Restricted Space: Drawings indicate maximum dimensions for enclosed switches and circuit breakers, including clearances between enclosures, and adjacent surfaces and other items. Comply with indicated maximum dimensions.
- C. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- D. Comply with NFPA 70.

1.7 PROJECT CONDITIONS

- A. Environmental Limitations: Rate equipment for continuous operation under the following conditions unless otherwise indicated:
 - 1. Ambient Temperature: Not less than minus 22 deg F and not exceeding 104 deg F.
 - 2. Altitude: Not exceeding 6600 feet.
- B. Interruption of Existing Electric Service: Do not interrupt electric service to facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary electric service according to requirements indicated:
 - 1. Notify Architect and Owner no fewer than seven (7) days in advance of proposed interruption of electric service.
 - 2. Indicate method of providing temporary electric service.
 - 3. Do not proceed with interruption of electric service without Architect's written permission.
 - 4. Comply with NFPA 70E.

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.

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. 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.

PART 2 - PRODUCTS

2.1 FUSIBLE SWITCHES

- A. Basis-of-Design Product: Subject to compliance with requirements, provide product indicated on Drawings 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.
 - 4. Square D; a brand of Schneider Electric.

- B. Type HD, Heavy Duty, Single Throw, 240-V ac, 1200 A and Smaller: UL 98 and NEMA KS 1, horsepower rated, with clips or bolt pads to accommodate specified 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 and aluminum ground conductors.
 - 2. Neutral Kit: Internally mounted; insulated, capable of being grounded and bonded; labeled for copper and aluminum neutral conductors.
 - 3. Isolated Ground Kit: Internally mounted; insulated, capable of being grounded and bonded; labeled for copper and aluminum neutral conductors.
 - 4. Class R Fuse Kit: Provides rejection of other fuse types when Class R fuses are specified.
 - 5. Lugs: Mechanical and/or Compression type, suitable for number, size, and conductor material.
 - 6. Service-Rated Switches: Labeled for use as service equipment.
 - 7. Elevator Disconnect Switches: Auxiliary contact accessory for disconnect of battery backup system.

2.2 NONFUSIBLE SWITCHES

- A. Basis-of-Design Product: Subject to compliance with requirements, provide product indicated on Drawings 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.
 - 4. Square D; a brand of Schneider Electric.
- B. Type HD, Heavy Duty, Single Throw, 240-V ac, 1200 A and Smaller: UL 98 and NEMA KS 1, horsepower rated, lockable handle with capability to accept three padlocks, and interlocked with cover in closed position.
- C. Accessories:
 - 1. Equipment Ground Kit: Internally mounted and labeled for copper and aluminum ground conductors.
 - 2. Neutral Kit: Internally mounted; insulated, capable of being grounded and bonded; labeled for copper and aluminum neutral conductors.
 - 3. Isolated Ground Kit: Internally mounted; insulated, capable of being grounded and bonded; labeled for copper and aluminum neutral conductors.
 - 4. Lugs: Mechanical and/or Compression type, suitable for number, size, and conductor material.

2.3 MOLDED-CASE CIRCUIT BREAKERS

- A. Basis-of-Design Product: Subject to compliance with requirements, provide product indicated on Drawings 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.
 4. Square D; a brand of Schneider Electric.
- B. General Requirements: Comply with UL 489, NEMA AB 1, and NEMA AB 3, with interrupting capacity to comply with available fault currents.
- C. Thermal-Magnetic Circuit Breakers: Inverse time-current element for low-level overloads and instantaneous magnetic trip element for short circuits. Adjustable magnetic trip setting for circuit-breaker frame sizes 250 A and larger.
- D. Ground-Fault, Circuit-Interrupter (GFCI) Circuit Breakers: Single- and two-pole configurations with Class A ground-fault protection (6-mA trip).
- E. Features and Accessories:
1. Standard frame sizes, trip ratings, and number of poles.
 2. Lugs: Mechanical and/or Compression type, suitable for number, size, trip ratings, and conductor material.
 3. Application Listing: Appropriate for application;
 4. Ground-Fault Protection: Comply with UL 1053; remote-mounted and powered type with mechanical ground-fault indicator; relay with adjustable pickup and time-delay settings, push-to-test feature, internal memory, and shunt trip unit; and three-phase, zero-sequence current transformer/sensor.
 5. Shunt Trip: Trip coil energized from separate circuit, with coil-clearing contact.
 6. Elevator Main Power Breakers: Auxiliary contact accessory for disconnect of battery backup system.

2.4 MOLDED-CASE SWITCHES

- A. Basis-of-Design Product: Subject to compliance with requirements, provide product indicated on Drawings 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.
 4. Square D; a brand of Schneider Electric.
- B. General Requirements: MCCB with fixed, high-set instantaneous trip only, and short-circuit withstand rating equal to equivalent breaker frame size interrupting rating.
- C. Features and Accessories:
1. Standard frame sizes and number of poles.
 2. Lugs: Mechanical and/or Compression type, suitable for number, size, trip ratings, and conductor material.
 3. Ground-Fault Protection: Comply with UL 1053; remote-mounted and powered type with mechanical ground-fault indicator; relay with adjustable pickup and time-delay

settings, push-to-test feature, internal memory, and shunt trip unit; and three-phase, zero-sequence current transformer/sensor.

4. Shunt Trip: Trip coil energized from separate circuit, with coil-clearing contact.

2.5 ENCLOSURES

- A. Enclosed Switches and Circuit Breakers: NEMA AB 1, NEMA KS 1, NEMA 250, and UL 50, to comply with environmental conditions at installed location.
 1. Indoor, Dry and Clean Locations: NEMA 250, Type 1.
 2. Outdoor Locations: NEMA 250, Type 3R.
 3. Kitchen and/or Wash-Down Areas: NEMA 250, Type 4X.
 4. Other Wet or Damp, Indoor Locations: NEMA 250, Type 4.
 5. Indoor Locations Subject to Dust, Falling Dirt, and Dripping Noncorrosive Liquids: NEMA 250, Type 12.
 6. Hazardous Areas Indicated on Drawings: NEMA 250, Type 9.

PART 3 - EXECUTION

3.1 EXAMINATION

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

3.2 INSTALLATION

- A. Install individual wall-mounted switches and circuit breakers with tops at uniform height unless otherwise indicated.
- B. Comply with mounting and anchoring requirements specified in Division 26 Section "Vibration and Seismic Controls for Electrical Systems."
- C. Temporary Lifting Provisions: Remove temporary lifting eyes, channels, and brackets and temporary blocking of moving parts from enclosures and components.
- D. Install fuses in fusible devices.
- E. Comply with NECA 1.

3.3 IDENTIFICATION

- A. Comply with requirements in Division 26 Section "Identification for Electrical Systems."

1. Identify field-installed conductors, interconnecting wiring, and components; provide warning signs.
2. When switch is not mounted to equipment served, label enclosure with engraved metal or laminated-plastic nameplate listed equipment served.
3. Identify all switches with associated panel and branch circuit number.

3.4 FIELD QUALITY CONTROL

A. Acceptance Testing Preparation:

1. Test insulation resistance for each enclosed switch and circuit breaker, component, connecting supply, feeder, and control circuit.
2. Test continuity of each circuit.

B. Tests and Inspections:

1. Perform each visual and mechanical inspection and electrical test stated in NETA Acceptance Testing Specification. Certify compliance with test parameters.
2. Correct malfunctioning units on-site, where possible, and retest to demonstrate compliance; otherwise, replace with new units and retest.
3. Test and adjust controls, remote monitoring, and safeties. Replace damaged and malfunctioning controls and equipment.

C. Enclosed switches and circuit breakers will be considered defective if they do not pass tests and inspections.

D. Prepare test and inspection reports, including a certified report that identifies enclosed switches and circuit breakers and that describes scanning results. Include notation of deficiencies detected, remedial action taken, and observations after remedial action.

3.5 ADJUSTING

- A. Adjust moving parts and operable components to function smoothly, and lubricate as recommended by manufacturer.
- B. Set field-adjustable circuit-breaker trip ranges as specified in Division 26 Section "Overcurrent Protective Device Coordination Study".

END OF SECTION 26 28 16

SECTION 26 51 19

LED INTERIOR LIGHTING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section Includes:
 - 1. Interior solid-state luminaires that use LED technology.
 - 2. Lighting fixture supports.

1.3 DEFINITIONS

- A. CCT: Correlated color temperature.
- B. CRI: Color Rendering Index.
- C. Fixture: See "Luminaire."
- D. IP: International Protection or Ingress Protection Rating.
- E. LED: Light-emitting diode.
- F. Lumen: Measured output of lamp and luminaire, or both.
- G. Luminaire: Complete lighting unit, including lamp, reflector, and housing.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product.
 - 1. Arrange in order of luminaire designation.
 - 2. Include data on features, accessories, and finishes.
 - 3. Include physical description and dimensions of luminaires.
 - 4. Include emergency lighting units, including batteries and chargers.
 - 5. Include life, output (lumens, CCT, and CRI), and energy efficiency data.
 - 6. Photometric data and adjustment factors based on laboratory tests, complying with IESNA Lighting Measurements Testing and Calculation Guides, of each lighting fixture

type. The adjustment factors shall be for lamps and accessories identical to those indicated for the lighting fixture as applied in this Project IES LM-79 and IES LM-80.

- a. Manufacturers' Certified Data: Photometric data certified by manufacturer's laboratory with a current accreditation under the National Voluntary Laboratory Accreditation Program for Energy Efficient Lighting Products.
- b. Testing Agency Certified Data: For indicated luminaires, photometric data certified by a qualified independent testing agency. Photometric data for remaining luminaires shall be certified by manufacturer.

B. Shop Drawings: For nonstandard or custom luminaires.

1. Include plans, elevations, sections, and mounting and attachment details.
2. Include details of luminaire assemblies. Indicate dimensions, weights, loads, required clearances, method of field assembly, components, and location and size of each field connection.
3. Include diagrams for power, signal, and control wiring.

C. For luminaires and lamps ref to Product Schedule: Shipping carton / box designation to be clearly marked with same designations as indicated on Drawings.

1.5 INFORMATIONAL SUBMITTALS

A. 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 luminaires.

B. Qualification Data: For testing laboratory providing photometric data for luminaires.

C. Seismic Qualification Certificates: For luminaires, accessories, and components, from manufacturer.

1. Basis for Certification: Indicate whether withstand certification is based on actual test of assembled components or on calculation.
2. Dimensioned Outline Drawings of Equipment Unit: Identify center of gravity and locate and describe mounting and anchorage provisions.

D. Detailed description of equipment anchorage devices on which the certification is based and their installation requirements.

E. Product Certificates: For each type of luminaire.

F. Product Test Reports: For each luminaire, for tests performed by manufacturer and witnessed by a qualified testing agency.

G. Sample warranty.

1.6 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data: For luminaires and lighting systems to include in operation and maintenance manuals.
 - 1. Provide a list of all lamp types used on Project; use ANSI and / or manufacturers' model numbers.

1.7 QUALITY ASSURANCE

- A. Luminaire Photometric Data Testing Laboratory Qualifications: Provided by an independent agency, with the experience and capability to conduct the testing indicated, that is an NRTL as defined by OSHA in 29 CFR 1910.7, accredited under the NVLAP for Energy Efficient Lighting Products, and complying with the applicable IES testing standards.
- B. Provide luminaires from a single manufacturer for each luminaire type.
- C. Each luminaire type shall be binned within a three-step MacAdam Ellipse to ensure color consistency among luminaires.

1.8 DELIVERY, STORAGE, AND HANDLING

- A. Protect finishes of exposed surfaces by applying a strippable, temporary protective covering before shipping.

1.9 WARRANTY

- A. Warranty: Manufacturer and Installer agree to repair or replace components of luminaires that fail in materials or workmanship within specified warranty period.
- B. Warranty Period: Five year(s) from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Seismic Performance: Luminaires shall withstand the effects of earthquake motions determined according to ASCE/SEI 7.

2.2 LUMINAIRE REQUIREMENTS

- 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. NRTL Compliance: Luminaires for hazardous locations shall be listed and labeled for indicated class and division of hazard by an NRTL.
- C. FM Global Compliance: Luminaires for hazardous locations shall be listed and labeled for indicated class and division of hazard by FM Global.
- D. Recessed Fixtures: Comply with NEMA LE 4.
- E. Bulb shape complying with ANSI C79.1.
- F. Lamp base complying with ANSI C81.61 (where applicable).
- G. CRI of minimum 80. CCT of 4000K unless otherwise listed in schedule.
- H. Rated lamp life of 50,000 hours.
- I. Lamps dimmable from 100 percent to 10 percent of maximum light output unless otherwise listed in schedule.
- J. Internal driver.
- K. Nominal Operating Voltage: 120-277 VAC.
 - 1. Lens Thickness: At least 0.125 inch minimum unless otherwise indicated.
- L. Housings:
 - 1. Extruded-aluminum or aluminum housing and heat sink.
 - 2. Finish approval by architect.
- M. Manufacturer – Base of Design
 - 1. See fixture schedule

2.3 MATERIALS

- A. Metal Parts:
 - 1. Free of burrs and sharp corners and edges.
 - 2. Sheet metal components shall be steel unless otherwise indicated.
 - 3. Form and support to prevent warping and sagging.
- B. 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.
- C. Diffusers and Globes:

1. Acrylic Diffusers: One hundred percent virgin acrylic plastic, with high resistance to yellowing and other changes due to aging, exposure to heat, and UV radiation.
2. Glass: Annealed crystal glass unless otherwise indicated.
3. Lens Thickness: At least 0.125 inch minimum unless otherwise indicated.

D. Housings:

1. Extruded-aluminum or aluminum housing and heat sink.
2. Powder-coat finish.

E. Factory-Applied Labels: Comply with UL 1598. Include recommended lamps. Locate labels 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 characteristics:
 - a. "USE ONLY" and include specific lamp type.
 - b. Lamp diameter, shape, size, wattage, and coating.
 - c. CCT and CRI for all luminaires.

2.4 METAL FINISHES

- A. Variations in finishes are unacceptable in the same piece. Variations in finishes of adjoining components are acceptable if they are within the range of approved Samples and if they can be and are assembled or installed to minimize contrast.

2.5 LUMINAIRE FIXTURE SUPPORT COMPONENTS

- A. Comply with requirements in Section 260529 "Hangers and Supports for Electrical Systems" for channel and angle iron supports and nonmetallic channel and angle supports.
- B. Single-Stem Hangers: 1/2-inch steel tubing with swivel ball fittings and ceiling canopy. Finish same as luminaire.
- C. Wires: ASTM A 641/A 641 M, Class 3, soft temper, zinc-coated steel, 12 gage.
- D. Rod Hangers: 3/16-inch minimum diameter, cadmium-plated, threaded steel rod.
- E. Hook Hangers: Integrated assembly matched to luminaire, line voltage, and equipment with threaded attachment, cord, and locking-type plug.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

- B. Examine roughing-in for luminaire to verify actual locations of luminaire and electrical connections before fixture installation. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 TEMPORARY LIGHTING

- A. If approved by the Architect, use selected permanent luminaires for temporary lighting. When construction is sufficiently complete, clean luminaires used for temporary lighting and install new lamps.

3.3 INSTALLATION

- A. Comply with NECA 1.
- B. Install luminaires level, plumb, and square with ceilings and walls unless otherwise indicated.
- C. Install lamps in each luminaire.
- D. Supports:
 - 1. Sized and rated for luminaire weight.
 - 2. Able to maintain luminaire position after cleaning and relamping.
 - 3. Provide support for luminaire without causing deflection of ceiling or wall.
 - 4. Luminaire mounting devices shall be capable of supporting a horizontal force of 125 percent of luminaire weight and vertical force of 400 percent of luminaire weight.
- E. Flush-Mounted Luminaire Support:
 - 1. Secured to outlet box.
 - 2. Attached to ceiling structural members at four points equally spaced around circumference of luminaire.
 - 3. Trim ring flush with finished surface.
- F. Wall-Mounted Luminaire Support:
 - 1. Attached to structural members in walls or bracing detail if shown on drawings.
 - 2. Do not attach luminaires directly to gypsum board.

3.4 IDENTIFICATION

- A. Identify system components, wiring, cabling, and terminals. Comply with requirements for identification specified in Section 260553 "Identification for Electrical Systems."

3.5 FIELD QUALITY CONTROL

- A. Perform the following tests and inspections:

1. Operational Test: After installing luminaires, switches, and accessories, and after electrical circuitry has been energized, test units to confirm proper operation.
 2. Test for Emergency Lighting: Interrupt power supply to demonstrate proper operation. Verify transfer from normal power to battery power and retransfer to normal.
- B. Luminaire will be considered defective if it does not pass operation tests and inspections.
- C. Prepare test and inspection reports.

3.6 ADJUSTING

- A. Occupancy Adjustments: When requested within 12 months of date of Substantial Completion, provide on-site assistance in adjusting the direction of aim of luminaires to suit occupied conditions. Make up to two visits to Project during other-than-normal hours for this purpose. Some of this work may be required during hours of darkness.
1. During adjustment visits, inspect all luminaires. Replace lamps or luminaires that are defective.
 2. Parts and supplies shall be manufacturer's authorized replacement parts and supplies.
 3. Adjust the aim of luminaires in the presence of the Architect.

END OF SECTION 26 51 19

